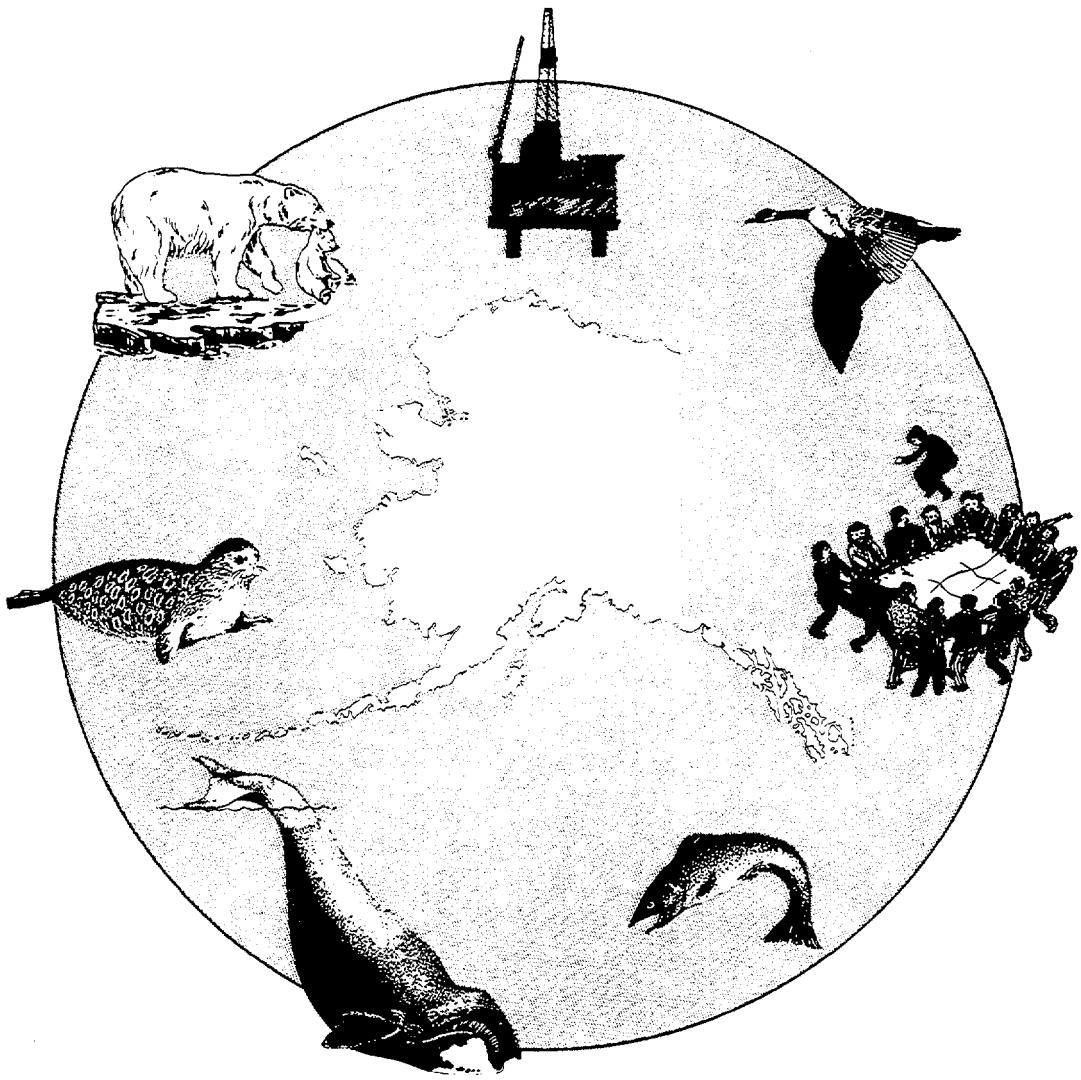
OCS Study
MMS 93-0035

Social Indicators Study of Alaskan Coastal Villages

II. Research Methodology: Design, Sampling, Reliability, and Validity



U.S. Department of the Interior
Minerals Management Service
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OCS Study
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Social Indicators Study of Alaskan Coastal Villages

II. Research Methodology

Design, Sampling, Reliability,

and Validity

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Submitted by:

Human Relations Area Files, Inc.

Principal Investigator
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June 1993

Alaska OCS Environmental Studies Program

Social Indicators Study of Alaskan Coastal Villages
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Prepared by Joseph Jorgensen, the principal investigator and project manager. The author appreciates the efforts of the Minerals Management Service technical editors in Anchorage who helped edit this report.

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PART ONE: VALIDITY AND THE RESEARCH DESIGN

CHAPTER 1
INTRODUCTION

In late 1986, the Minerals Management Service (MMS) awarded a contract to Joseph G. Jorgensen, as principal investigator, through the Human Relations Area Files, Inc. (HRAF), for the analysis of contemporary life in 30 Alaskan villages located among seven ANCSA[1] Native regions from Kodiak Island to the North Slope. The MMS requested that special attention be paid to distinguishing differences, if they existed, among ANCSA regions, between Native and non-Native residents (ethnicity/race), between villages that possessed well-developed infrastructures and superstructures and those that did not, and between Outer Continental Shelf (OCS) oil-related activities and other activities that might affect village organizations and life within villages. The 30 villages in the original sample were selected to provide contrasts along each of these dimensions.

The contract called for developing two separate Social Indicator systems that periodically can be used to monitor the social conditions of Alaska's rural communities. Each system shall be composed of variables that are sensitive to political and economic changes occurring in rural Alaska and shall provide valid longitudinal measures of the consequences of those changes. One system was to be based on a questionnaire and was

[1] The ANCSA represents the initial letters of the Alaska Native Claims Settlement Act of 1971 (amended in 1988 [PL 100-241]). This act created 13 ANCSA regions, 12 of which received lsnd bases in Alaska. The 13th did not have a land base. It was possible for Alaska Natives residing outside Alaska to receive shares in the 13th, or in any of the other twelve regions. The key feature of all regions is their corporate nature. Regional for-profit corporations are mandated by ANCSA, which provided regional corporations a continuous geographic land base, about half of which was transferred to village for-profit corporations with smaller portions conveyed to cities. Regional for-profit corporations retain subsurface rights to all land originally granted them through provisions in ANCSA. The villages within a region are located with the continuous geographic area that comprises a region. In some instances, regional populations are relatively homogeneous, speaking ordy one or two dialects of the same language (such as the Northwest Alaskan Native Association [NANA]). In other instances, language, history and environmental differences are considerable (such as among the villages in the Bering Straita Regional Corporation [BSRC]). ANCSA regions are political-historical artifacts.

administered by questionnaire investigators (or questionnaire interviewers) (QI is the abbreviation for both terms.). The other was to be based on a protocol administered by key investigators (or key interviewers) (KI is the abbreviation for both terms.).

Each of the methodologies possessed unique strengths and was to produce a unique data set. Unavoidably, each method also had inherent weaknesses. A third, less formal method, comprising anthropological observations, informed the two formal methodologies and facilitated interpretation.[2] The multimethod and multidata-set design is structured so that the strength of each formal method compensates for the weakness of the other method, and the informal method allows for close analysis of the construct validity of items in each formal method.

The questionnaire, referred to by MMS as AOSIS (Alaska OCS Social Indicators System) was prepared by Stephen Braund and Associates and pretested among 86 Native informants resident in nine villages in 1985 (Braund, Kruse and Andrews 1985:94, 135, 146-147). "Repeated tests and retests ultimately involved six drafts of the [AOSIS] questionnaire" (Braund, Kruse and Andrews 1985:146).

In developing the request for proposals (RFP), MMS staff, in coordination with John Kruse of the Braund, Kruse and Andrews team, sought Office of Management of

[2]Traditional anthropological observations are discussed below. This method includes focused discussions using an institutional protocol with prominent persons in villages (elected leaders, persons appointed to public offices of all kinds, religious leadera, school teachers, business persons); having conversations with persons; collecting prices for goods and services; mapping the houses and other structures in rhe village; attending and observing village activities; and reviewing histories, ethnographies, and public records about the village. A copy of the Institutional Protocol appears in the Appendix. The interviews with prominent persons were seldom hasty, allowing for open exchange of information. We used protocols in a second, more systematic fashion for many of the same reasons that we employed them among prominent persons-to gain greeter depth of understanding. After selecting informants and administering questionnaires to them, we next selected at random 30 percent of the persons who responded to the questionnaire to respond to our Key Informant Protocol (KIP). Responses to these questions were not "forced choices. " They allowed depth of understanding, which facilitated interpretation of questionnaire responses (see the Appendix). Throughout this report, we often refer to "QI respondents" or "QI informants" and "KI respondents" or "KI informants. " These references are to the persona who comprise the study's subjects. The QI respondents are the respondents who were administered AOSIS questionnaires by questionnaire interviewera. The KI respondents are persons who were administered KIP's by key interviewers. We identify these persons by I for interviewee, RI for reinterviewee, or R for respondent.

Budget (OMB) approval to administer the AOSIS questionnaire to a large sample of respondents among the seven regions in the study area. This OMB approval was required by provisions of the Paperwork Reduction Act of 1977 (see the guidelines created by OMB in 5 CFR 1320.6).

The OMB granted approval but stipulated that approval would be granted for only 1 year of research. At the end of the first field research year, OMB required the submission of a report that analyzed the validity and sensitivity of each item in the AOSIS questionnaire. Although Braund and his associates thought that the questionnaire was a valid instrument, OMB staff, including a statistician, was skeptical that the instrument invaded sensitive areas of personal lives and that many questions suffered from threats to construct validity. The questionnaire items had to pass the validity and sensitivity tests before a second wave of research was to be allowed.

Assuming that threats to item validity could be solved and that sensitivity issues could be answered such that a second year of field research could be undertaken, at the conclusion of the second research period, OMB required a second report that assessed the validity of the sampling design. If the sampling design proved to work as the design proposed, then OMB would grant permission to complete the 4-year research project.

Thus, the AOSIS questionnaire instrument and the sampling design, which was proposed to reduce threats to internal and external validity, raised doubts for some OMB staff; and the work burden on the research team increased considerably.

At the onset of the project, the AOSIS questionnaire posed 326 questions comprising a mixture of forced-choice and open-ended items. Throughout this report, it

is referred to as the AOSIS instrument, the AOSIS questionnaire, or as the QI instrument.

Under the contract and its subsequent modifications--which added 2 regions, 10 villages, and 360 QI respondents--the AOSIS instrument was administered to 1,870 individuals residing in 40 rural Alaskan communities over a 5-year period (1987-1991)?

The 1,870 administrations of the questionnaire do not represent 1,870 different people. Rather, the interviews are divided into initial interviews and reinterviews. And the initial interviews are divided into "pretest" and "posttest." By special features of the research design, 1,426 persons received initial interviews over the life of the study; and 364 persons were reinterviewed on one, two, or three occasions in subsequent years for a total of 580 reinterviews. If all persons reinterviewed in the first wave of reinterviewing (364) had been reinterviewed in a second wave, the total reinterviews would be 728. Only 580 reinterviews were administered because of the attrition of 22 respondents from the second wave of one reinterview panel (A), and 8 respondents from another (B). Three reinterview panels comprising respondents whose villages were directly affected by the Exxon Valdez oil spill were created. Because of time and money constraints, the largest panel comprising respondents from all sample villages in the affected area was interviewed a few months after the spill in 1989 and reinterviewed only once (in the winter of 1991) (95*N*).[4] One small Kodiak sample whose respondents reside in Kodiak

[3]The Solomon Four Group Design developed and implemented in this project is addressed in Chapter 2.

[4]The reinterview panel referred to here was drawn from a schedule crested in 1989 that incorporated villages affected by the Exxon Valdez oil spill of March 24, 1989. These respondents and the villages in which they resided had not been incorporated in the original study. There was neither time nor resources to administer a third wave (second reinterview) of questionnaires to these respondents or to draw a postteat sample of initial interviewees.

City, Karluk, and Old Harbor was interviewed in 1990 and reinterviewed in 1991. And a second small sample (18*N*) of Kodiak City and Old Harbor respondents is the sole panel for which measures of prespill (two waves) and postspill (two-waves) responses are available (1988, 1989W, 1989S, and 1991).

One large group of initial interviews, referred to as a pretest sample, was administered in 1987 to 342 residents in 21 villages located in four Native regions (NANA, North Slope, Calista, and Aleutian Pribilofs). A second major group of initial interviews, also a pretest sample, was administered in 1988 to 206 residents in 10 villages located in the Kodiak, Bering Straits, and Bristol Bay regions. A third major group of initial interviews, again a pretest sample, was administered in the summer of 1989 to 354 residents in 8 villages located in the Exxon Valdez spill area (Prince William Sound, Cook Inlet, the Alaska Peninsula, and Kodiak Island) and two villages in adjacent control areas (Aleutian Islands and the interior of the Bristol Bay drainage). Although this last sample was drawn and interviewed after the spill, it is a pretest sample in our design. The 1987 pretest sample is referred to as "Schedule A," the 1988 pretest sample as "Schedule B," and the 1989 pretest sample as "Schedule C."

Posttest interviewing without replacement was required by our research design. These initial interviews--that is, interviews administered to persons in the sample villages who had not been interviewed previously--were conducted in Schedule A and Schedule B villages (see footnote 3). In 1989, 168 respondents in Schedule A villages were interviewed. In 1990, 144 respondents in Schedule B villages were interviewed.

Although the QI sample households in each sample village were drawn at random from a list of all occupied households in that village, the individual respondents (R) selected to represent each household were selected by objective stratification criteria in the study design (over 18 years of age, alternating male and female in each successive interview).

The second Social Indicator system was to be built upon a Key Informant Protocol (KIP) instrument. At the outset of the project, KIP comprised 58 open-ended questions that were administered face-to-face. The protocol was administered to an aggregate 585 initial respondents in the Schedule A, Schedule B, and Schedule C samples. The reinterviews that were conducted among 186 of these respondents represented all schedules including post-spill waves among villages presumed to be directly affected by the Exxon Valdez oil spill (parts of the previously interviewed A and B KIP samples).

The KIP samples for the A, B, and C schedules were drawn as follows: 30 percent random samples of respondents were drawn from individuals previously selected for the initial pretest interviews of the AOSIS instrument for the A and B schedules (112 KI respondents in the Schedule A sample, and 60 respondents in the Schedule B sample). As we made ready to study the villages in the spill area following the foundering of the Exxon Valdez, we were uncertain about many topics that should be studied--aspects of household and village life that were affected by the spill and aspects that were not. In addition, in the conduct of our research in the Schedule A and B villages, we discovered that many of the topics we had inquired about through the

AOSIS questionnaire were not adequately elicited and measured by that instrument. Some items suffered from poor construct validity, some violated cultural expectations and received low responses, some items--say items that addressed self-reported health--did not correlate highly and positively with other items that addressed the same topic, and so forth. Most importantly, many questionnaire items that sought to elicit information on traditional customs and beliefs, including subsistence practices, had not passed our reliability and validity tests. So, when we prepared to enter the field, the AOSIS instrument was bereft of questions that would elicit information we considered to be critical to an accurate assessment on the consequences of the oil spill for traditional practices and beliefs.

The inherent flexibility of the protocol and the many issues about which we were uncertain and for which we had no questions prompted us to introduce many new topics about the oil spill, traditional customs and beliefs, political knowledge and practices, and household economics into the protocol. The protocol proved to be a versatile instrument in our research design, sufficiently flexible to incorporate (1) new versions of questions that had to be dropped from the questionnaire and (2) new questions to accommodate the consequences of the Exxon Valdez oil spill. To take advantage of the protocol's ability to elicit information focused on the oil spill, we increased the proportion of KIP respondents to 72 percent (216*N*) of the Schedule C AOSIS pretest sample (300*N*). As in the Schedule A and B research, the KIP sample was selected at random from the AOSIS questionnaire pretest sample.

To assess the item reliability and validity of the KIP variables, reinterviews were administered among 108 (of the 172) respondents from the original KIP samples for Schedules A and B. We sought to reinterview every one of the 172 original KIP respondents, but a variety of factors--from weather to costs--coalesced to reduce by 37 percent the respondents we reinterviewed in the A and B KIP samples. Costs were important in our decision to reinterview only 72 (33'%) of our original 216 KIP respondents in the Schedule C pretest? We selected the KIP reinterview respondents at random from that original KI pretest sample (216*N*). During the posttest year (1991) when we reinterviewed the panels that we initially had interviewed after the oil spill in 1989, we selected our AOSIS questionnaire posttest sample (159*N*) and drew a 63-percent random sample (100*N*) from it for our KIP posttest sample. This allowed us to test for "testing artifacts," regression, and history in the KIP panel.

In addition to the new samples we created in the oil-spill area, all respondents in the Aleutian Pribilof, Bristol Bay, and Kodiak villages who were members of KIP samples, QI panels (persons who were selected for reinterviewing with the QI instrument), or both, created in 1987 and 1988[6] were reinterviewed in 1989 and 1990 with a version of the KI protocol modified for use among the Schedule C villages during those same periods. We intended to use those data in our inquiry as controls for the

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[5]It is confusing to mention the relations among the samples and panels so frequently, but the pretest KIP sample (216P/) is a 72-percent random sample of the pretest AOSIS questionnaire sample (300*N*), and the KIP panel is a 33-percent random sample of the pretest KIP sample.

[6]The Aleutian Pribilof villages belong to Schedule A, the Bristol Bsy and Kodiak villages belong to Schedule B. The villages in these three areas were threatened by the Exxon Valdez oil spill of March 24, 1989. The Kodiak villages and some of the Bristol Bay villages (on the south side of the Alaskan Peninsula) were directly affected by the spill. Because we had prespill measures for some villages in these areas, we drew these respondents together in a new panel to be interviewed at the same time the Schedule C respondenta were interviewed.

data recollected in the spill area. But because our informants in those Schedule A and B regions wearied of our questions (they had been reinterviewed only 5 months earlier) and because we did not have sufficient funds to reinterview them again in 1991, we did not analyze for our Schedule C reports.

The MMS has funded studies that have employed one (Braund, Kruse, and Andrews 1985) or two (Louis Berger & Associates 1983) of the methods we employ here to assess Alaskan social change.[7] Here we demonstrate the methods we have employed to test the reliability, validity, and sensitivity of the two systems. The multiple methods and multiple data sets are brought together in a technique called "triangulation." In triangulation, multiple methodologies and multiple data sets are employed so that the strengths of each will compensate for weaknesses in one or more of its sisters.

I. **VALIDITY:** AN INTRODUCTION

Validity is a central concern in the Social Indicators project. The research design we prepared and implemented seeks to reduce threats to validity. The research design MMS submitted to OMB for clearance explained that there are strengths but also weaknesses in every data set and each methodology employed in social science. Weaknesses are threats to validity. Therefore, the Social Indicators research project was designed to use the strengths of each method and data set to offset the weakness inherent in one or more of the other methods and data sets. A complex system of multiple panels, sampling, interviewing and reinterviewing, and several controls was

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[7] These studies are as follows: (1) A Social Indicators System for OCS Impact Monitoring, Alaska OCS Region, Social and Economic Studies Program Technical Report Number 116 (Stephen Braund, John Kruse, and Frank Andrews 1985) and (2) Social Indicators for OCS Impact Monitoring, Alaska OCS Region, Social and Economic Studies Program Technical Report Number 77 (Louis Berger & Associates 983).

designed to generate valid results. Thevalidation methodology required 4 years for completion.

Several types of validity are known to the social science research literature, including *apparent* or *face* validity (the obviousness of the relationship between an observational procedure and what it is intended to observe), *instrumental* or *criterion validity* (the correspondence between an observation and a different and accepted observation of the same thing), *construct* or *theoretical* validity (the fit between a measure and a construct), and *statistical conclusion* or *testing* validity (the "real" and "determinate," i.e., probabilistic, basis of an inference). , Several more types of validity have been defined and used by social scientists, including *internal* and *external* validity. Internal and external validity are crucial to this study, but both must satisfy the requirements of construct and statistical conclusion validity. The difference between them is the universe to which conclusions are attributed. We return to internal and external validity below.

The many types of validity recognized by social scientists are neither unique nor distinct. To eliminate the inherent confusion, we follow Cook and Campbell (1979), who propose a validity system composed of internal, external, construct and statistical conclusion validities. We introduce each briefly, then discuss each of them more fully in relation to this study.

Internal validity refers to the absolute validity of an inference. To illustrate, assume that research leads to the inference that X causes Y, i.e., that public transfers (X) cause diminished work incentive (Y). Yet if we exercise controls and determine that some other factors, such as access to capital and inadequate opportunity, cause

diminished work incentive and public transfers do not, then the initial inference is false. In this example, the factor public transfer (X) is a threat to the internal validity of the inference.

External validity refers to relative validity or the generalizability of a causal inference. If public transfers cause diminished work incentive only where access to the locus of political power is severely limited (for example, in a community, or region, or state, or nation), then the inference is only relatively true. Aspects of the research milieu, such as ready access to the locus of power, that prevent X (public transfers) from causing Y (diminished work incentive) in the real world--meaning the rest of the world--are threats to the external validity of inference.

Construct validity refers to the fit between measure and construct. For example, if respondents (R's) uniformly reply that they do not drink alcohol but the majority do in fact drink alcohol, the question surely measures something of interest, but it does not measure whether a person drinks alcohol. If a questionnaire item measures something other than what it intends to measure, inferences are invalid. Any factor that weakens the fit between measure and construct is a threat to the construct validity of inference.

Statistical Conclusion validity refers to the probabilistic basis of an inference. The validity of X causes Y with 95-percent confidence or that X determines Y less than 5 times in 100 by chance depends on statistical assumptions. If these assumptions are unwarranted, the level of confidence is misstated with invalid consequences. Any factor that renders model assumptions less plausible is a threat to the statistical conclusion validity of inference.

LA. Validity Issues Regarding the AOSIS and KIP Instruments--An Introduction: Regarding the survey instrument and also the protocol, our first concern was *construct* validity: we asked whether the questions in the instruments were measuring what they were supposed to be measuring. Construct validity assumes a theory about relations. Questions are formulated to elicit data that will measure the relations posited by the theory. In assessing construct validity in both instruments, we had to determine the quality of the relationship between an observation and the element of the construct or theory that it represented.

The second concern was determining *statistical conclusion* validity. Statistical conclusion validity can be separated from construct validity for analytical purposes, but the two are interdependent in the Social Indicators research design. To assess statistical conclusion validity, we asked two questions about relations posited by some theory: is the relation real and is the relation determinate? Relational statements minimally require the definition and measurement of at least two observations. Construct validity, the fit between a measure and a construct, is crucial to and entailed by all analyses of statistical conclusion validity, to wit: regardless of the sampling distribution (statistical assumptions) employed, items must be accurately defined and must be linked to the phenomena to which they are supposed to be linked according to the theory. The observations also must fit the sampling distribution that is used to measure probabilities.

The criteria for statistical conclusion validity require that when one item in the relation varies, then the other item in the relation varies (the relation is “real,” or "covaries" in statistical terms). The criteria further require that no other source or

sources of influence intervene to alter that relation (the relation is “determinate”). Hence, any comparison between two items that seeks to measure a relation also must be controlled to determine whether other factors intervene to influence (wash out, reduce, or strengthen) that relation.

‘The basis of the inference that no other factors intervene is relative to all of the controls that a researcher can think of and marshall in the analysis. It is the nature of social inquiry that someone can always think of other factors that may intervene, so all conclusions, in this sense, are concluding hypotheses. Nevertheless, this inference is probabilistic and depends on statistical assumptions. All things equal and assuming that the researcher has applied controls for every factor that can be reasonably adduced, a determinate relation is one in which no factors other than those that have been specified account for the relation.

If the statistical assumptions are unwarranted (the factors do not meet, say, the scale assumptions of the sampling distribution) or if all potential intervening factors have not been controlled, then the inference is unwarranted and invalid. By definition, then, statistical conclusion validity requires multivariate analysis to evaluate relations, and the factors (variables) in those relations must satisfy the assumptions of the sampling distribution on which probability values are based.

Internal and *external* validity refer to ways in which we assess construct validity and statistical conclusion validity. Internal validity asks whether trustworthy conclusions can be drawn about the sample from the research. External validity asks whether research results can be generalized to the universe from which the sample was drawn.

While internal and external validity are distinct, their threats are controlled by static design features in the Social Indicators research, such as pretest/posttest contrasts of independent samples without replacement, pretest/posttest contrasts of reinterview panels, control groups of various kinds, a multiple sampling methodology that includes longitudinal sampling, multiple methodologies and multiple data sets, and so forth.

The Solomon Four Group Design and Threats to Internal and External Validity--An Introduction: The research design is inextricably tied to our pursuit of valid conclusions. We employed a variant of the Solomon Four Group Design because it is the strongest design possible to eliminate threats to validity in survey research (Campbell and Stanley 1966). Our version was designed to employ two separate pretest samples drawn in fiscal years 1987-1988, two separate posttest samples drawn in 1989-1990, and reinterviews of questionnaire and protocol panels (drawn from the pretest samples of 1987-1988) to control the most viable threats to internal validity. The Exxon Valdez oil spill of March 24, 1989, prompted us to create new pretest samples of questionnaire and protocol respondents encompassing seven villages in the spill area and two control villages and, in 1990, to create reinterview panels of questionnaire and protocol respondents.

In preparation for the first year's inquiry, the HRAF research team anticipated four important threats to internal validity: (1) test artifacts (essentially instrument reactivity wherein initial interviews bias responses to interviews), (2) history (that is, responses conditioned by historical context in which some event affects a village or a group of villages, but not all, or in which responses of several respondents are dependent

or interdependent rather than independent from one another--this last is a special form of autocorrelation often referred to as Galton's Problem in the anthropological literature), (3) reliability (whether persons give similar answers to similar questions on the same interview, on different interviews, to different interviewers, and so forth) and (4) nonresponse (differential subject loss).

We recognized that issues of construct validity for the AOSIS instrument had to be addressed before entering the field in 1987; that further issues of internal validity had to be addressed at the conclusion of the first field session (results of the AOSIS instrument administered to Schedule A respondents in 1987); and that still more threats to internal and external validity--such as *regression effect, over-time stationariness,* and over-time *reliability--would* have to be addressed in subsequent years. But for 1987, threats to the generalizability of the results from problems of construct validity, or nonresponse, or interinstrument reliability could not await the completion of the fourth year's analysis. We therefore developed a short set of debriefing questions for each R that was administered at the end of each interview. Sensitivity issues, in particular, were pinpointed in the debriefing discussions. They proved crucial to an assessment of the construct validity of some questions and served to inform the research team members about remedies. Those remedies were implemented with MMS approval. The threats to external validity are much the same as the threats to internal validity. They are history (do different histories cause persons sharing those histories to respond in a similar fashion and different from persons sharing different histories?); test artifacts (do respondents react subjectively to the instrument upon being reinterviewed?); and

construct validity (are the instrument's questions appropriate for the entire sample population and do they link observations to labels in the same way throughout the entire sample?).

Sampling Bias and Threats to Validity--An Introduction: The question of sampling bias is intimately connected to threats to validity. In part, sample bias is determined through analysis of history or of Galton's Problem (independence of responses and independence of correlations). The KIP administered to one-third of all persons who responded to the questionnaire instrument assisted us in determining one aspect of potential sampling bias. The KIP protocol requires the collection of genealogies from the KIP subsample of the questionnaire sample so that kinship relations among persons included in the random sample could be assessed. The relevance of the household KIP genealogical data is that every person within two degrees of collaterality and three' degrees of lineality of each respondent can be traced to Ego and to one another.

Ego (that is, the respondent [R]) was assigned a unique interview number at the time the questionnaire was administered. That same number was used when the genealogy was recorded. Any relative or relatives of that person who were drawn at random for the questionnaire sample also received unique interview numbers. Thus, when two or more persons who were drawn at random for the questionnaire sample appear in the same genealogy, we have a way to measure their kinship relation(s) and to determine whether their responses to the AOSIS instrument (and the KIP) maybe

influenced by their relatedness (and all that entails, including sharing, visiting, cooperating, and the like).

These data allow us to determine whether family networks are overrepresented or not. We summarize similarities and differences of responses among R's related by kinship in dependency correlation matrices for villages that were and those that were not over-represented. Whereas one goal was to correct for kinship network dependencies (an historical artifact), a second goal was to use these brief genealogies to understand village compositions and intervillage relations. This understanding evinces itself in our narratives here and especially in Social Indicators Project III: Analysis (1993).

Annual Assessments of Threats to Validity--An Introduction

Year One: Validity at this stage of the inquiry was sought first by establishing the construct validity for each variable, posed as questions, in the AOSIS instrument. Construct validity was assessed in several ways. The techniques we employed prior to entering the field and the techniques we employed after the first wave of field research follow:

1. Before we entered the field to administer the questionnaire and protocol in 1987, the research team met in Anchorage to discuss the instruments and the manner in which they were to be administered.[8] We went through the AOSIS instrument item by item. We could not change any of the questions because of OMB regulations, but as we

[8]The senior research staff was composed of the Principal Investigators (Joseph G. Jorgensen and Richard McCleary), the Senior Investigator (Steven McNabb), two Key Investigators (Ann Fienup-Riordan, Taylor Brelsford), and nine Questionnaire Investigators (Miles Cleveland, Dora Dushkin, Morgan Solomon, Ray Peterson, Muriel Hopson, Pst Petrevelli, Trim Nick, David Chanar, Christina Westlake). The persons responsible for overseeing the field research were McNabb (North Slope and Northwest Alaska), Fienup-Riordan (Yukon-Kuskokwii or Calista), and Taylor Brelsford (Aleutian Pribilof Island), each an acknowledged expert in the regions to which they were assigned. The Questionnaire Investigators were bilingual Natives experienced in conducting social and economic research end residents of the regions in which they conducted research for the Social Indicators project.

moved through the questionnaire, the Key Investigators (KI's) and Questionnaire Investigators (QI's) called attention to several threats to construct validity in the AOSIS instrument. Inasmuch as these persons possessed rich ethnographic (cultural, social, and social psychological) knowledge of the persons and societies being studied, we noted all of the critical comments. We anticipated problems with responses (and nonresponses) to many questions. At the conclusion of field research, analysis of the responses to some questions were occasions to check the impressions of KI's and QI's before entering the field. As will be demonstrated below, some questions that were anticipated to violate customs of Native societies did precisely that.

2. Responses to each question were analyzed for variance and response rate. Construct validity problems were suggested when either variance or response rates were low.

3. Construct validity problems also were anticipated by persons with extensive linguistic and sociolinguistic knowledge of the languages spoken by the people being studied. It was anticipated that several questions would violate linguistic conventions. For other questions, it was anticipated that one-to-one correspondences between words and concepts were not possible and that the language of the questions would bias the responses. These hunches, too, were checked against the results.

4. Construct validity was further evaluated through some controls that were introduced into the research design. Their implementation allowed us to correlate attitudinal responses with objective responses within the questionnaire and, perforce, to assess reliability as well as the fit of measures to observations.

5. The KIP provided some interinstrument, identical-respondent reliability checks with the AOSIS or QI instrument. It was administered to one-third of the R's selected at random from the QI sample. The KIP's advantage is that it facilitates discussion of topics in a less structured and more detailed fashion than does the AOSIS questionnaire. To avert boredom and, perhaps, resentment over redundancy in the instruments, similar questions in the two were few in number, but sufficient to allow correlations between the KIP and the AOSIS.

Our strategy to assess validity within instruments during the first year also included correlational and multivariate methods (see 6 and 7 below). Here, of course, we sought to establish whether Schedule A relations were "real." The discussion of internal and external validity makes it clear that the correlational and multivariate methods applied to Schedule A data are only provisional.

6. For zero-order correlations (correlation of a relation of two parts, say, variables a and b), we selected the rather stringent coefficient value of .50 as the minimum acceptable correlation to establish a real relation between two variables. A .50 value for proportional reduction of error (PRE) statistics--such as Goodman and Kruskal's Gamma (Γ), or factor- analytic squared error statements--reduces the errors in our guesses by half. Higher gammas, of course, reflect greater reduction of errors in our guesses.

For interval data, r^2 values of .50 are interpreted as explaining 50 percent of the variation in the relation. We interpret PRE and r^2 values of .5 (+ or -) as strong relations between variables. A rather high value (.5) was selected because the issue we

addressed was strength of the relation and not significance of the relation. The Schedule A sample ($N=342$) was sufficiently large that r^2 coefficients of .20 are significant at the .05 level. This is a simple function of sample size. Therefore, we have employed a standard that evaluates strength rather than significance.

7. Multivariate analysis, principally factor analysis, was used to evaluate the relations among all variables within each of the five topical sets (Sections A-E) in the questionnaire. Variables within a set, by construct, should measure related phenomena. As such, their internal correlations should be higher, on average, than their external correlations. We began our multivariate analysis within topical sets (Respondent Characteristics), assessing the regression effects of R characteristics on the polychoric, polyserial, and Pearsonian correlations for each item. We then extended the multivariate analysis among items within each set (Reliability) by developing confirmatory factor-analytic models (maximum likelihood).

Statistical conclusion validity, which requires multivariate analysis among traits from different topics, or different sets of AOSIS iterns (A through E), was addressed--very provisionally--through 6 and 7 above. Statistical conclusion validity required the full implementation of the 4-year design.

Year Two: Research during the second year allowed us to exercise explicit controls for threats to the AOSIS's internal validity posed by *history* and *regression*. Regression effect, which is the tendency of high and low responses at one point in time (t_0) to regress toward the mean at a second point in time (t_1), cannot be assessed until the second year, and then only if there are two distinct samples measured on the same

variables. One of those samples must be a panel of respondents reinterviewed on identical questions posed to them in a previous wave. The other sample must be composed of respondents interviewed for the first time, and responses in the two samples must be compared. After the second field session, it was possible to begin our analysis of item reliability and stability over time, as well as our analysis of theoretical contrasts.

Year **Three:** At the conclusion of field research in the third year, two panels and one posttest sample had been interviewed. As the design unfolded, we increased the number of contrasts within panels, between panels, and between panels and independent pretest and posttest samples, By late 1989, then, we had several means to assess threats to internal and external validity, including over-time (2- and 3-year) tests of stationariness of each item, over-time tests of reliability of each item, test effect (testing artifact) for each item, and theoretical contrasts for each item.

Year **Four:** The final field research wave completed the embedded panel and posttest research, allowing us to complete the over-time stationariness and reliability tests and the analysis of testing artifacts and theoretical contrasts for the study.

LB. The Logic of the Validity Analysis

Given the salient role of theory in construct validity and statistical conclusion validity, an evaluation of threats to these types of validity requires a detailed analysis of the theoretical foundations of AOSIS. Definitions of well-being and a few other key concepts appear in the Appendix. The first report in this series provides a complete assessment of well-being as it has been defined for this project, as well as weaknesses inherent in the concept. Basic to the manner in which we have sought to determine

well-being in this research is the integration of objective empirical measures with cognitive attitudinal measures.

Nonresponse: The analysis of nonresponse patterns at the conclusion of the first year's research prompted the deletion of many items and changes to many more items in the AOSIS instrument. Even before entering the field, we identified many potential problems among AOSIS questions and took some affirmative steps to minimize refusals. We recognized that sample bias due to refusals could pose a fatal threat to statistical conclusion validity. Braund, Kruse, and Andrews (1985:192-3) recommended use of telephone interviewing of the AOSIS instrument among sample respondents. Prior to onset of the research, Kruse claimed that". . . [assigning] an equal probability of selection to each household in a given target population [Alaskan villages]. . . is economically feasible due to generally widespread phone coverage" (Institute for Social and Economic Research 1987:3).

Telephone interviewing posed an especially ominous nonresponse bias in the Alaska sample because, contrary to the claims of Braund et al. and Kruse, home-telephone densities among our respondents ranged from 10 percent to 100 percent among the sample villages. Furthermore, there was high monthly variability in the termination of residential telephone service. Thus, telephone interviewing in village Alaska, on its face, posed a threat to validity because it defined as ineligible residents in some of the households in 29 villages in the 31-village sample. Only 2 villages in the sample had 100-percent residential telephone densities; 14 had less than 65-percent densities, and 9 had less than 40 percent.

We took the precaution of minimizing nonresponse by ensuring that each household in each sample village had a nonzero probability of selection. To accomplish this, we mapped every occupied house in each village that we entered. A number *1,* 2, *3,...n* was assigned to each, and a table of random numbers was consulted to select the houses from which R's would be selected (alternating male and female after a random start).

In theory, nonresponse bias maybe corrected by poststratification. In practice, poststratification is a complicated hit-or-miss procedure with no guarantees (Sudman 1983: 183-4). We opted not to use this procedure.

A second type of nonresponse occurs when the respondent from a selected household refuses to be interviewed. Telephone interviews typically have lower response rates than face-to-face interviews: a person who hangs up the phone is less apt to slam the door in the face of an interviewer, particularly one who resides in R's village or region, speaks the Native language of the region, and carries instruments written in the local language as well as English.

The Schedule A sampling technique and interviewing procedure in 1987 resulted in negligible nonresponse rates. This is different and separable, of course, from nonresponse to particular items. At the conclusion of the first year's research, biases due to nonresponse on particular items remained a viable threat to validity. Questionnaire R's could, and sometimes did, answer "don't know" on items. Thus, we checked each "nonresponse" for potential bias.

Sensitivity Sensitivity is, perhaps, more commonsensical than either validity or reliability, but it is also a crucial issue in assessing reliability and validity. Sensitivity here refers to questions that are too sensitive to elicit meaningful responses. Questions may evoke reluctance because they violate social norms or conventions, invade privacy, or cause personal discomfort--even anguish--to the respondent. Alert questionnaire interviewers, whether or not they are Natives (in the current instance), quickly sense when questions cause discomfort and enter domains that should not be opened. Nonresponse, reliable but wrong responses, abrupt termination of interviews, and even ill will can be generated by sensitive questions.

Items D17A-E in the AOSIS instrument employed in Schedule A villages in 1987, for example, which ask R's to assess the effectiveness of elected officials, elicited nonresponses from as many as 50 percent of the 348 R's. While items of this sort might not seem sensitive in some other population, the AOSIS populations found these items too sensitive. The relation of "sensitivity" to "non-response" bias in the AOSIS instrument is assessed below.

Variance:

Univariate: During the first 2 years of field research, we inspected the univariate frequencies for each AOSIS question (variable) to provide the quickest available means to determine the variation in responses. Whereas the inspection of univariate frequencies is useful in discovering low response rates and modest or high item variation, univariate analysis is only the first step in a much more time-consuming

process. That process requires the analysis of covariance--a bivariate and multivariate procedure.

Bivariate, Multivariate: Inasmuch as there were about 16,000 bivariate relations in the AOSIS instrument used in 1987, descriptive multivariate matrix-reducing techniques (metric- and nonmetric-factor analyses, and nonmetric multidimensional-scale analysis) were applied to coefficients derived from the bivariate relations within each topical section in the AOSIS instrument (A through E). The rationale for calculating bivariate relations within topics is drawn from standard social science experience--relations within topical sets are more highly correlated than relations across topical sets. If variance and covariance cannot be achieved within sets, covariance will not be obtained across sets.

The multivariate analysis does not conclude with intratopic procedures in the first year or subsequent years. In the first year, each AOSIS instrument item was correlated with several respondent characteristics--including sex, age, ethnicity, education, income, length of residence in the village, and marital status--in a procedure to discover invariant and variant responses. Variance and covariance, as explained above, are intimately connected to construct validity. When an item elicits the same response across a population, issues of measurement are moot. But it is not known whether the fit between the observation and the construct is valid. Variance, then, is not a sufficient condition of construct validity. Lack of variance is, however, a signal to assess the construct validity of the items in question.

If variance is high or low in response to an item, theoretically consistent covariances are required as well. Items B6 and B7 of the AOSIS instrument, for example, which ask R's to characterize their ability to run and lift--all things being equal--should covary with age: older R's would be expected to have more difficulty running and lifting than younger Rs. If these items do not covary with age, their construct validity would be in question so must be checked. The items presumably would measure something other than physical vigor among the respondents. On the other hand, all populations are not the same, and Native populations that exhibit high dependencies on resource extraction may well diverge from non-Natives in physical abilities.

At the conclusion of the first wave of research, we discovered little variation in a wide variety of questions in AOSIS Section E (measuring affective attitudes). The lack of variation in many of these questions and the very low covariation coefficients between questions appear to have been caused by the violation of cultural conventions in some instances and non-translatability due to the violation of linguistic conventions in others. Many questions, then, were not measuring what they were supposed to be measuring: these are problems of construct validity.

II. RELIABILITY: AN INTRODUCTION

Reliability is intimately and inextricably related to validity. Reliability in the metalanguage of statistical research has several meanings:

- If an informant gives the same answer to the same question at two or more points in time, the question is said to have "test-retest" reliability.

- If two different interviewers receive similar answers from the same informant to the same question, that question is said to have "interobserver" reliability.
- If similar but nonidentical questions receive similar responses from an individual informant, then these questions are said to have "equivalent-tests" reliability.

Variations on reliability accrue as various controls are exercised for samples drawn at several points in time from the same population (with replacement and without replacement) and as questions are altered--maintaining similarity but not sameness.

Item reliability is an important issue in any assessment of validity because responses to questions must be reliable in order to demonstrate that a relation is real (covaries) in a statistical sense. But a perfectly reliable item maybe untrue. For example, responding at two points in time to two or more investigators, respondents in a longitudinal sample drawn at random from members of the Church of Jesus Christ of Latter-day Saints (Mormons) may uniformly answer a question about the consumption of alcohol in the same way, namely: the respondents do not consume alcohol. The answer is highly reliable (interobserver, test-retest), but it may not be correct. Mormons may be reluctant to provide the correct answer because it violates their religious code, hence it is a sensitive question that may elicit a wrong but reliable answer. Correctness is a question for construct validity--the fit between a label and the observation.

In the text that follows, we have several occasions to address the reliability of AOSIS and KIP items. The type of validity involved in any particular problem is always arguable. For example, nonresponse is a reliability issue, but it is also treated as a threat to statistical validity. Nonresponse could just as easily be treated as a threat to construct

validity. But as we have pointed out, construct validity is always a prior question in the assessment of statistical conclusion validity. If nonresponse to an item reflects a sensitivity problem, then the item does not measure what it purports to measure. Rather, it indicates a sensitive topic.

Item reliability, by recent convention (e.g., Borhnstedt 1983), is defined as the proportion of variance in a measure due to the “true” construct. Hence, reliability cannot be expressed independent of construct validity. Nevertheless, highly reliable responses can, indeed, be incorrect. We seek to assess the construct validity of the responses to the AOSIS questions.

CHAPTER 2
RESEARCH DESIGN

I. INTRODUCTION

The MMS directed us to avoid three problems commonly associated with survey research: (1) achieving sufficient statistical power; (2) satisfying threats to internal validity; and (3) avoiding unwarranted generalizations, especially those that are attributable to ecological fallacy (specification error, that is, generalizing effects from any macrolevel to microlevel behavior).

Although these problems frequently co-occur in survey research, they are conceptually distinct from one another and can vary independently from one another. In survey research, they frequently co-occur because of the sample design that has been implemented in the larger research design. Separate sample pretest-posttest designs frequently conjoin these problems, but they do so as unintended consequences. This is particularly true of designs in which the posttest samples are drawn from target universes in which the pretest respondents have been replaced (sampling with replacement where persons previously interviewed in a pretest maybe reinterviewed in a posttest). The ecological fallacy is a persistent threat in such designs because it is not empirically or logically warranted to generalize to the t_0 target population from the t_1 sample, or to the t_1 target population from the t_0 sample. Controls have not been exercised for respondents that may appear in both samples and respondents that may be drawn in only one of the two samples.

The separate sample pretest-posttest design can be modified to control internal and external threats to validity while gaining statistical power. The sample research

design employed in the Social Indicators research was developed and implemented specifically to control internal and external threats to validity while decreasing sample size on the one hand and increasing statistical power on the other.

11. THE SOLOMON FOUR GROUP DESIGN WITH NESTED PANELS

We have nested two small panels inside the original[9] larger AOSIS design of two pretest and two posttest samples. Our nested panels design is a sub-species of the design named the "Solomon Four Group" by Campbell and Stanley (1966). Whereas it took 4 years to fully assess the economy, power, and validity of the sampling design, as we progressed through each field research wave, we were able to increase the controls we exercised over threats to internal and external validity. Statistical power increased as a function of the increased number of controls we exercised. By the end of the second field research season, for example, it was possible to conduct the first statistical and empirical test of panel stability--one of three crucial sample design controls for validity.

Because of the relative complexity of the design, Figure 2-1 is provided to facilitate understanding. The sampling and interviewing schedule is designed so that after the second year (1989 W) through the fourth year (1990 W), systematic comparisons can be made between samples of initial interviewees drawn without replacement and panels of reinterviewees (controls for testing artifacts), and comparisons also can be made within

[9] In response to the foundering of the Exxon Valdez a second Solomon Four Group sampling design was crested to study the spill-affected villages. Because the oil spill occurred in an area that, for the most part, waa not represented in our original Solomon Four Group sample design, the exceptions being the villages of Kodiak City and Old Harbor on Kodiak Island, we added villages in the Cook Inlet, Prince William Sound, and Alaska Peninsula areas to our study. We also added a Kodiak Island village (Karluk) and initial (new) respondents in Kodiak City and Old Harbor. It was necessary to create a pretest sample (1989 wave), a posttest sample (1991 wave), and panels from the 1989 research wave among QI and KI respondents. The design is complex, because some panel respondents were reinterviewed in 1990 and 1991 and othera in 1991 alone. The design also included respondents from Aleutian Pribilof and Bristol Bay villages (commercial-fishkrg areas that may have suffered secondary effects from the spill). This complex design is treated in a separate report.

	A SCHEDULE			B SCHEDULE		
YEAR	QI	QI	KI	QI	QI	KI
1990 w				0B3 (93) ?	OBD (14) [*POST*]	
1989 W	9A3 (92) t	9AD (168) [*POST*]	KIA2 (62) t	9B2 (101) t		KIB2 (46) t
1988 W	8A2 (114) t		t t t	8B (206) [*PRE*]		KIB (60)
1987 W	7A (342) [*PRE*]		KIA (112)			
	QI	QI	KI	QI	QI	KI

FIGURE 2-1. SOCIAL INDICATORS PROJECT SOLOMON FOUR GROUP SAMPLING DESIGN.

Legend: QI = questionnaire investigator AOSIS interviews, KI = key investigator protocol interviews, A = Schedule A sample (North Slope, NANA, Calista, and Aleutian-Pribilof Islands), and B = Schedule B sample (Bering Straits, Bristol Bay, and Kodiak) .

Initial Interviews end the Year Administered (Questionnaire) 7A, 8B[PRETESTS]; 9AD, OBD [POSTTESTS]: The number before the letter represents the year the initial interview was administered (e.g., 7 representa 1987); D following the number and A or B represent second sets of initial interviews we refer to as posttesta (new samples in each schedule drawn without replacement of original interviewees into the sampling universe).

Initial Interviews (Protocol) KIA, KIB:KI represents the key informant protocol (or KIP); A or B represents the schedule.

Panels: P = panel. Random samples drawn from initial QI [PRE 7A, 8B] samples in each schedule are reinterviewed. The first waves, selected from the initial interview samples, are designated 7AP and 8BP but are not distinguished from the pretest sample in the figure. There are two waves of reinterviews for the QI panels for A and B. There also is one wave of reinterviews for the entire KI samples for A and B. A subset of the KI panels for Schedules A and B (see KIAB above) is reinterviewed in one wave, and a smeller panel of Kodiak villages alone is reinterviewed a second time (KIAB2) (ace the analysis of Schedule C in a separate report). The numbers 2, 3 following the panel's year (#) and schedule (alpha) represent the wave of the reinterview (e.g., 8A2 = 1988, Schedule A questionnaire panel, second wave).

panels by correlating responses to the same questions by the same respondents at two (or more) points in time (controls for stationariness and for reliability). Additionally, comparisons can be made between instruments (AOSIS and KIP).

Reasonable controls for external and internal validity for Schedules A and B were completed at the end of the fourth field session in the winter of 1990.[10] As shown in Figure 2-1, a pretest sample was drawn at random in Schedule A villages in 1987 and a similar sample was drawn from Schedule B villages in 1988. Panels were selected at random from each of the pretest samples and reinterviewed in two successive waves (1988 and 1989 for the A Panel, 1989 and 1990 for the B Panel). *Posttest* samples were selected at random and without replacement from the pretest samples for Schedule A in 1989 and for Schedule B in 1990. The sequencing of the interviews among pretest, posttest, and panel respondents was designed to provide tests for stationariness and testing artifacts each year. The design also provided flexibility so that posttest samples could be drawn to accommodate discoveries from the analyses of pretest and panel responses.

If it is demonstrated that variables (questions) have good construct validity, are stationary, and are not subject to testing effect, statistical power is increased in two ways: (1) the pretest and posttest samples (7A, 8B, 9AD, and OBD) can be merged to increase sample size (thereby decreasing sample error) and (2) panel covariances that require small N's can be employed, the latter being extremely sensitive to small differences in theoretical contrasts. Although statistical power is increased by the use of panels

[10] "Within reason" is a simple qualification: we have exercised all controls we can think of for internal and external validity, including tests for stationariness, reliability, construct validity, and statistical conclusion validity.

embedded in the pretest-posttest sampling design, we usually opt for the most conservative rather than the least conservative measure of inference. This increases the likelihood that the differences we discover in our theoretical constructs are real and determinate.

We used the flexibility inherent in the Solomon Four Group Design to add villages to our study following the Exxon Valdez spill (see footnote 1 preceding), to increase the size of the Schedule B posttest sample, and also to increase the proportion of non-Natives in that sample. We had undersampled non-Natives in the pretest sample for Schedule B because we did not want non-Native responses to swamp Native responses and lose the advantage provided by our strategy to sample villages by theoretical contrasts. Yet between 1988 and 1989, we discovered highly significant differences between Natives and non-Natives in a large variety of contrasts. Inasmuch as non-Natives far outnumber Natives in the Kodiak area, we increased the proportion of non-Natives in our posttest sample for Schedule B to provide better contrasts between combined pretest samples (A and B) against combined posttest samples (A and B).

As is apparent in Figure 2-1, at the end of the field research for the second year (1988 W), the two pretest samples jointly comprise 548" respondents. Those respondents reside in 31 villages which, in turn, are located in seven ANCSA regions located throughout coastal Alaska from the eastern Beaufort Sea on the north to Kodiak Island on the southwest. Panels drawn from those samples had been constituted by the

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[1] "The research design originally accommodated 532 Schedule A and Schedule B respondents for the first 2 years. At the conclusion 'f the first wave of the A panel, MMS added the village of Kaktovik on the North Slope to the study. Lease-sale-date changes and Government/industry planning made it imperative that Kaktovik, located east of Prudhoe Bay, be added to the sample. The MMS anticipates that oil-related activities could affect that village in the near future. Kaktovik was added and studied in the first wave of the B panel.

second year, and the A Panel had been reinterviewed (wave 2). By the end of the third year (1989 W), a posttest sample for Schedule A comprising 168 respondents had been drawn without replacement of persons in the pretest sample. The A Panel had been reinterviewed a second time (wave 3), and the B Panel had been reinterviewed a first time (wave 2). By the end of the fourth year (1990 W), a posttest sample of 130 respondents had been drawn without replacement for Schedule B villages, and the B Panel had been reinterviewed a second time (wave 3).[12]

Statistical power is increased and threats to internal and external validity were controlled as the research progressed, i.e., as pretest and posttest samples grew and as panels were reinterviewed. The division of the original seven-region sample into two parts--Schedules A and B--was required by time and money constraints, not because the requirements of a natural or social division that rationalized the stratification.

II.A. Village Selection and Theoretical Contrasts

Village Selection: There were 128 villages in the original target universe to which we sought to generalize (seven ANCSA regions from Kodiak through the North Slope).[13] Just as every household in a village need not be interviewed, households in every village need not be interviewed. Valid inferences from AOSIS assume random samples from that universe. Because we did not want to either overrepresent or underrepresent several theoretically important subpopulations among the 128 coastal communities included in the universe in 1987, we stratified the villages to produce a nonredundant set

[12]The Exxon Valdez oil spill was sandwiched between the third and fourth years of fieldwork. A pretest sample (Schedule C) wss drawn (1989 S), and QI and KI panels from that sample were reinterviewed about 19 months later (1989 W). Posttest QI and KI samples also were drawn and interviewed in the winter of 1991.

[13]The target universe expanded to 150 with the inclusion of the Cook Inlet, Prince William Sound, and Alaska Peninsula areas in 1989.

that would be representative of the universe. The samples were drawn so that they were nonrandom with respect to the population, but random with respect to each subpopulation (Sudman 1983:145-194). The stratified random sample may be transformed so that it approaches a simple random sample (leaving questions of interdependence and history aside for the time being). The stratified random samples provide the best compromise among cost, theoretical considerations, and statistical power. All things being equal, theoretical considerations are the most important of the three because they address the reasons for which the research was conducted.

Rationale for the Theoretical Contrasts: The MMS desired that each ANCSA[14] region have some representation in the sample (a set of simple geographical-political units established by ANCSA). The MMS also desired that OCS effects and non-OCS effects be distinguished from each other, that race/ethnicity within the universe be considered, and that differences between populations in regional centers and smaller outlying villages be analyzed. It is the case in Alaska that the four factors can vary independently, but villages that serve as regional centers tend to have large non-Native populations (more than 25% in the north and more than 50% among the more southerly villages) They also tend to be more exposed to OCS effects. Small villages on the periphery of the regional centers seldom have fewer than 85 percent Natives. There are exceptions among peripheral villages. For example, at the commencement of the research project, the small North Slope village of Wainwright--because of capital-improvement projects made possible by oil revenues, drew so many non-Natives for

[14]The Alaska Native Claims Settlement Act of 1971 (ANCSA) mandated regional and village corporations. Each region encompassed a continuous geographic region and embraced all of the villages with that region.

employment that they constituted more than 25 percent of Wainwright's population. And Naknek, a small village in the Bristol Bay region, is successfully integrated into the commercial-fishing industry. The employment available there also attracts non-Natives.

The race/ethnicity factor is important because Native and non-Native residents differ in their educational and occupational backgrounds in general. They also differ in their cultural backgrounds, in the effects of State and Federal legislation upon them, in their access to capital, in their access to the locus of power, and in many other factors (see report number 3 in this series). A shelf of Federal legislation for Indians and Eskimos attests to different treatment for them as opposed to non-Natives. Although ANCSA exercised profound effects on Alaska's Natives, a spate of legislation continues to treat Alaska's Natives as different from non-Natives. That Native well-being is the underlying theme in much of this legislation is beyond question. The provisions of the Indian Education Act (PL 92-318), the Indian Self Determination and Educational Assistance Act (PL 93-638), the Johnson-O'Malley Act (PL 74-638), the Indian Sanitation Facilities Act (PL 86-121), and many more whose listing here are unnecessary, regularly affect Natives lives, including their governments, their personal and community health, their village infrastructures, and their economies.

The OCS effects, we have learned, also differ between regional centers or secondary centers and peripheral villages partly because of the size of the villages but also because of their infrastructures and economic roles. So we have treated the two types of villages as separate target populations.

Although regional centers have experienced the bulk of the direct and indirect consequences from OCS activities (and onshore oil activities) in the recent past, some coastal villages are closer to lease-sale areas, potential reserves, proven reserves, and transportation lanes than other villages. Those villages that are located near known or anticipated onshore supply bases, pipeline landfalls, nearshore staging areas, or airports servicing offshore activities are differentiated from those that are not so situated. When the study commenced, evidence supported the classification of the following villages as those most likely affected or to be affected by OCS activities: Barrow, Wainwright, Kaktovik, and Nuiqsut on the North Slope; Kotzebue in NANA, Nome, Unalakleet, and likely Gambell in the Bering Straits area; St. Paul and Unalaska in the Aleutian-Pribilof area; Bethel and possibly Alakanuk in the Calista region; and Kodiak. All of these communities are included in the sample. We were least sure about the vulnerability of Alakanuk and Gambell to OCS activities.

In addition to the three strata sought by MMS, we added additional ways to subclassify, i.e., stratify, the sample. After all, the goal of any sampling frame is to select communities that collectively represent all of the important distinctions (i.e., target populations) in proportions that are approximately the same as those found in real life. Thus, we added strata to control for one of the effects of history[15] (interdependence of sampling traits through inheritance and diffusion of customs), to control for governments created by personal initiative rather than Federal Government requirements, and to

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"In Chapter 1 we introduce, albeit briefly, two types of historical effects that threaten validity. The first is an incident that affects one village or a group of villages but not other villages. The second is similarities among persons in groups of villages that derive from common historical traditions. These similarities are deeper than recent historical events and are often passed from one generation to the next, whether borrowed from neighbors in the distant past or inherited from a proto-language/proto-culture. See the discussion of sampling trait interdependence in Section V.A of this chapter.

control for the importance of commercial-fishing-related industry to the total income of a village.

Our strata for history proved to be so flawed as to not bear maintaining after the third wave of research in 1989. Our theoretical contrasts employed the criterion of the dominant Native language spoken by villagers. The Native languages were grouped into sets in which the languages in one were mutually unintelligible with the others. Several dialects, on the other hand, were classified within each set. The exception was Siberian Yupik, whose speakers (in our sample) are restricted to St. Lawrence Island.

Language similarity is the best known synchronic indicator of the genetic relations among people. That is to say, the languages of persons speaking sister languages of a language family are reconstructed through explicit procedures to a mother language. Sister languages, then, are daughter languages (see Dyen and Aberle 1974 on proto-language and culture reconstruction). The four Native language strata in our sample comprise Siberian Yupik, Central/Pacific Yupik, Inupiaq, and Aleut. If speaking the same language correlates with sharing similar customs and beliefs--whether those customs and beliefs were inherited, borrowed, or both--history will be reflected by significant differences among language strata (see Driver 1966 and Jorgensen 1980, 1983).

The language classifications posed the problem of specification error. We did not have reliable measures of the Native languages spoken by the respondents; and lacking such information, we could not generalize to all respondents in a language area.

The second strata we introduced distinguish populations in villages organized into regional governments with bonding authority somewhat similar to county governments within the State of Alaska from populations in villages that are not so organized. In our 1987 and 1988 tests, respondents residing in villages organized into regional governments, called boroughs, proved to be considerably different from respondents in villages not so organized. Differences were especially significant on public sources of income, household income, household size, and the like. Those differences began to disappear, or became difficult to interpret, with the 1989 and 1990 data.

We created the strata to distinguish villages organized into regional governments from those that are not because of the empowerment that borough status provides to the villages within them. Regional governance within the State of Alaska constitution is different from the various forms of regional corporations that were imposed on Alaska's Natives pursuant to ANCSA's provisions.[16]

Our final strata distinguish villages in which the commercial-fishing industry is the dominant source of income from villages where it is not. This contrast loomed important following analysis of KIP data in 1988 (Jorgensen and McNabb 1989), where it was apparent that respondents in villages dependent on commercial fishing expressed very

[16] As a caveat, or perhaps as a footnote is more accurate, an early criticism that was expressed about the sampling design implemented here was that regional effects cannot be distinguished (we test for regional effects below). The design was never intended to test for ANCSA regional effects qua ANCSA regional effects. This research has been driven by theoretical considerations that seek to answer MMS's questions. On their face, village or regional effects are uninteresting unless their analysis is motivated by questions that are situated at the village or regional level. For example, "did village A get something that village B wanted but didn't get because of an action taken in the administrative center of the ANCSA region"? Because ANCSA regions are corporations mandated by ANCSA, administrative districts for certain administrative agencies, and service areas for some services, any analysis must be couched in those terms or we become mired in problems of construct validity. Specifically, we would require some a priori assumptions about how and why the data would vary systematically because of service and administrative influence (hence posing a threat to statistical conclusion validity). We address administrative, service, and economic issues through Hub:Village distinctions. Because all villages within a region do not experience the same threats from OCS activities, we address this issue through Test:Control distinctions. And because villages in different regions are similar in the likelihood of threats from OCS activities, we control for their similarities and differences through stratification.

different attitudes about naturally occurring resources and their management than did respondents in villages in which the commercial-fishing industry was not the dominant source of village income.

Village Sample Sizes and Theoretical Contrasts: The *N*'s for each village were drawn for the widest possible range of individual and household characteristics. This procedure was rationalized by our desire to have a useful definition of "subpopulation."

Village Level: At the village level, subpopulations are defined on theoretical dimensions, including the following:

- *Test vs. Control,*
- *Hub vs. Periphery,*
- *Mixed vs. Native,*
- *Commercial Fish vs. Noncommercial Fish,* and
- *Borough vs. Not Borough.*

Respondent Level: At the respondent level (R), we define subpopulations as:

- *Native vs.* Non-Native and
- *Commercial Fishers vs. Noncommercial Fishers.*

For example, Unalaska (an Aleutian Island village) and Kotzebue (a NANA village on Kotzebue Sound) are similar because both are *Test-Hub* villages but are different because Unalaska is *Mixed (i.e.,* more than 25% non-Native) and Kotzebue is *Native (i.e.,* more than 75?% Native). Defining subpopulations in this way, the sampled range of

individual and household characteristics is optimized by drawing nearly equal *N*'s from opponent dimensions.

Although the 31 villages in Schedules A and B were nonredundant in terms of individual and household profiles, kinship networks presented a potential redundancy. We addressed this threat through the collection of genealogies from one-third of the R's interviewed in the pretest samples (those R's who were selected for the KI samples).

We sought to guarantee external validity by drawing highly variant *N*'s from a nonredundant subset of villages. We will return to this question below. The volatility of the public and private sectors of the national and Alaskan economy, influenced in part by worldwide oil prices, exercise powerful influence on village economies and, subsequently, village demographics. As a consequence, the classifications of villages on some contrasts had to be changed between 1986 and 1990. We anticipated that a volatile economy would affect some villages over the course of the study. The study was launched during the sixth year of President Reagan's tenure and one year after the international price of oil had plunged to one-third of its 1982 value. Specifically, we thought that the powerful influence of oil price on Alaska revenues, as well as the general policy of the Reagan Administration to reduce Federal programs and revenue transfers to welfare and to Native American programs of all kinds, would affect villages.

Definitions of the Theoretical Contrasts: The definitions of the theoretical contrasts into which the villages were subclassified follow:

- *Native:Mixed* contrasts classify villages on the basis of ethnicity/race. *Native* village populations are more than 75 percent Native. *Mixed* village populations are less than 75 percent Native.
- *Hub:Periphery* contrasts classify villages on the basis of infrastructures, transportation services, and economic roles within a continuous geographic area. *Hub* villages have considerable infrastructure for business, transportation, and services; superstructure in public and private delivery of goods and services; and a central economic place in the geographic area. *Periphery* villages have limited infrastructure, superstructure, and economic roles within the geographic area.
- *Test:Control* contrasts classify villages on the basis of their proximity to OCS activities (and onshore oil activities) including lease-sale areas, transportation lanes, potential reserves, proven reserves, pipelines (projected or completed), onshore supply bases, and nearshore staging areas or airports servicing offshore activities. *Test* villages are places in which some of these activities or developments have occurred, are expected to occur, or could occur. Control villages are remote from these activities, and it is not anticipated that such activities or developments will occur near them.
- *Commercial Fish:Noncommercial Fish* classifies villages on the basis of the proportion of total income made by the commercial-fishing industry to the village economy. *Commercial Fish* villages gain more than 60 percent of their total income from commercial-fishing-related business. *Noncommercial Fish villages* gain less than 40 percent of their total income from commercial-fishing-related business. NOTE: In some

subsequent text and tables, these terms are abbreviated as "Comm Fish' and "Noncom Fish."

- *Borough:Not Borough* classifies villages on the basis of whether they are incorporated into boroughs (a division of local government comparable to counties with the ability to create bonds to raise revenues and to gain access to some State revenues not available to villages organized solely into city forms of government). *Borough* villages are incorporated in boroughs. *Not Borough* villages are not so incorporated.

The **Sample Villages:** Table 2-1 identifies each village in the sample[17] by the ANCSA region to which it belongs, and by the four characteristics that provide the theoretical contrasts important to this study. Most of the villages from Bristol Bay southward, including all villages in the Exxon Valdez spill-affected area, gain 60 percent or more of their total incomes from commercial fishing-related businesses. The commercial-fishing areas also are heavily populated by non-Natives. Non-Natives far outnumber Natives in the largest fishing villages (Dillingham, Naknek, Unalaska, Sand Point, Kodiak, Kenai, Valdez, Cordova, and Seldovia). Because of the high concentration of non-Natives in the largest villages of the Kodiak, Bristol Bay, and Aleutian-Pribilof regions, we drew equivalent sample sizes for the largest *Mixed* villages. For example, Kodiak, with a population of about 6,100, and Bethel, with a population of about 3,700, each were represented by respondents from 40 households. We sampled in this fashion so that the responses from *Native* villages would not be swamped by responses from the large *Mixed* villages. Let us turn to the rationale for this procedure.

[17]Schedule c villages are included here for comparison, although analysis of the Exxon Valdez sample occurs in a separate volume.

Table 2-1

SAMPLING FRAME BY REGIONS, VILLAGES,
AND COMMON CHARACTERISTICS

REGION	VILLAGE	CHARACTERISTICS			
Not Boroughs					
Aleutians	St. Paul	Test	Hub	Native	Comm Fish
	Nikolski	Control	Periphery	Native	Noncom Fish
	Unalaska	Test	Hub	Mixed	Comm Fish
	Atka	Control	Periphery	Native	Noncom Fish
	Sand Point'	Control	Periphery	Mixed	Comm Fish
Bristol Bay	Dillingham	Test	Hub	Mixed	Comm Fish
	Manokotak	Control	Periphery	Native	Comm Fish
	Togiak	Control	Periphery	Native	Comm Fish
	Naknek*	Control	Periphery	Mixed	Comm Fish
Bering Strait	Nome	Test	Hub	Mixed	Noncom Fish
	Shishmaref	Control	Periphery	Native	Noncom Fish
	Unalakleet	Test	Hub	Native	Noncom Fish
	Gambell	Test	Periphery	Native	Noncom Fish
Calista	Bethel	Test	Hub	Mixed	Noncom Fish
	Nunapitchuk	Control	Periphery	Native	Noncom Fish
	Toksook Bay	Control	Periphery	Native	Noncom Fish
	Scammon Bay	Control	Periphery	Native	Noncom Fish
	Alakanuk	Test	Periphery	Native	Noncom Fish
	Aniak	Control	Hub	Mixed	Noncom Fish
Boroughs					
North Slope	Barrow	Test	Hub	Mixed	Noncom Fish
	Anaktuvuk	Control	Periphery	Native	Noncom Fish
	Nuiqsut	Test	Periphery	Native	Noncom Fish
	Wainwright	Test	Periphery	Native	Noncom Fish
	Point Hope	Test	Periphery	Native	Noncom Fish
	Kaktovik	Test	Periphery	Native	Noncom Fish
NANA	Kotzebue	Test	Hub	Native	Noncom Fish
	Kivalina	Test	Periphery	Native	Noncom Fish
	Deering	Control	Periphery	Native	Noncom Fish
	Buckland	Control	Periphery	Native	Noncom Fish
Kodiak	Kodiak	Test	Hub	Mixed	Comm Fish
	Old Harbor	Test	Periphery	Native	Comm Fish
POSTSPILL					
Aleutians	False Pass	Control	Periphery	Native	Comm Fish
Bristol Bay	Ekwok	Control	Periphery	Native	Comm Fish
(Alaska Peninsula)	Chignik	Test	Periphery	Native	Comm Fish
Kodiak	Kodiak	Test	Hub	Mixed	Comm Fish
	Old Harbor	Test	Periphery	Native	Comm Fish
	Karluk	Test	Periphery	Native	Comm Fish
Cook Inlet	Kenai	Test	Hub	Mixed	Comm Fish
	Tyonek	Test	Periphery	Native	Noncom Fish
Prince William	Seldovia	Test	Periphery	Mixed	Noncom Fish
Sound	Valdez	Test	Hub	Mixed	Comm Fish
	Tatitlek	Test	Periphery	Native	Comm Fish
	Cordova	Test	Periphery	Mixed	Comm Fish

*These villages are Borough sites, although the regions in which they are classified are not.

To assess the questions posed by MMS, we aggregated *Native* villages and we aggregated *Mixed* villages to produce relatively equal proportion. We did this as well for *Hub* and *Periphery* villages. The proportions of *Native* to *Mixed* and *Hub* to *Periphery* vary across all study regions.

The specific combinations of ethnicity and community characteristics that are suited to a study region suit only that region. In Kodiak, for example, the 6,100 residents of Kodiak City (at the commencement of the project), a predominantly non-Native village, dwarf the entire population of Bristol Bay. If Kodiak were represented in strict proportion to the entire sample, its weight would influence the statistical comparisons in such a way as to blur the distinctions that MMS wishes to test. It would swamp the little villages and exercise greater weight than Barrow and Kotzebue combined.

II.B. Village Representations in Samples by Respondents

Given the impossibility of sampling all 128 villages in the original target universe and all 150 in the expanded universe, and also given the theoretical reasons for creating a stratified random sample, the first section of Table 2-2 lists the sample frame for each region by village, total village populations, number of households, and number of respondents. The numbers of households within villages were a major concern for the Social Indicators project because we sampled households, not villagers *in toto*. Table 2-2 demonstrates the representation by household-sampling units for each of the 40 villages in the three schedules. The village household totals and the raw numbers of households in which a respondent is interviewed (section 1 of Table 2-2) are not sufficient to explicate our sampling strategy. Although we selected villages on the basis of the

Table 2-2

SOCIAL INDICATORS **SAMPLING FRAME (PRETEST, POSTTEST, PANELS) BY SCHEDULES, REGIONS, VILLAGES, VILLAGE POPULATIONS, AND YEARS, 1987-1990**

SECTION 1

Rerrion	Village	Village Population (Rounded)	Total Village Households	Pretest No. HH"s Interviewed	Posttest No. HH's Interviewed
SCHEDULE A				1987	1989
Aleutians	St. Paul	600	130	20	5
	Nikolski	50	11	7	0
	Unalaska	1,920	505	30	20
	Atka	80	17	9	5
	Sand Point	870	229	28	5
Calista	Bethel	3,680	968	40	33
	Nunapitchuk	350	76	10	0
	Toksook Bay	370	80	10	4
	Scammon Bay	300	65	5	9
	Alakanuk	560	122	15	6
	Aniak	480	104	12	0
North Slope	Barrow	2,930	771	40	18
	Anaktuvuk	230	50	10	0
	Nuiqsut	310	67	11	0
	Wainwright	510	111	10	5
	Point Hope	580	126	10	15
	Kaktovik	350	76	10	4
NANA	Kotzebue	2,980	784	40	33
	Kivalina	270	59	10	5
	Deering	150	33	5	5
	Buckland	250	54	10	5
SCHEDULE B				1988	1990
Bristol Bay	Dillingham	2,030	534	32	24
	Manokotak	300	65	10	6
	Togiak	550	120	21	12
	Naknek	390	103	11	7
Bering Strait	Nome	3,730	982	31	21
	Shishmaref	410	89	10	5
	Unalakleet	790	171	20	10
	Gambell	500	109	21	12
Kodiak	Kodiak	6,070	1,597	40	40
	Old Harbor	360	78	10	7
TOTAL				548	312

SECTION 2

Proportion of Households Sampled In Each Village

St. Paul	19	Toksook Bay	18	Nuiqsut	16	Deering	33	Nome	5
Nikolski	64	Scammon Bay	22	Wainwright	14	Buckland	28	Shishmaref	17
Unalaska	10	Alakanuk	20	Point Hope	20	Dillingham	10	Unalakleet	18
Atka	82	Aniak	12	Kaktovik	18	Manokotak	25	Gambell	30
Sand Point	14	Barrow	8	Kotzebue	9	Togiak	28	Kodiak	5
Bethel	8	Arraktuvuk	20	Kivalina	25	Naknek	17	Old Harbor	22
Nunapitchuk	14								

Table 2-2
(Continued)

SECTION 2

Number of Households In Village	Proportion of Households Sought for Combined Preteat-Posttest Sample	Proportion of Households Represented In Combined Pretest-Postteat Sample
5 - 20	60 - 80%	64 - 82%
21 - 60	30 - 40%	20 - 38%
61 - 100	20 - 30%	14 - 25%
101 - 250	10 - 20%	12 - 30%
251 - 550	10%	10%
551 +	5 - 10%	5 - 9%

SECTION 3

Region	Village	AOSIS Panels Second Wave	AOSIS Panels Third Wave	KI Protocol	KI Panel
SCHEDULE A		A Panel	A Panel		
		1988	1989	1987	1989
Aleutians	St. Paul	6	5	6	5
	Nikolski	2	2	3	3
	Unalaska	10	7	10	5
	Atka	3	3	3	3
	Sand Point	9	7	7	3
Calista	Bethel	13	13	10	5
	Nunapitchuk	4	2	3	1
	Toksook Bay	4	4	4	3
	Scammon Bay	2	2	3	1
	Alakanuk	6	4	5	4
	Aniak	5	4	3	3
North Slope	Barrow	13	7	11	5
	Anaktuvuk	3	0	3	0
	Nuiqsut	3	0	3	2
	Wainwright	3	2	3	2
	Point Hope	4	3	3	3
	Kaktovik	0	3	3	2
NANA	Kotzebue	13	14	10	8
	Kivalina	4	3	4	1
	Deering	3	3	3	2
	Buckland	4	4	4	1
		N 114	N 92		
SCHEDULE B		B Panel	B Panel		
		1989	1990	1988	1989
Bristol Bay	Dillingham	17	15	10	7
	Manokotak	6	6	3	3
	Togiak	10	10	7	7
	Naknek	5	4	3	2
Bering Strait	Nome	15	15	7	2
	Shishmaref	5	5	3	2
	Unalakleet	10	10	6	2
	Gambell	10	10	9	7
Kodiak	Kodiak	18	14	13	12
	Old Harbor	5	4	3	2
		N 101	N 93	N 169	N 108

theoretical contrasts we wished to make throughout the study, we weighted villages by the total number of households in each of them.

In this research design, as explained above, we sought representation in our samples of Natives and non-Natives; persons in large, complex villages and persons in small, simple villages; villages located near areas that are expected to be directly affected by OCS oil-related activities and villages not so located; and so forth. For example, Nikolski, Atka, Deering, Buckland, and Scammon Bay are very small Periphery villages. Most of the residents are Natives who were born and reared in these villages. They enjoy less infrastructure and services as well as less employment in general and less private-sector employment in particular, and they incur greater expenses to travel to minor and major markets and medical centers than do the residents of *Mixed:Hub* villages, such as Bethel, Nome, and Unalaska. Although the small *Native:Periphery* villages are inherently interesting, the MMS charged us with ensuring the adequate representation of Natives (persons) in our research design to assess specific questions about consequences to Natives and Native villages from oil-related developments.

In contrast to the small village, say, of Deering, the City of Kodiak is a large community of 6,700 people (about 6,100 in 1986 when the original sample was drawn), 86 percent of whom are non-Natives. Kodiak was represented by only 40 households, or about 2.5 percent of the households in the village, in the 1988 pretest sample. In the 1990 posttest sample, we drew another 40 households that increased representation to about 5 percent of all Kodiak households. If our 1987 and 1988 pretest sample had been weighted to reflect equal proportions of every village's population, the effects of Kodiak

alone would have heavily skewed ethnicity for the entire A and B schedule. The City of Kodiak's population is larger than the entire Bristol Bay population, and larger than that of Barrow and Kotzebue combined. To avoid swamping the data from the small, more homogeneous, Native-dominated villages by data from the large, heterogeneous, non-Native-dominated villages--such as Kodiak City, Dillingham, and Unalaska--we sampled larger proportions of households in the small villages (*Periphery* and Native) than in the large villages (*Hub* and Mixed).

Upon analyzing the pretest results (1987-1988 research waves) and discovering the very large differences between Native and non-Native respondents on a wide range of topics, we increased the samples in the *Mixed* villages in the 1989 and 1990 samples. The Exxon Valdez oil spill also prompted us to increase the sizes of *Mixed* village samples in Dillingham and Kodiak in 1990. Because the important community dimensions in this study are poorly measured in terms of population *per se,* representativeness is only partly evaluated in terms of population parameters as normally defined and tallied.

The decisions we made to include larger proportions of the smaller villages, and smaller proportions of the larger villages, are evident in section 2 of Table 2-2. This portion of the table shows the proportion of households from which a respondent was drawn in each village, the fit between the proportions of respondent households we sought in villages of various sizes, and our eventual success in matching those proportions. In a few instances, we did not achieve the proportion of respondent households we had projected to include in a village (Tooksook Bay, Nunapitchuk, Aniak,

Nuiqsut, and Anaktuvik). There are several reasons why: some villages could not be reached during the posttest wave because of inclement weather (inability of the field researchers to fly into the villages during the research period); some were not visited because the costs to do so were high and because they were *Control* villages located long distances from the coast (Anaktuvik and Aniak). Conversely, we oversampled in one village because the villagers requested us to do so (Gambell).

Section 3 of Table 2-2 is the frequency distribution of AOSIS questionnaire-panel respondents and protocol respondents selected at random from the pretest samples and of protocol-panel respondents (those persons in the original protocol sample who were located and reinterviewed in 1989). .

For the total Schedule A and B sample, this plan has the advantage of requiring only N= 1,296, comprising N= 748 (I) initial interviews and N= 448 (RI) reinterviews. A separate sample design of comparable statistical power requires N= 7,000 interviews. A more important advantage is the design's flexibility. Because Schedules A and B are self-standing schedules with embedded panels, the design can be easily modified.[18] But to return to the issue of flexibility, we had several reasons and several occasions to use this flexibility. The first instance was the incorporation of Kaktovik as a *Test* village in the A panel to accommodate a change in the leasing schedule and MMS's proximate goal of controlling information on villages likely to be affected by imminent lease sales and oil-related activities. The second was increasing the number of interviews conducted in the City of Kodiak during the Schedule B posttest [0BD]. The increase was prompted

[18]Schedule C (Exxon Valdez spill sample) also can stand alone, although the benefits of comparisons with the commercial-fishing villages in the Schedule B sample will be obvious.

by the need to increase non-Native representation for optimum contrasts on several significant topics concerning naturally occurring resources.

II.C. Mapping the Villages and Sampling the Households

During the 1987 (7A) and 1988(8B) field session, the questionnaire investigators (QI's) and the key investigators (lU's) overseeing them mapped every house in each sample village that they entered. Occupied houses were distinguished from unoccupied houses, and the occupied houses comprised the sampling universe for the village. Each occupied house was assigned a number 1,2,...*n*. A table of random numbers was consulted to select the households in the proportions established before entering the field. Rejections were replaced by returning to the original stopping place in the table of random numbers. The sample was completed by selecting random numbers and the house to which it was assigned until the proportion for the village was reached.

Upon completion of the initial sample, the KI in each region drew from it a one-third sample, following the same procedure of consulting a table of random numbers until the sample was completed. There were no refusals to respond to protocol inquiry after having been administered the AOSIS questionnaire.

The Schedule A reinterview panel for 1988 (8A2) and 1989 (9A3) was selected at random from 1987's 7A sample (the first-wave responses drawn from 7A are designated as 7AP). That panel, constituting one-third of the initial wave of A, was not replaced. The Schedule B reinterview panel for 1989 (9B2) and 1990 (0B3) constituted one-half of the initial wave of B, drawn at random. A larger panel was selected to provide better

balance between *Natives:Non-Natives, Mixed:Native*, and *Comm. Fish:Noncom. Fish* contrasts.

III. CONTROLS IN THE SAMPLING DESIGN FOR INTERNAL AND EXTERNAL VALIDITY

The Solomon Four Group Design has facilitated controls to threats of internal and external validity which, though distinct, are controlled by static design features, such as the control groups (theoretical contrasts), a multiple sampling methodology that includes longitudinal sampling and multiple methodologies and data sets. We focus on the sampling methodology here not solely because of the OMB requirement that we do so, but also because it is through the sampling methodology that we have been able to control for the most important threats to internal validity: (1) test *artifacts* (instrument reactivity wherein initial interviews bias responses to interviews), (2) *history* (responses conditioned by historical context--a form of Galton's problem and a special form of autocorrelation--in which responses of several respondents are dependent or interdependent rather than independent from one another), (3) *reliability* (whether persons give similar answers on the same interview, on different interviews, to different interviewers, and so forth), and (4) *nonresponse* (differential subject loss).

A full explanation of the sampling design will occasion some redundancy, but understanding should be benefitted by repetition. Separate samples were drawn the first 2 years of the inquiry (pretest), and separate samples were drawn the following 2 years of the inquiry (posttest) from among the same villages. This panel design is similar to a "separate" sample design mentioned above as "separate sample pretest-posttest" (without

replacement). A proportion of respondents initially interviewed (I) in the 1987 pretest sample (7A) were selected at random for a panel (A Panel). They were reinterviewed (RI) in 1988 (8A2) and 1989 (9A3).[19] Similarly, a pretest sample was drawn and interviewed (I) among Schedule B villages in 1988 (8B). A subsample of that pretest sample was selected to form a panel (B Panel) and was reinterviewed (RI) in 1989 (9B2) and 1990 (0B3).

Thus, each panel was reinterviewed twice, providing the bases to calculate over-time stationariness (stability) and over-time reliability coefficients, to measure testing artifacts, and to test multivariate hypotheses about change.[20] Valid conclusions about change in indicator systems cannot be achieved without accurate measures of stability and reliability of items. (For example: Do they remain the same or do they change over time? Do they correlate strongly and positively or do they yield low correlations rife with variation?) Reinterviews, when contrasted with initial interviews conducted at the same time, can indicate testing artifacts. The separate samples drawn from the opposite panel (B as a check on A, and A as a check on B) afford tests of testing artifacts, as do posttest interviews (drawn without replacement) from Schedule A villages and Schedule B villages in 1989 and 1990.

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[19] Throughout, the following system is used to differentiate samples: I= Initial Interview, R= Reinterview, 7= 1987, 8= 1988, 9= 1989, O= 1990, 1 = 1991, **2 = Second Wave Interview for Respondents to an Earlier Interview, **3 = Third Wave Interview for Respondents to Earlier Interviews. Thus, 8A2 signifies that this sample is the 1988 second wave of the A Panel (following the Schedule A pretest interview); 9A3 signifies that this sample is the 1989 third wave of the A Panel.

[20] At several places below, we introduce discussions of testing artifacts (or test effects), stationariness, and change. The three are inextricably bound in our pretest-posttest design with embedded panels. We implemented the design to distinguish variables that are sensitive to internal and external factors. Stationary variables can change, and the change can be measured by systematic companions and controls. We seek to determine stationariness and the factors that influence some stable variables to change.

Figure 2-2 denotes the time schedule of the original sampling design for A and B (top), and the addition to the design prompted by the Exxon Valdez oil spill in the spring of 1989. The schedule demonstrates the manner in which responses were compared within years and between years. For example, in 1988 the A Panel (8A2) responses were tested against the B Pretest (8B) responses for testing artifacts, and the same A Panel responses were tested against responses by identical informants in the previous year (7AP subsample of 7A) for stationariness and reliability.

III.A. Minimizing Nonresponse

We sought to minimize nonresponse by conducting face-to-face (FTF) interviews during 1987. At that time, we intended to switch our reinterviewing methodology to administering the questionnaire either by **mail or** by telephone. We presumed that the cost savings would be possible after initial respondents had become familiar with the questionnaire. Our experiences during the 1987 field session disabused us of that presumption. Our sample included monolingual Natives for whom administering the questionnaire took considerably more time than for bilingual respondents, But in addition, concepts in English (e.g., completely satisfied, very satisfied, mostly satisfied, somewhat satisfied, not satisfied) did not readily translate into Native languages, nor were they commonly used concepts. But our decision to administer the instrument FTF also allowed us to avoid the bias that would be introduced by restricting the sample to households with telephone hookups. Telephone densities vary considerably throughout Alaska. The communities in our sample are not exceptional in this regard.

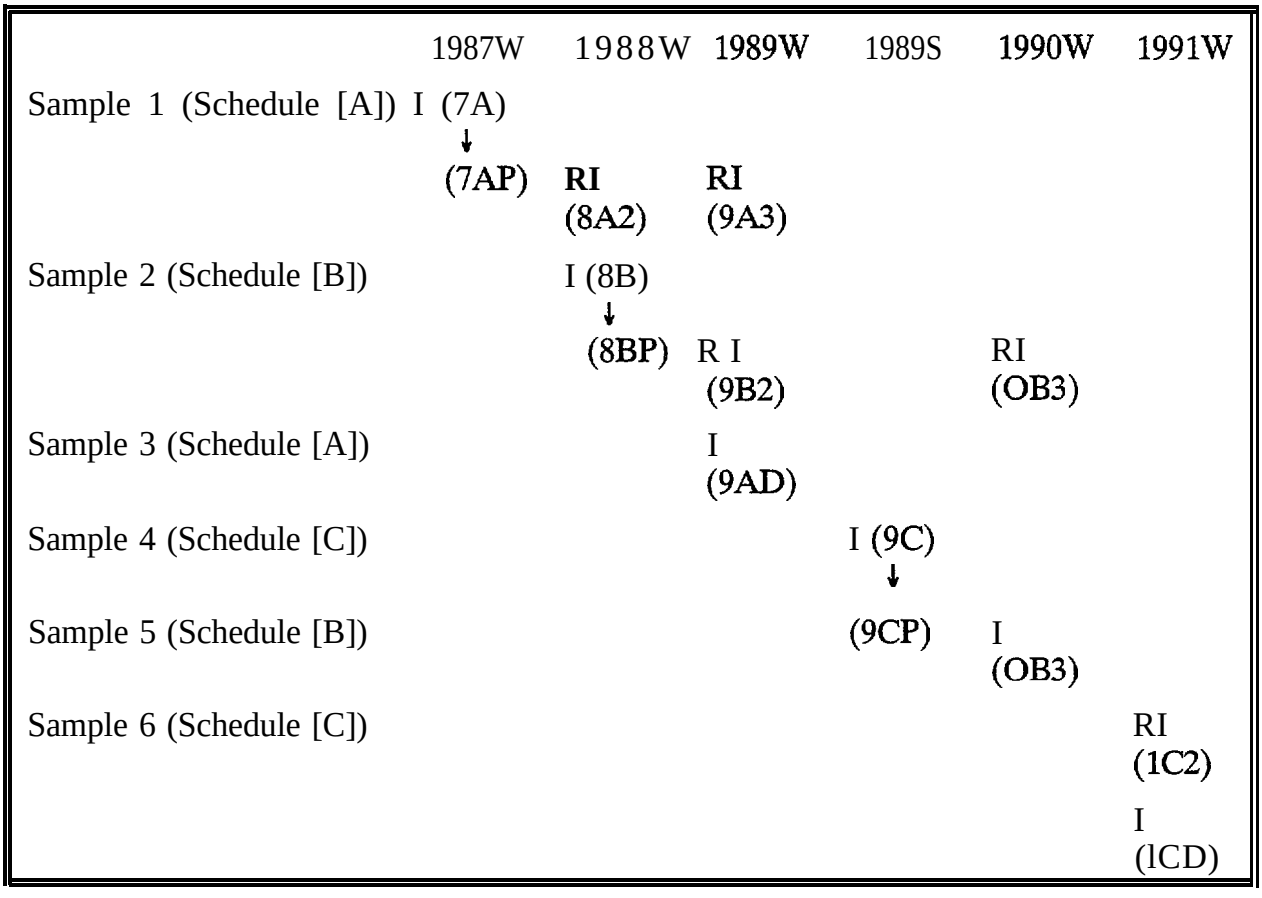

FIGURE 2-2. TIME SCHEDULE OF THE SAMPLING DESIGN.

The ALASCOM provided us with tallies of listings for each of the 31 villages in our AOSIS sample and the likely proportion of business hookups. We calculated densities as the percentage of the ratio of residential, business, public, and multiple-line telephones to the estimated number of households (obtained from the Alaska Department of Labor and/or the Alaska Department of Community and Regional Affairs revenue-sharing data and/or borough-census figures). The range of aggregate telephone densities (business, public, residential, and multiple lines) in 1987 was from 54 percent in Buckland (NANA region/NANA borough) to 326 percent in Kodiak (Kodiak region/Kodiak borough). Kodiak, by Alaskan village standards, is most unusual: its population is overwhelmingly non-Native (86%), large (6,100 in 1986, 6,700 in 1990), and diverse in private-sector businesses and public-sector services and administration. In our classification scheme, Kodiak is a *"Mixed-Hub-Test-Comm Fish-Borough"* village. Buckland is a small Native village (population 248) in the hinterland with almost no private-sector businesses and with limited public-sector services and administration. In our scheme, it is a *"Periphery-Native-Noncom Fish-Borough"* village (although it was not incorporated into a borough when this study commenced). The differences in village telephone densities between Kodiak and Buckland are not unexpected.

As Table 2-3 demonstrates, the differences in densities for sample respondents vary from the densities for villages. In Kodiak, 93 percent of the respondents were hooked up during the 1988 field session. During the 1987 field session, 40 percent of Buckland respondents households were hooked up. Hookups and disconnects are frequent in village Alaska. The range of residential hookups among villages in our

Table 2-3

AOSIS SCHEDULE A AND B TELEPHONE DENSITIES, ENTIRE COMMUNITY VS. PRETEST SAMPLE RESIDENTS, **1987-1988**[a]

community	Overall Density	Sample Residence Density
Alakanuk	82%	40%
Anaktuvuk Pass	119%	70%
Aniak	78%	67%
Atka	210%	78%
Barrow	191 %	75%
Bethel	209 %	63%
Buckland	54%	40%
Deering	117%	40%
Dillingham	213%	85%
Gambell	105 %	15%
Kaktovik	107%	80%
Kivalina	73%	10%
Kodiak	326 %	93%
Kotzebue	171 %	63%
Manokotak	98%	100%
Naknek	n/a	73%
Nikolski	133%	57%
Nome	207%	88%
Nuiqsut	105 %	45%
Nunapitchuk	108%	30%
Old Harbor	95%	60%
Point Hope	92%	40%
Saint Paul	101 %	70%
Sand Point	n/a	89%
Scammon Bay	90%	40%
Shishmaref	87%	100%
Togiak	107%	80%
Toksook Bay	97%	60%
Unalakleet	133%	70%
Unalaska	145 %	87%
Wainwright	n/a	90%

'Estimated overall densities are based on ALASCOM data. Figures include residences, businesses, multiple lines, and public telephones. The denominator, however, is the estimated number of households based on approved Alaska Department of Labor or Alaska Department of Community and Regional Affairs revenue-sharing population data, or borough census figures where they exist. The "ne" denotes that ALASCOM date are unavailable for selected communities. Sample densities exclude "contact" telephone numbers for friends, relativea, or employers.

sample, as reported above, was 10 percent to 100 percent in 1988. Should those densities have been disregarded and sampling proceeded among households with telephone hookups alone, the sample would be exceptionally biased.

Of the 31 villages in the sample, 10 have aggregate telephone densities (business, public-sector, and multiple-line hookups included) of less than 100 percent. Sample residence density is another issue: the range of telephone densities by *sample* residences is 10 percent to 100 percent. In 9 of the villages, less than 50 percent of the respondents have telephones. The average sample density is 64.5 percent (respondents with telephones).

The 1988 field session in which we reinterviewed A Panel (8A2) and administered initial interviews to the Schedule B sample (8B) provided empirical evidence that FTF interviews are expensive, certainly more expensive than a typical "separate sample" design, in which interviews are conducted over the telephone. But the Solomon Four Group's panel design provides inherent statistical power that offsets the expense.

Hookups are one issue, monolingual informants or informants who otherwise have difficulty responding to a structured instrument in which choices are forced are others. Face-to-face interviewing was the only way we could avert potential threats to internal validity and testing artifacts.

As a caveat about the adequacy of telephone interviewing, during the summer of 1990 we sought to contact by telephone every respondent in our study (combined Schedules A and B) (N = 862) to determine whether the respondent was a commercial fisherperson. It was evident that respondents in North Slope villages and Gambell (St.

Lawrence Island) were not commercial fishermen, so we eliminated them from our sample, reducing *N* to 676. Our QI researchers, (Native speakers, university trained in social science and members of our field research team), went over our entire list of most recent telephone numbers for respondents. We had sent letters to each respondent each year to inform them of our study's progress and to record any change of telephone service (new number, disconnect, and the like). In addition, each year more than a third of the Schedule A and Schedule B respondents were reinterviewed, either as participants in a QI panel, a KI panel, or both. Panel interviewing was face-to-face, so provided the best possible means for learning whether telephone service was on-line or had been changed.

David Chanar, an assistant on the project, established ground rules for contacting all respondents by telephone:

(1) If telephone logs were incomplete, there would be no attempt to make contact.

(2) Four attempts would be made to contact a respondent (R), two during weekday working hours and two after hours or on weekends.

If an R was not contacted in the initial call, Mr. Chanar would call that person a second time at a later date. If that person was not contacted on the second try, the name would be put aside for a week while other R's were pursued. The researchers would resume trying to contact the R who could not be contacted earlier. If, after two more attempts--i.e., four attempts in all--the R could not be contacted, the attempt was scored as "No Contact."

Tables 2-4 and 2-5 demonstrate the results of 3 months of telephoning.[21] Working from the most recent telephone numbers respondents had given us, we were able to contact 26 percent of the *Comm Fish* sample (N = 676). Of the total sample, 24 percent neither had phone service when initially interviewed nor when we attempted to contact them in late 1990. Eliminating the 24 percent (N = 163) who did not have phones during the duration of our study, our sample was N = 513 (hence two N's for Schedule A and Schedule B in Table 2-5). We learned the following about the 513 R's: 29 percent had recently had their service disconnected, 36 percent could not be contacted, and 35 percent were contacted.

The range of telephone disconnections for respondents by village is remarkable, from O percent to 50 percent. Some of the tiniest Native villages had the fewest telephones and the fewest disconnects (e.g., Nikolski and Nunapitchuk) and also the most disconnects (Scammon Bay, Atka, and Deering). And some of the largest villages also had relatively few disconnects as well as relatively many disconnects. The predominantly non-Native, commercial-fishing village of Dillingham, had 8 percent disconnects, but the range among similar types of villages was great: in order, Kodiak and Naknek had 31 percent and 33 percent disconnects, and Unalaska and Sand Point had 45 percent and 50 percent. Among *Mixed* villages (> 26% non-Natives) not

***'North Slope villages (Schedule A) and Gambell respondents (Schedule B) were eliminated from this telephone survey, and not all sampled respondents were sampled in other villages if telephone logs were incomplete at the time of the survey. "No Phone" signifies that the sample residence did not have telephone service. "Contact" means that the respondent household was contacted by telephone. "No Contact" means that no telephone contact was completed after four trials (two during weekday working hours and two after hours or on weekends). "Disconnect" signifies that the telephone service had been disconnected, that the telephone number had been reassigned, or that the respondent(s) moved.**

Table 2-4

TELEPHONE RECONTACT TABULATION,
SCHEDULES A AND B, FALL 1990'

Schedule and N	No Phone	Contacted	No Contact	Disconnect	Disconnect Percentage
Schedule A (364) *(249)*	115	84	77	88	24%
Schedule B (312) (264)	48	95	107	62	20%

Table 2-5

TELEPHONE RECONTACT TABULATION
BY VILLAGE, SCHEDULES A AND B, FALL 1990

Village N and N	No Phone	Contacted	No Contact	Disconnect	Disconnect Percentage
Atka (14) *(12)*	2	6	5	1	8%
Alakanuk (21) *(8)*	13	4	2	2	25%
Aniak (12) *(8)*	4	5	2	1	13%
Bethel (64) (49)	15	18	10	21	43%
Buckland (15) *(9)*	6	6	1	2	22%
Deering (10) (2)	8	1	0	1	50%
Dillingham (57) *(50)*	7	21	19	4	8%
Kivalina (15) *(5)*	10	1	2	2	4%
Kodiak (80) *(71)*	9	21	28	22	31%
Kotzebue (73) (50)	23	17	14	19	38%
Manokotak (16) (15)	1	5	10	0	o%
Naknek (17) *(15)*	2	5	5	5	33%
Nome (51) (47)	4	14	22	11	23%
Nikolski (7) *(4)*	3	1	3	0	o%
Nunapitchuk (6) *(3)*	3	1	2	0	0%
Old Harbor (13) *(7)*	6	4	1	2	29%
St. Paul (25) *(17)*	8	5	8	4	24%
Sand Point (33) (30)	3	5	10	15	50%
Scammon Bay (5) *(2)*	3	1	0	1	50%
Shishmaref (16) *(15)*	1	4	7	4	27%
Togiak (32) *(24)*	8	10	10	4	17%
ToksookBay (14) *(10)*	4	5	4	1	10%
Unalakleet (30) *(20)*	10	11	5	4	20%
Unalaska (50) *(40)*	10	8	14	18	45%

dominated by commercial fishing, the range also was wide (23% disconnects in Nome, **43$% in** Bethel).

The point here is not to account for differential rates of discomects among the *Comm Fish* sample. It is evident that several factors are operating, including disconnects because of financial embarrassment and/or out-migration because of economic exigencies; seasonal discomects (among some commercial fisherpersons who spend only parts of the year in Aleutian, Kodiak, and Bristol Bay villages). The high rates of sample Table 2-4 residence-telephone densities when initially interviewed are instructive. The seven villages with high rates of non-Native residents (≥ 26%), whether or not they are dominated by commercial fishing, also had high rates of telephone connects among respondents during initial interviews (86% unweighed average). The telephone connects during initial interviews for respondents in the 17 predominantly Native villages in the *Comm Fish* sample was **23** percent less **(63%** unweighed average).

The failure to make contact with 65 percent of sample respondents who had telephones when initially interviewed (or subsequently reinterviewed in panel waves) demonstrates the folly of attempting test-retest questionnaire research by telephone in rural Alaska.

Rejections/Refusals: A second form of nonresponse is refusal to be interviewed. Rejection rates are a threat to validity. If the reasons for which potential sample respondents refuse to be interviewed are systematic (for the same intention or reason), randomness is not achieved and a biased sample results. The assumptions of the

theoretical sampling distributions we have employed would be violated and applications would be invalid.

During the 1987 and 1988 field sessions, 568 persons were approached and were requested to participate in an AOSIS interview 548 persons were interviewed, 20 were not. Table 2-6 tallies the rejections by villages for the pretest waves of Schedules A and B. We sought as much information as we could get as to the reasons for which some potential respondents rejected our requests. Fifteen of the twenty rejections occurred in the *Hub-Mixed-Test* villages of Barrow (3), Bethel (4), Dillingham (3), Nome, (4) and Kodiak (l). Among these, eight were not refusals *per se. These* persons asked the QI's something to the effect of "How long will you be here?" (i.e., "I cannot work it into my schedule now, but if you will be here on [some specific day in the future], I can do it.") We attribute these rejections to scheduling conflicts because the potential respondents were not available until after the researchers left the village. We have no information on the other seven persons who did not participate, so we have no way of knowing whether they shared similar reasons for not participating.

The differences between sample respondents in the hubs and those in the smaller villages are obvious. Gambell, with a population of 500, had been frequented by several research teams in the 2 years prior to our initial entry there during the early winter of 1988. Four provided the same reasons for their refusals to comply with our requests: they had been studied too often and, perhaps, to no avail. They did not want to have their privacy invaded. The overall refusal proportion is 3.6 percent. Upon accounting

Table 2-6

AOSIS SAMPLE RESPONDENT REJECTION RATE, PRETEST SAMPLES, SCHEDULES A AND B (N=548), 1987-1988[a]

Community	Rejections	N	Rejection Proportion
Alakanuk	0	15	0%
Anaktuvuk Pass	0	10	0%
Aniak	0	12	0%
Atka	0	9	0%
Barrow	3	40	7.5%
Bethel	4	40	1 0%
Buckland	0	10	0%
Deering	0	5	0%
Dillingham	3	32	9%
Gambell	4	20	20%
Kaktovik	0	10	0%
Kivalina	0	10	0%
Kodiak	1	40	2.5%
Kotzebue	0	40	0%
Manokotak	0	10	0%
Naknek	0	11	0%
Nikolski	0	7	0%
Nome	4	32	12.5%
Nuiqsut	0	11	0%
Nunapitchuk	0	10	0%
Old Harbor	0	10	0%
Point Hope	0	10	0%
Saint Paul	0	20	0%
Sand Point	0	28	0%
Scammon Bay	0	5	0%
Shish maref	0	10	0%
Togiak	0	21	0%
Toksook Bay	0	10	0%
Unalakleet	1	20	5%
Unalaska	0	30	0%
Wainwright	0	10	0%

[a] Rejection Proportion: Proportion = rejections/ssrnple N. Total sample refusal proportion: 3.6%. Adjustment for schedule conflicts as reasons for refusal (8). Adjusted sample refusal proportion: 2.2%

for eight rejections as scheduling conflicts within the larger communities, we conclude that the remainder, 2.2 percent, does not indicate significant bias in our sample.

III.B. Ecological Fallacy and Nonpanel Contrasts

The ecological fallacy is a ubiquitous problem in separate sample pretest-posttest designs (Chap. 1.11.). We have rendered ecological fallacy moot in this design because in nesting the panel within the larger AOSIS separate sample pretest-posttest design, we estimate panel parameters at the individual level (or the microlevel). It is our contention that ecological fallacy is a specification error in primary survey research (see Hanushek and Jackson 1977:4.3). The panel can be used to statistically correct aggregation or any other specification bias.

In this design, we have focused on the panel's application to nonpanel contrasts (contrasts with pretest and posttest samples). At the outset of this inquiry, we had empirical reasons to assume that nonpanel effects were at least proportional to panel effects. Our research supports this assumption.

III.C. Internal Validity

Our panel model provides explicit controls for the threats to AOSIS's internal validity posed by *history* and *regression*. *These two* threats occur if, and only if, an AOSIS indicator is temporally unstable or, technically, if it is nonstationary. Our panel model include explicit Table 2-6 stability structures to test null hypotheses based on these two threats. If a null hypothesis is rejected, the same explicit stability structures make statistical corrections for the degree of indicator instability.

IV. INCREASING STATISTICAL POWER

IV.A. Reductions in Sample Size

The nested panel design allows us to work confidently with much smaller samples than is possible with "separate sample" designs. For example, AOSIS questionnaire item A30 asks respondents to answer yes or no to whether subsistence foods comprised part of the meals that they consumed 2 days prior to being interviewed. In 1987, 65 percent of the 114 persons in the A Panel responded yes, designated as P, and 35 percent responded no, designated as Q. In 1988, 63 percent of the same persons responded yes, and 37 percent responded no. Change in this item is inferred from the proportional difference P-Q. In a panel design such as ours, the variance is bounded by

$$V.(P-Q) < .25/N1 + .25/N2 - COV(P, Q)$$

where N1 and N2 are 1987 and 1988 sample sizes.

In a separate sample design, on the other hand, variance is bounded by

$$VAR(P-Q) < .25/N1 + .25/N2$$

Because it will always be the case that

$$.25/N1 + .25/N2 - COV(P, Q) < .25/N1 + .25/N2$$

panel-design variances will always be smaller than separate sample variances, just as designs that sample without replacement always have smaller errors of the estimate than comparable samples drawn with replacement.[22]

AOSIS and KIP, the bases for the Social Indicator monitoring systems, are designed to monitor change. Separate samples, in general, are not recommended for

[22] See Sample Design in Business Research (E. W. Deming 1960) for a discussion of the advantages of replicated sampling end interpenetrating subsamples for estimating standard errors and increasing statistical power, and see Surveys as Social Indicators: problems in Monitoring Trends (Elizabeth Martin 1983) for a recent discussion of the advantage of panel samples.

measuring change, whereas embedded panels are ideally suited for measuring change. If we let V be the change in π from t_0 to t_1. Then

$$v = \pi_1 - \pi_0$$

$$\delta_v^2 = \delta_{\pi 1}^2 - 2E(\pi_1\pi_0) + \delta_{\pi 0}^2 \text{ and } \hat{\delta}_\pi^2 = [\hat{\delta}_{\pi 1}^2 - 2E(\hat{\pi}_1\hat{\pi}_0) + \hat{\delta}_{\pi 0}^2]/N$$

Measuring π from panel respondents (the same respondents) at two points in time (longitudinal), or three points in time (over time), will produce covariance terms that are quite large while minimizing the sampling variance of V.

One compelling property of panel models is that they can reduce the cost of one aspect of survey research by reducing the number of instruments that must be administered. Dollars that are saved by reducing the number of instruments that must be administered can be allocated to controlling other threats to validity. As to the question of sample size: in order to detect a change of (P-Q=) .05 at 95-percent confidence, separate sample designs require N= 1,536 interviews. The analogous N for a panel design depends on the size of COV(P, Q). The following table demonstrates required N's for a range of COV(P, Q) values. The differences from the separate sample design are obvious, inasmuch as an N of 171 in a panel design can detect a change of (P-Q=) .02 at 95-percent confidence.

N	*COV(P, Q)*
1,098	.0010
768	*.0025*
512	.0050
308	.0100
219	.0150
171	.0200

IV.B. Sampling Techniques and Theoretical Contrasts Employed to Optimize Statistical Power

As explained above, we rejected sampling with replacement for several reasons concerning validity. Among them is the issue of statistical conclusion validity and the relation of standard errors of the estimate to that issue. Sample size was one crucial issue. If researchers replace respondents and/or refusals in the sampling universe, sample size must increase. In most formulae provided in introductory statistics texts, subsamples, alone, must include at least 200 households. Because only 12 villages in the three schedules have at least 200 households, and because 4 small villages in our Exxon Valdez spill-area sample (Schedule C), alone, have no more than 26 households, the prescriptions of introductory texts are neither sufficient nor warranted for this research.

Most of the villages in this study are too small for a Normal approximation. Moreover, even if Normal approximation were warranted, zero nonresponse must be assumed. In practice, as N increases, nonresponse to iterns increases. The purpose of the large N is thus defeated. These large survey-sample formulae apply solely to within-item hypotheses, and even these hypotheses are unwarranted for the Social Indicators research project.[23] We define subpopulation theoretically in terms of *Hub:Periphery*, *Test:Control*, and so forth. As Table 2-1 makes clear, villages maybe similar on all theoretical characteristics, dissimilar on all, or any combination in between. Although populations in two *Mixed-Hub-Test* villages maybe similar, such as Bethel and Valdez,

[23] Within-item hypotheses posit that the proportion p who respond yes to a binary item equals the proportion l-p who respond no. Such hypotheses are meaningful in political polling because a candidate needs 50 percent or more of the vote to win (in a two-eandidate race). In the present research, p has no absolute meaning and can only be interpreted to another subpopulation or to the same subpopulation over time (e.g., our Hub: Periphery or Test:Control or 7A vs. 8A2).

there are proportionally more non-Natives in Valdez (90%) than in Bethel (50%). Similarities and differences of this sort outweigh the similarities and differences by nominal regions.

In MMS's submission to OMB (Supporting Statement for Alaska OCS Social Indicators Survey [Support Statement] 1987) to justify the use of the AOSIS instrument in survey research, populations, samples, and 95-percent-confidence intervals for theoretical arid regional contrasts for each year of the study were presented (see Table 13 a-d, pp. 91a-91b of the Support Statement 1987). It was demonstrated that a 60-percent increase in AOSIS sample size between 1987 and 1988 reduced the confidence intervals for nominal regional contrasts by less than 10 percent on average and did not reduce them uniformly across regions. (Increased N's, then, do not reduce the standard error estimates uniformly.) Our design favors theoretical contrasts rather than regional contrasts, for which we demonstrated that confidence intervals were reduced by more than 20 percent on average between 1987 and 1988.

In 1989 and 1990, we sought to balance the *N's* to optimize the statistical power of the theoretical contrasts for *Comm Fish:Noncom Fish* and *Mixed:Native*. Our balancing did not optimize all contrasts, and several changes we had not anticipated occurred in the contrasts for several reasons beyond our control. Most crucial among them is actually a family of factors inherent in the organization of social phenomena--the vagaries of unpredictable social and economic events. The Exxon Valdez oil spill of March 24, 1989, caused the reclassification of Old Harbor (on Kodiak Island) from a *Control* village to a *Test* village. The organization and ratification of a borough in the

Northwest Alaska region in 1989 caused the reclassification of Kotzebue, Deering, Kivalina, and Buckland from *Not Borough* to *Borough*. *The* loss, followed by the resumption, of daily commercial flight service to the Bering Strait village of Unalakleet caused the reclassification of that village from *Hub* to *Periphery*, then back to *Hub* again. Wainwright and perhaps Point Hope (North Slope villages) hover between classification as *Mixed* or *Native* depending on the number of capital-improvement projects under way in those villages.

The vagaries in these examples are economic--often but not always functions of the relations between the plunging price of oil and public transfers to villages. The Exxon Valdez spill, in the vernacular of Charles Perrow (1984), is a "normal accident," that is, a normal consequence of combinations of unanticipated system failures in complex technologies. We increased the *N*'s in the 1990 posttest sample so as to increase the representation of non-Native respondents in *Mixed* villages. This procedure required only random sampling, not stratified sampling, for non-Natives within *Mixed* villages. The non-Native population of Kodiak, for example, is nearly six times as large as the Native population, so simple random assignment increased the proportion of non-Natives to Natives.

Table 2-7 demonstrates the statistical power of the pretest, posttest, and combined pretest-posttest samples. Table 2-7 results are a product of the multiple goals of the Social Indicators project, some of which are at odds, as well as the vagaries of some aspects of social change. For external validity, *N*'s must be optimally variant; but for statistical power, *N*'s must be minimally variant. Within the topic of statistical power,

Table 2-7

95-PERCENT-CONFIDENCE INTERVALS, SCHEDULES A AND B SOCIAL INDICATORS STUDY, ALASKA, 1987-1990

Schedule A and B, Pretest Sample (Combined) 1987-1988 (N = 548)[a]

Contrast	P1	P2	N1	N2	95-Percent-Confidence Intervals (Best) P-Q	(Worst) P-Q>/
Hub: Periphery	5530	1610	305	243	.0422	.0827
Test: Control	5850	1290	339	209	.0434	.0852
Mixed: Native	4785	2355	281	267	.0425	.0834
Not Borough: Borough	3460	2070	331	217	.0429	.0841
Comm Fish: Noncom Fish						
Aleutian-Pribilof vs. Others	715	6425	94	454	.0570	.1117
Calista vs. Others	1275	5865	92	456	.0558	.1094
North Slope vs. Others	1365	6125	91	457	.0585	.1147
NANA vs. Others	810	6330	65	483	.0638	.1251
Bristol Bay vs. Others	770	6370	74	474	.0642	.1259
Bering Straita vs. Others	1185	5955	82	466	.0585	.1147
Kodiak vs. Others	1370	5770	50	498	.0714	,1400

Schedule A and B, Pretest-Posttest Samples (Combined) 1987-1990 (N = 861)[b]

Hub: Periphery	509	352	.0427	.0839	
Test: Control	648	213	.0460	.0880	
Mixed: Native	487	374	.0424	.0821	
Not Borough: Borough	467	394	.0420	.0823	
Comm Fish: Noncom Fish	328	533	.0440	.0860	

[a]Panel reinterviews are ignored throughout the two sections of this table. The regional strata provide the "worst" 95-percent-confidence intervals in the sample. The worst cases among the theoretical contrasts in our research design are the Test:Control and Comm Fish:Noncom Fish contrasts. In the pretest sample, for example, we are 95-percent confident that a difference of slightly less than 9 percent (.0852) can be detected. In other words, if some measure varied by 9 percent between the Test and Control subpopulations, we can detect that change and it will not be attributed to chance.

[b]The posttest sample (N = 313) is smaller than the pretest sample (N = 548). The "best" standard errors of the estimate range for the combined pretest-postteat sample are .0420 to .0460 and the "worst" from .0821 to .0880.

The combination of poattest and pretest samples-respondents drawn at random and interviewed once and only once-is justified by the analysis of stationariness and testing artifacts-demonstrates the effects of increased sample size in which optimization of contrasts is sought. The Exxon Valdez oil spill caused the reclassification of Old Harbor from Control to Test, migration caused the reclassification of Kotzebue from Mixed to Native, and the creation of a borough caused the reclassification of all NANA region villages from Not Borough to Borough. The worst-case detectable differences fall below 9 percent (below the 10% target difference mentioned in the RFP). This design has the statistical power and general sensitivity to be 95-percent confident that the survey instrument, as refined through validation, sensitivity, and reliability test in 1987, can detect changes between subpopulations of less than 9 percent in an AOSIS indicator.

two problems of estimating differences are at odds. For example, estimates of π and Θ from subpopulations P and Q have upper-bound sampling variances

$$\hat{\delta}^2_{\pi} = .5(1-.5)/N_P \text{ and } \hat{\delta}^2_{\pi} = .5(1-.5)/N_Q$$

But the upper-bound sampling variance of the estimated difference is

$$\hat{\delta}^2_{\pi-\Theta} = .5(1-.5)\ (N_P+N_Q)/N_PN_Q$$

The equation assumes, of course, that π and Θ are nominal proportions, that all requirements of a Normal distribution are met: variances must be weighted for P and Q. Assuming these conditions, sampling variances of π and Θ are minimized when their N's are proportional to P and Q, but sampling variance of π-Θ when their N's are equal (Frankel 1983:32-34). We can require N's to optimize π or Θ, but not both.

Exceptions to the rule are trivial, unrealistic, or unacceptable. With an unlimited budget, we could increase *N*'s to the point where sampling variances approached zero, or we could ignore questions of validity, reliability, and nonresponse--investing the resources saved into larger N's. We chose to pursue questions of validity, reliability, and nonresponse, so as to balance the goals of the indicator research in a pragmatic fashion.

On Balancing the Sample and Design Flexibility Other things being equal, statistical power is optimized when *N's* are equal for the contrasted subpopulations (Frankel 1983:32-34). The theoretical contrast for Commercial *Fish:Noncommercial Fish* arose after the 1988 field session. We reassigned interviews to accommodate this contrast and reduce the size of the confidence interval, much as we did prior to the 1988 field session to accommodate the *Borough:Not Borough* contrast. The balancing for both the borough and commercial-fishing contrasts was prompted by consideration of the

similarities among some villages in which commercial fishing was the dominant source of village income and others in which it was not, and because some regions that were organized into boroughs appeared to be receiving more public benefits of many kinds than regions that were not organized into boroughs.

In the borough case, it appeared, hence we postulated, that regions (not necessarily ANCSA regions) that organized into boroughs generated higher incomes per household and per capita--either through participation in the private-market sector or through successful participation in the public-market sector--than did the regions that are not so organized. Whereas all ANCSA regions, as administrative and service, participate in the public sector, persons residing in borough villages appeared to participate more successfully in the public sector than people who did not reside in boroughs. Success, as measured by such indicators as higher incomes, smaller household sizes, and the like, can distinguish between two populations in which both are heavily dependent on public sources of income.

In the final report of this study, we demonstrate how the theoretical contrasts of the commercial-fishing and noncommercial-fishing villages provide information of considerable use to MMS, although not envisioned by MMS or the researchers at the beginning of the research.

At the commencement of this study, the addition of new villages to the original 30 was not contemplated. The fixed costs for adding a new community are very high; they embrace travel, per diem, respondent reciprocity, mapping and drawing a sample (at the front end), and smaller costs. The addition of Kaktovik after the study began increased

the costs, but those costs were offset by the dropping of Little Diomede and also by not returning for third-wave reinterviews to two Control villages located long distances from OCS areas (Anaktuvuk and Aniak).

The Exxon Valdez oil spill in March 1989 required a quick response if the Social Indicators study was going to be able to assess consequences to the villagers affected by the spill. Moving as rapidly as possible, MMS was able to secure funds for the administering of questionnaires and protocols in seven villages directly affected by the spill and in two control villages outside the immediate spill area. Inflation in travel, room, and food expenses--common consequences of economic booms and economic disasters--increased our costs. We were able to administer the questionnaires and protocols but did not have sufficient funds to return to the field for reinterviews of panel respondents and for posttest interviewing until the winter of 1991, nor to analyze the data until the spring and summer of 1991.

In order to optimize the new contrast--*Spill vs.* No *Spill--we* required sufficient funds to add another six or seven *Control* villages to the study. But because funds were limited, and because *all* villages in the area encompassing Prince William Sound, Cook Inlet, and the Alaska Peninsula (from Cape Douglas to Perryville) were oiled either by slick or blobs, all were *Test* villages and optimum contrasts could not be made. The spread of the oil, influenced by tides, currents, and wind, and the difficulty in achieving a quick response for research dollars for a "normal accident," required careful evaluation before our sample was expanded.

Although we carefully evaluated additions to the sample, research in three Native villages affected by the spill was denied by attorneys for North Pacific Rim (several Prince William Sound and lower Cook Inlet villages) for reasons not made clear to the principal investigator.

The posttest (initial) interviews in 1989 were restricted to Schedule A communities. We originally thought that the initial interviews in 1989 and 1990 should be conducted in the *Hubs* because (1) of our perception that interviews cost less in the larger *Hub* communities than in the smaller outlying communities and (2) transportation costs to *Hubs* were cheaper than transportation to the *Peripheries* (because almost all trips to *Peripheries* must be routed through *Hubs).* Subsequently, we learned that interview costs are much higher in *Hubs. The* reasons are several; the major reasons are higher room and meal costs for researchers and higher rates of employment for residents. As is expected in villages with higher rates of employment, more sample respondents are employed in *Hubs* than in *Peripheries. Hub* residents, in juggling subsistence-extraction tasks, work, and community affairs, are more difficult to contact, more difficult with which to establish a time for an interview, and more apt to reschedule interviews than are respondents in the *Peripheries.* Time delays are expensive for the project because the QI's and KI's are drawing pay and per diem during the dead time. The unit costs in the *Periphery* villages are actually lower than the unit cost in the *Hubs.* For visits of 3 days, it was often cheaper to fly directly to some sample *Periphery* villages by charter and avoid *Hubs* altogether.

While we did not avoid *Hubs,* our better understanding of costs that were hidden to us before we embarked on the research prompted us to draw the 1989 (9AD) and 1990 (0BD) samples at random from the villages previously sampled in Schedules A and B. We thus maintained the representativeness that we sought during the first 2 years of the sampling design among some villages in which commercial fishing was the dominant source of village income and others in which it was not, and because some regions that were organized into boroughs appeared to be receiving more public benefits of many kinds than regions that were not organized into boroughs.

Rebalancing for Non-OCS Effects: Based on only partial knowledge, we presumed at the outset that *Hub, Test,* and *Mixed* villages were likely to be more affected by OCS activities than their theoretical contrasts (Periphery, *Control,* and Native). Partial knowledge stemmed from several sources, including (1) proven gas and oil reserves, (2) social and economic studies of villages as enclaves (staging areas) for oil and gas operations and studies of oil-transportation corridors conducted in behalf of the MMS, and (3) the schedule prepared by the MMS for OCS lease sales in the area from Kodiak Island on the southwest through the Beaufort Sea in the northeast. Our tests below are consistent in demonstrating very small standard errors as well as significant differences between the theoretical contrasts (e.g., *Test: Control*) on large numbers of AOSIS items.

We have not yet discriminated between OCS effects (such as increased employment due to oil exploration, or the multiple consequences of an oil spill) and non-OCS effects (such as a downturn in the world oil price, or the effects of a Federal act on, coastal Alaska); and until we do so, inferences will be limited. But OCS and non-OCS

effects are best analyzed within a panel. It appears that welfare transfers and other unearned income from public sources are more important in some villages than others, just as employment is greater in some villages than in others. What is not evident is the relation between these phenomena and OCS effects. We pursue this topic in Social Indicators Project III. Analysis (1993).

V. COTERMINOUS CONTROLS: ECOLOGICAL FALLACY, STATISTICAL POWER, AND INTERNAL/EXTERNAL VALIDITY

Our "pretest-posttest model with embedded panels" exercises coterminous controls for ecological fallacy, statistical power, and internal validity. The following two diagrams represent the design structure that controls for each of these for any year. Each *0* represents an AOSIS indicator, and each X represents OCS development (or any other factor that we wish to substitute) between survey waves within the panels. The first diagram distinguishes panel villages classified as *Test* and *Control*. *Any* of the theoretical distinctions can be substituted (*Hub:Periphery*, etc.). The second diagram distinguishes the relations between the embedded panels over three research waves.[24] The research waves are staggered so that the A panel exercises controls for the B panel and vice versa. Both panels, of course, provide controls for--and also are controlled by--the pretest of 1988 (Schedule B), the posttest of 1989 (Schedule A), and the posttest of 1990 (Schedule B).

[24]Panel respondents during the initial interview wavea are selected from the pretest samples (see 7A and 8B here and in Figure 2-l). The panel respondents are designated as I (initial interview) during the first research wave (7AP,8BP), and RI (reinterview) during the second (8A2, 9B2) and thiid (9A3, 0B3) research waves.

STRUCTURE OF THE SAMPLING DESIGN BY THEORETICAL CONTRASTS FOR MEASURES OF INTERVENING FACTORS BETWEEN RESEARCH WAVES				
t_0		t_1		
[7AP]		*[8A2]*		
0	x	o	*(Test)*	*[Measures OCS "incident/effect" on O]*
o	*	o	*(Control)*	*[Measures O saris OCS "incident/effect"]*
		[8BP]		
*	x	o	*(Test)*	*[Controls for instrument reactivity in Test villages]*
*	*	o	*(Control)* .	*[Controls for reactivity in Control villages]*

PRETEST-POSTTEST AND EMBEDDED PANELS			
Year	Pretest/Posttest	A Schedule	B Schedule
1990	Posttest OBD		
1989	Posttest 9AD	9A3 [RI] Wave 3	0B3 [RI] Wave 3
		⇑	⇑
1988	Pretest 8B	8A2 [RI] Wave 2	9B2 [RI] Wave 2
		⇑	⇑
1987	Pretest 7A	7AP [I] Wave 1	8BP [I] Wave 1

In the pretest-posttest control group design as implemented in the Social Indicators research (see Fig. 2-1 and the two diagrams above), *Test* and *Control* respondents are selected for *two types* of samples. The first is the separate pretest and separate posttest sample(s) in which respondents appear in one and only one sample and are interviewed only once. In the second, a proportion of identical respondents from a pretest sample form a panel, so those respondents are reinterviewed twice each (two posttest waves for each panel). In our design, we reinterview the A Panel and B Panel

twice. The correlations within panels between years (longitudinal) and over time (3 years) over the entire range of variables in the AOSIS and KIP instruments (and the significance of differences between panels and pretest and posttest samples during the same year) provide us with our measures of stability and change. Internal validity assumes group equivalence, but except for the regional contrasts, our theoretical contrasts assure that there are only two groups to worry about. Pretest-posttest contrasts within panels correct for the two most plausible threats to internal validity--history and regression--but in so doing, the threat of creating a testing artifact is raised. That is to say, if a respondent is interviewed (I) and subsequently reinterviewed (RI) one or more times, we must determine whether initial contact with the instrument conditioned the second response.

V.A. History and the **KI** Protocol Sample

The **KI** data are not incorporated into the design merely to provide equivalent test- reliability measures. The open-ended responses to the protocols are strong precisely where the **AOSIS** instrument is weak, in construct validity. Responses to the protocols not only provide information on their own but also inform the meaning of responses to questionnaire items. More important to this assessment, however, is the question of independence or interdependence of sampling traits. Independence of traits cannot be estimated from the recommended *N's* or from any *a priori* assumption. Independence of sampling traits in Alaskan Native villages, furthermore, cannot be assured by simple random sampling. The problem posed here belongs to the family of threats to internal validity that we referred to in Chapter 1 as *history*.

In our initial discussion we defined history as threats to validity in two ways. The first is as responses conditioned by historical context in which some event affects a village or group of villages, but not all, at some time prior to a research wave. For example, imagine that during a fishing season when Pacific salmon are especially abundant throughout most of Alaska's commercial-fishing grounds, salmon runs in one of Alaska's commercial-fishing zones are meager. Imagine, as well, that the paucity of fish in that zone is attributable to Asian gillnetters on the high seas who intercepted the fish destined to spawn in rivers in the affected zone. The intervention and its consequences are an instance of history. Incidents such as these often can be discovered and explained. When possible, they must be discovered and explained to avert threats to validity caused by history in this form.

A second threat to validity caused by history is much more complex than the first. Sampling theory requires that each household (the sampling unit in this study) in each study village has an equal probability of selection. Within each selected household, an adult respondent is randomly selected and stratified for equal proportions of males and females. Whereas random sampling can assure that each population element has an equal chance of selection, it cannot transform interdependent sampling traits into independent sampling traits. Until we can estimate the effects of interdependence on the distribution of sampling traits and the correlations between sampling traits, we do not know whether and how much *history*, i.e., interdependence of respondents through networks of kinship, employment, religion or other associations, has influenced the responses to the AOSIS instrument or to the KI protocol. We do not know, then,

whether our sample is a random sample or whether it merely represents random assignment of people interconnected in various ways. The result of correlating interdependent traits is a type of autocorrelation known in the cross-cultural research literature as "Galton's Problem" (Naroll 1970).

Genealogical Data: Among the many types of networks (regular associations among persons either directly or through intermediaries with whom each acts), kinship exercises the most profound influences on Native customs (a century of anthropological research from Lewis Henry Morgan's Systems of Consanguinity and Affinity (1861) to E. S. Burch's Eskimo Kinsmen (1975) make this point so obvious that to argue otherwise would display equally profound ignorance). We could have chosen to use the KI protocols to seek information on relatedness among respondents through religious activities, athletic activities, employment, and the like. But none of these relations are so formal, so easy to trace, and so clearly structured as kinship relations. So in addition to using protocols to seek information on several topics relevant to Native life that were not addressed, were improperly addressed, or were underrepresented in the original AOSIS instrument, we specifically sought information on kinship.

Among the crucial unaddressed topics were genealogical data, that is, family kinship information for each respondent that includes information on his/her kinspersons through three degrees of linearity (a respondent's parents and grandparents [3 degrees "up," counting the respondent] and a respondent's children and grandchildren [3 degrees "down," counting the respondent]) and two degrees of collaterality (siblings and first

cousins, the latter through the father's side and the mother's side, or the children of the father's siblings and the mother's siblings).

These data were collected for the A, B, and C KIP samples. Because the collection of genealogies is time consuming and expensive, we did not seek to collect them among all QI respondents.

The genealogies for the three KIP samples were analyzed to determine all QI respondents who related by kinship to any KIP respondent, and also to determine relations among KIP respondents. The relevance is that the responses to AOSIS items by related persons within the A, B, or C AOSIS sample or among the three samples could be tested in a dependency correlation" matrix to determine whether correlations are accountable by independent factors that operate in the same way on related respondents, or whether the correlations are accountable by dependencies. To determine whether our sampling traits are independent, then, we analyzed the kinship relations among sample respondents.

Summarizing genealogical analyses in a dependency correlation matrix for represented and nonrepresented villages, AOSIS questionnaire data can be corrected for dependencies due to kinship networks. The matrices suggest solutions to threats to external validity posed by nonrepresented villages.

V.B. Controls for Testing Artifacts

Testing occurs whenever a pretest generates a reaction or expectancy that then biases the posttest. The result is a testing artifact. We have controlled for testing threat by including interviews and reinterviews each year, after the initial year (see Figures 2-1

and 2-2). *The* reinterview wave of the A Panel in 1988 (8A2) is coterminous with the initial interview wave of the Schedule B pretest sample. A wave of initial interviews for the Schedule A posttest sample is coterminous with the third wave (reinterviews) of the A Panel (9A3) and the second wave of the B Panel (9B2). "Testing," then, is a threat to internal validity and is interpreted as reactivities of expectancies raised in initial interviews that may bias subsequent reinterviews.

We used Schedule B interviews in 1988 to control for the threat of testing for the Schedule A reinterviews in 1988; we used Schedule A posttest interviews in 1989 to control for the threat of testing to A Panel and B Panel reinterviews in 1989; and we used Schedule B posttest interviews in 1990 to control for testing effects to B Panel reinterviews in 1990.

Schedule C pretest interviews were conducted in the fall of 1989. The C Panel interviews conducted during the late fall of 1990 were controlled by the Schedule B posttest interviews of 1990.

V.C. Testing Artifacts and the **KIP** Samples

Second-wave reinterviews of the KIP sample for Schedules A (KIA2) and B (KIB2), and for the AB Impact Sample (KIAB), are controlled by the Schedule C KIP sample for 1989.[25]

[25] **The Schedule C sample is analyzed in Social Indicators Project V. Research Methodology: *Sampling* Design, Reliability, Validity (Exxon Valdez Spill Area, 1989-1991) (1993).**

PART TWO: FIELD TESTING THE INSTRUMENTS, 1987

CHAPTER 3
ANALYSIS OF THE AOSIS QUESTIONNAIRE, 1987

I. INTRODUCTION

I.A. General

Before entering the field during the winter of 1987, the Social Indicators project team was skeptical of the construct validity of many items in the AOSIS questionnaire: we discussed potential threats to construct validity, and we prepared a schedule to be used in debriefing respondents. We anticipated that we would identify problems of construct validity--including highly sensitive items--and reliability through careful analyses of the responses collected to the AOSIS and KIT instruments. We also anticipated that we would be able to strengthen both instruments by deleting invalid questions and restructuring questions that appeared to be salvageable and worthy of retaining. The first year's research and analysis proved to be especially important. The methodologies we implemented in testing item validity and reliability on the Schedule A sample responses ($N=332$ [Kaktovik had not yet been added to the Schedule A sample]) follows in considerable detail.

When we embarked on the first wave of field research in 1987, the AOSIS instrument (see the Appendix) comprised about 175 variables covering a wide range of topics from the respondent's subsistence activities to the respondent's attitude about his/her "life as a whole." Although more than two-thirds of the questions sought objective information rather than attitudinal information, the AOSIS instrument was focused on the assessment of well-being as an attitudinal construct. Here we provide a

brief assessment of the concept of well-being, the constructs used to measure it, and well-being's central place in the design of the AOSIS instrument. We emphasize that the AOSIS instrument is only one device in the multimethod, multidata-set research design of the Social Indicators project. The validity of any or all parts of the AOSIS instrument will not be determined solely by measures internal to the questionnaire.

I.B. On **Defining** Well-Being

Well-being refers to a satisfactory state, health, and prosperity of a person or a society (units may range from a subcommunity to a nation). For the purposes of theory construction and research design, the subject of well-being must be defined (person, subcommunity, etc.), as must the area of life that is to be assessed (economic prosperity, personal relations, health, and the like) (see Levy and Guttman 1975:361-88 for an appositive analysis of the concept well-being and its measurement).

Well-being is an exclusively attitudinal concept, so any measures of well-being are attitudinal, but not all attitudinal items measure well-being (Levy and Guttman 1975:369-70). Objective measures, of course, can be correlated with attitudinal measures to assess the fit between attitudes and objective empirical conditions. Sections A-D of the AOSIS instrument focus on objective questions rather than attitudes, although a few attitudinal questions appeared in these sections in 1987, and a few of them survived the tests to which they were subjected.

The range of attitudes implied in the measurement of well-being is from very satisfactory to very unsatisfactory. Satisfactory is a normative concept as employed in the assessment of well-being. The referent who establishes the norm is crucial to the

assessment of, and to the interpretation of well-being. The norm maybe established by the person being interviewed for himself/herself, it may be established by the group to which the person belongs (a statistical norm obtained for a universe or a sample of respondents about a prescriptive rule or a standard of correctness), or it may be established by some other individual or by some other group.

Areas of life are often interdependent, yet they frequently vary independently from one another. The measurement of well-being, therefore, has come to be recognized as a multivariate problem. Correlations within topics, such as personal health, can exhibit a wide range of strengths for a given sample (within, say, Control villages, or between *Control* and *Test* villages, or for all villages). The same is true for correlations between topics for a population.

It was necessary to develop a definitional system for well-being so that differential correlations could be related to that system. We begin here with the definitional system but soon turn to problems of validity we encountered in the AOSIS instrument when using that definition. Although sensitivity, reliability, and types of validity are defined above, as are several design elements that facilitate the analysis of threats to validity, at various places in the following discussion we again define some of these items to facilitate understanding.

II. CONSTRUCT VALIDITY

II.A Linguistic Conventions and Cultural Conventions as Threats to Validity

In order to measure “satisfactory,” the persons who prepared the AOSIS questionnaire assumed a range of responses that varied from “very satisfactory" to “very

unsatisfactory." The variable property, then, such as the impressions that persons have about the time that they have available to them to devote to hunting, fishing, and gathering activities, is assumed to form an underlying affective scale--something that is felt--from very satisfactory to very unsatisfactory. Whereas the scale assumes infinitely small gradations between its two ends, choices in AOSIS were, for the most part, classified into a Likert-type scale of five categories (forced choices in a questionnaire): (1) completely satisfied, (2) very satisfied, (3) mostly satisfied, (4) somewhat satisfied, and (5) not unsatisfied.[1] Responses on these scales were to be correlated with responses on other scales within the same general topic, e.g., health, or across topics, e.g., traditional customs.

The original AOSIS questionnaire employed Likert-type questions in many of its five sections (A through E). Section E (Perceived Well-Being) almost exclusively employed questions of this type and was, therefore, the heart of the Social Indicator analysis of well-being. The other sections mixed predominantly objective questions with a very few attitudinal questions. The first 46 questions in Section E provided the five-step scale described in the preceding paragraph, and the respondent had to select one of those choices on each of the 46 forced-choice questions. A sixth possibility, listed as (8), was "never thought (about the question)."

We were initially concerned about these forced-choice questions because--as we learned in quizzing colleagues and research-team members--speakers of American

[1] In affective attitudinal scales, the following ranks are more widely used than those employed in the AOSIS: (1) completely or very satisfied, (2) mostly satisfied, (3) satisfied, (4) unsatisfied, or (5) very unsatisfied. The intention in this scale is to provide balance in choices on either side of satisfied. The inherent ambiguity in (2) mostly (in contrast with very), in Western populations, may be overcome by using completely rather than very, as the upper limit of the scale.

English do not quickly and reliably distinguish very satisfied from mostly satisfied without an explanation of what is intended by the difference. Furthermore, completely satisfied is not easily distinguished from very satisfied without further explanation to illustrate contextual differences. The same difficulty was posed for the distinction between mostly satisfied and somewhat satisfied. The question of proper fit between labels and the phenomena being measured was apparent in some of the AOSIS-instrument questions, so we were concerned about the threats to validity those questions posed.

In December 1986, we held the initial training session for the Key Investigators (ICI's) responsible for administering protocols and for overseeing the Questionnaire Investigators (QI's) responsible for administering AOSIS questionnaires. The QI's during this phase of the project were exclusively Natives and all spoke their Native language. The exception was Aleut in which English and Russian were used. Native QI's drew the attention of the KI's and the Principal Investigators to every Likert-type question in the instrument.

The Native QI's alleged that distinctions between ordinally scaled attributes--such as completely satisfied to not satisfied, or good idea to bad idea, or all to none--are alien to Native respondents. They were skeptical that respondents would discriminate among the choices other than satisfied or not satisfied, or some other dichotomy that distinguished good from bad, or some from none within an ordinal scale.

This assertion was similar to the expectations of the senior members of the Human Relation Area Files (HRAF) team. It was our professional opinion from conducting extensive face-to-face research among Alaskan Natives and from reading the

social science research literature on Alaska's Natives that many of the Likert-type questions would not be valid as approved in the AOSIS instrument. It also was similar to a critical comment that we received from the professional staff at the Alaska Native Language Center (ANLC), University of Alaska, Fairbanks. The ANLC staff prepared the translations of the AOSIS questionnaire from English to dialects of the Inupiaq and Yu'pik languages.

The ANLC staff warned the HRAF research team that terminological confusion may arise during interviews conducted in Native languages because of a paucity of real distinctions among or between the following: completely, very, mostly, and somewhat (satisfied); very and somewhat (clearly); very good, good, and fair; some and great (difficulty); not difficult, somewhat difficult, and very difficult; and some and quite a bit of (trouble).

The ANLC staff found it difficult to translate the meanings of these gradations except to use phrases and sentences to describe the adjectives and adverbs employed in the AOSIS instrument. They predicted that Native respondents, whether interviewed in their Native language or in English, would have a tendency to select the generic category, to wit: satisfied or not satisfied, clearly or not clearly, difficulty or no difficulty, good or bad, and so forth. The AOSIS-scale variants, they claimed, were mere elaborations on the generic category, hence included in the generic form. The ANLC staff pointed out that a person who is "completely satisfied" may logically respond with "satisfied," or that persons who were "satisfied" may logically respond with "completely satisfied." The same is true for scale variants of good, difficult, clearly, all, somewhat,

and other nominal categories that have been defined as ordinal scales.

If potential linguistic/semantic problems for speakers of American English occur in some AOSIS questions, a different set of Linguistic/semantic and cultural problems occur in those same questions for Natives.

These questions posed threats to construct validity. No social science study can be perfectly controlled, and no social science measuring instrument can be perfectly calibrated. We recognized that these problems are shared by all sciences, but they are especially prominent in the social sciences because they are the only sciences in which data can talk back to the researcher. Because the HRAF team, on the basis of its collective experience and the warning from the translators, was alerted to potential measurement problems before we began the data-collection phase of the Social Indicators research, we developed a means to address all of the problems that had occurred to us.

The issue was not minor, being more complicated than the limitation of accuracy in the AOSIS instrument. The issue of validity is a fundamental problem of theory as well as a ubiquitous problem of measurement. In the theory that rationalized the AOSIS questionnaire, it was assumed that the well-being of persons and groups could be measured by way of normative concepts, Each concept formed a variable whose response range varied from completely satisfied to not satisfied.[2] It was theorized (assumed) that the underlying property of the variable formed a continuum.

Construct validity focuses on whether an observation or an item on a

[2]The theory normally assumes a continuum from very satisfied to very unsatisfied. The AOSIS was aberrant in this regard.

questionnaire instrument measures what it is supposed to measure, not whether accuracy is limited. In short, construct validity asks whether phenomena are properly labeled and whether the measurements of those phenomena are linked to the phenomena.

In order to demonstrate construct validity, the researcher must exhibit substantial evidence that the theoretical paradigm rightly corresponds to observations. As we demonstrate below, the variance on many Likert-type questions in the AOSIS instrument . was so modest that at the conclusion of the first wave of field research, we surmised that there was little evidence that several iterns in the instrument were measuring the phenomena they were intended to measure.

The solution to the construct validity problems discovered among the Likert-type questions requires background knowledge of the Inupiaq and Yu'pik languages and dialects, as well as ethnographic research knowledge of Inupiaq, Yu'pik, and Aleut communities.

Pursuant to OMB approval No. 1010-0069, we were not allowed to make changes to the AOSIS instrument prior to interviewing Schedule A respondents. The results of the Schedule A inquiry demonstrated that some changes should be made to several questions in the instrument before conducting subsequent research waves.

Upon analyzing the attitudinal data in mid-1987, we consulted with bilingual researchers and linguists to substitute new terms that would fulfill the underlying scale assumptions for the Likert-type questions. Neither the ANLC staff nor the HRAF research team devised anything more helpful than the use of a visual scale on which not satisfied is positioned on one end, and satisfied on the other, and there are five points in

between. We did not know how respondents would respond to being asked to make choices from among the dots. And we had no idea whether any two R's would choose the same dots for the same reason. Would, for example, R's 1, 2, and 3 all choose a dot halfway between not satisfied and satisfied because each was more or less satisfied or because each was "medially satisfied," for some different and unrelated reasons?

We expected that attitudinal questions would pose threats to validity as long as they were retained in the study, so we developed some rules about the analysis of the data from each field session for future administrations of the instrument: (1) items would be retained if they were the best measure of the observations that were sought and if they produced the greatest variance and covariance among items addressed to a similar topic; (2) items whose responses produced the least variance and covariance would be dropped; and (3) items would be modified if small changes to the syntax would eliminate ambiguities or false conjunctions. A special problem was posed by the affective attitudinal questions, which asked how respondents felt about x. So few of those questions produced adequate variance that we changed a few from affective ("how do you feel about") to cognitive ("what do you know," or "what do you think") attitudes.

A second type of construct validity problem that occurred in the AOSIS instrument was attributable to social custom rather than linguistic convention. Native Alaskans are reluctant to make forecasts or to speculate about future conditions, even when objective evidence would allow predictions by Western standards. Natives are humble in their view of the world, whose workings and whose future they perceive as beyond the comprehension of mortals. This is a religious view of the world and how it

works (for recent assessments of this phenomenon see Chance 1966, Little and Robbins 1984, Luton 1986, Jorgensen and Maxwell 1984, and Oswalt 1990). It is antithetical to Native culture to make personal forecasts about future physical and social consequences.

Several questions in the original sections A, D, and E of AOSIS asked respondents to make forecasts about future conditions. The forced choices did not fit the phenomena that were sought to be linked by these questions. Therefore, construct validity problems caused by the violation of customs, in these instances ideological, required either the deletion or alteration of those questions.

II.B. "Sensitive Information about Respondents" and "Information Elicited from Respondents About Persons Other Than Themselves"

Several questions in the AOSIS instrument were not answered by respondents, or were answered by few respondents, because of their personal sensitivity. As refusals increase, sample error increases as well. But as refusals increase, unknown bias, too, may influence responses. Bias is very different from sample error and is best addressed as a problem of validity. In this research, we encountered bias as an issue of sensitivity.

Sensitivity refers to questions that evoke reluctance on the part of respondents to respond because they invade privacy, violate social norms or conventions, or cause persons emotional discomfort, even anguish. Several questions are clearly "sensitive" by this definition. Among them are the consumption of alcohol, family strife, beatings administered to the respondent, and divorces or separations. Many respondents were reluctant to answer these questions, and many refused to answer them altogether.

Questions that are sensitive to the respondents are often sensitive" to the QI

researcher as well. The QI, recognizing that the respondent will most likely be uncomfortable in responding, is thus uncomfortable in the asking. In such instances, responses may or may not be valid--a proper fit between the behavior and the label. In the variable-by-variable analysis following the 1987 field research, we excised several variables because of their negative sensitivity and because of the problems they caused for the assessment of validity. In a few instances, the questions were rewritten so as to desensitize them.

Another form of sensitivity bias is the reluctance of Natives to talk about household members (other than themselves) or to talk about neighbors, regardless of the context or topic. It is common knowledge among social scientists who have studied Alaskan Native culture, including the HRAF team's senior personnel, that Natives rarely volunteer information about others when asked and are seldom critical of neighbors and friends in their presence. Teaching is done by precept, not lecture. Admonitions and critical appraisals are rare.

This reluctance is embedded in Native etiquette and humility. Even though Natives may hold strong opinions, it is impolite, even considered arrogant, to speak about or to divulge opinions about neighbors. Restraint and modesty are encouraged. Part of that restraint causes Natives to eschew interference in other's lives and not to volunteer information about other persons (for concurring opinions see Briggs 1970:4, 112; Lantis 1960:vii-ix).

AOSIS questions that asked respondents to provide information about other persons or that asked respondents how they think other persons feel about (or treat) the

respondent posed construct validity problems for the analysis of the AOSIS instrument. It was not a simple task to rewrite questions of this type. It was possible to refer to a person's household (and not to specific persons within the household), or to the entire village. Even then the perception of the question may be particularistic (specific persons with whom the respondent regularly interacts and not persons, in general, in the village). We recognized that if we altered some of the questions to make more general references, we would have to analyze response rates to those questions in future waves. A tool was needed to assist us in analyzing the structures of the AOSIS questions themselves, so that subjects, objects, referents, and intentions were clearly defined.

111. MAPPING SENTENCES FOR OBSERVATIONS OF WELL-BEING

In the original AOSIS questionnaire, there were 65 attitudinal questions intended to measure well-being, 51 of which appeared in Section E (Perceived Well-Being). The remainder appeared in Section A (Traditional Activities, 3), Section B (Health, 2), and Section D (Income, Goods and Services, 9).

Theory construction is facilitated by constructing sentences for the observations that are the concern of the theory. This is a basic premise of construct validity. A facet mapping of the AOSIS attitudinal questions will facilitate an analysis of the way in which the original research design sought to measure the several categories of well-being. The analysis reveals what topics were included as well as those that were omitted; and it allows us to determine whether a respondent's assessment is cognitive, affective, or instrumental of the state of well-being, or treatment for well-being, of a person or some social group in some life area. The range is ordered from very satisfactory to very

unsatisfactory according to the normative criterion of the respondent (Levy and Guttman 1975).

In Figure 3-1, the mapping-sentence formula of Levy and Guttman (1975) is modified to accommodate the AOSIS sample. In the following, * = b, treatment from any source, ** = d_{10} biological and abiological area in which community gains livelihood and to which significant symbols have been assigned, *** = f_{15} norms for sharing, visiting, cooperating, friendship, etiquette, ethics, etc.

111A. Assessment of the Mapping Sentence

The 65 attitudinal questions in the original AOSIS instrument were mapped following the formula in the sentence map (Figure 3-l). To assist in evaluating the research design, the results of the mapping are summarized in Tables 3-1 and 3-2. Table 3-1 provides the notation for each AOSIS question and comments. Table 3-2 provides a ranking of use for each of the sentence facets.

As Table 3-2 demonstrates, the AOSIS questionnaire overwhelmingly sought **affective** assessments by the respondent of the state of well-being of himself/herself. It was almost exclusively an instrument that focused on the well-being of the individual and used the individual's feelings, not the individual's knowledge or instrumentality, to assess well-being. The questions in Section E, with four exceptions, asked "how do you feel about . . . ?" rather than "how do you evaluate . . . ?" or "how do you respond t o . . . ? "

The environment (d) whose affective assessment was sought was most frequently some resource or resources (e.g., education, job, house, income, fish), although the social

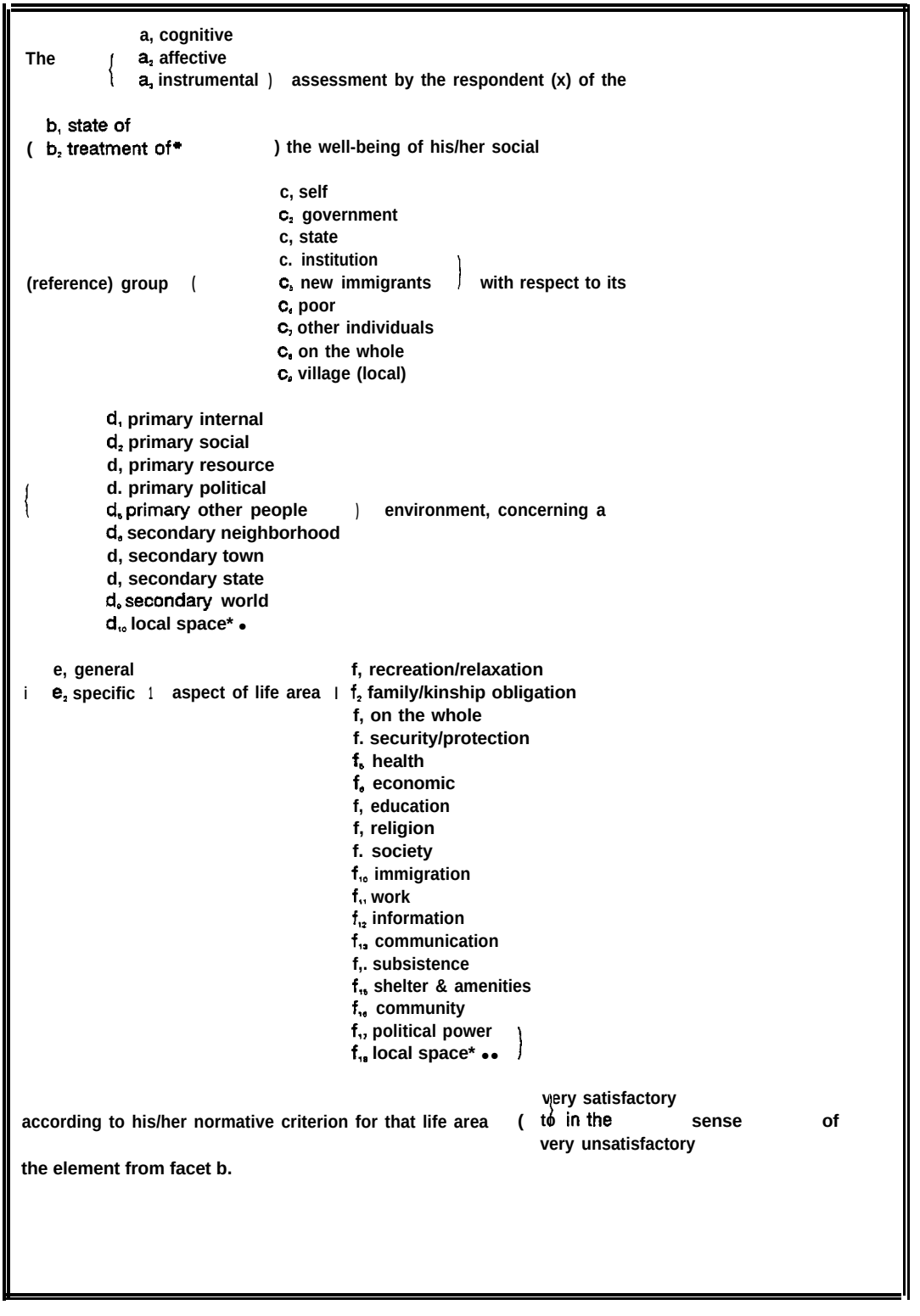

FIGURE 3-1. THE MAPPING-SENTENCE FORMULA. An Example of a Guttman-Design Mapping Sentence for the Facet Analysis of Well-Being.

Table 3-1

ASSESSMENT OF SENTENCE MAPPING

	a	b	c	d	e	f	COMMENTS
A26	1	1	1	3	1	1 4	Ambiguous: fish and game can vary independently
A27	1	1	1	3	1	1 4	Ambiguous: See A26. Violates custom about forecasting
A37	1	2	7	2	2	9	Comparison is embarrassing, violates convention
BI	1	1	1	1	2	5	
B2	1	1	1	1	2	5	Comparison is embarrassing, violates convention Forecast confounds comparison problem
D5	1	1	7	3	1	6	Comparison issue: See B2
D6	1	1	7	3	1	6	
D7	1	1	7	3	1	6	Violates custom about forecasting
D17	1	2	1 7 8 9	2	1	3	Ambiguity: assessor, life area, reference group
D17a	same as D17						
D17b	"						
D17c	"						
D17d	"						
D17e	"						
D18	1	1	2	4	1	1 6	Ambiguous through confusion of specific issues
El	2	1	1	3	1	1 5	
E2	2	1	1	1	1	3	
E3	2	1	1	3	1	1 4	Ambiguous: See A26
E4	2	1	1	3	2	1 4	Ambiguous life area
E5	2	1	1	2	2	9	
E7	2	1	1	2	2	9	
E8	2	1	1	2	2	2	
E9	2	1	1	2	2	9	
El 0	2	1	1	3	2	1 3	
El 1	2	1	1	2	2	1 9	Ambiguous life area
E12	2	1	1	2	2	9	
E13	2	1	1	3	2	1 6	Vary independently, ambiguous life area
El 4	2	1	1	1	2	5	
El 5	2	1	1	1	2	3	
El 6	2	1	1	5	2	3	Assessment of “others” violates cultural customs
El 7	2	1	1	1	1 2	3	“What”: general or specific ambiguity
El 8	2	1	1	1	1	3	
El 9	2	1	1	1	1	1 3	“Fun”: ambiguous

Table 3-1
(Continued)

	a	b	c	d	e	f	COMMENTS
E20	2	1	7	2	1	2	Violates custom: evaluation of
						3	others
E21	2	1	1	2	2	9	Ambiguous life area
						3	
E22	2	1	1	3	2	7	
E23	2	1	7	3	2	7	Ambiguous, evaluating others
E24	2	1	1	3	2	6	
E25	2	1	1	3	2	1	1
E26	2	1	1	5	2	3	Ambiguous life area, problem:
						9	feelings about others
						11	
E27	2	1	1	3	2	1	1
E28	2	1	1	3	2	1	4
E29	2	1	1	3	2	6	Ambiguous reference, affect re
			7				others
E30	2	1	1	3	2	1	5
E31	2	1	1	3	2	6	
E32	2	1	1	3	2	6	Ambiguous life area
						14	
						15	
E33	2	1	1	3	2	5	Ambiguous environment
				10			
E34	2	1	1	2	2	4	
E35	2	1	1	3	2	6	Ambiguous: only cites goods
E	2	1	9	4	2	1	4 Ambiguous reference: others, fish and game vary independently
E37	2	1	9	4	2	7	Evaluate others
E38	2	1	9	4	2	6	Evaluate others
E39	2	1	1	4	2	1	7
E40	2	1	1	3	2	1	8 Ambiguous, vary independently
				10			
E41	2	1	1	3	2	1	8 Vary independently
				10			
E42	2	1	1	2	2	1	6
E43	2	1	1	3	2	6	
E44	2	1	1	2	2	9	
E45	2	1	1	3	2	9	
E46	2	1	1	3	2	7	Ambiguous: many skills, vary
						14	independently
E48	2	1	1	1	1	3	
E49	1	2	4	3	2	6	
E50	1	2	9	3	2	6	Violates forecasting custom
E51	1	1	9	3	2	1	4 Ambiguous. Violates forecasting
				10			custom
E52	1	1	1	?	1	3	

Table 3-2

FACET TOTALS FOR 65 AOSIS ATTITUDINAL QUESTIONS RANKED BY FREQUENCY OF OCCURRENCE

Facet A Type of Assessment		Facet B Level or Treatment		Facet C Well-being of Group	
Affective	47	State of	57	Self	46
Cognitive	18	Treatment of	8	Other Indiv.	6
				Village	5
				Government	1
				Institutions	1
				On the Whole	1
				Ambiguous	5

Facet D Type of Environment		Facet E Aspect of Life Area		Facet F Type of Life Area	
Resource	30	Specific	45	Economic	13
Social	13	General	20	On the Whole	11
Internal	9			Society	9
Political	5			Subsistence	6
Local Space	4			Education	4
Other People	2			Local Space	4
Ambiguous	6			Shelter/Want	3
				Work	3
				Ret/Relaxation	3
				Family/Kinship	2
				Security	1
				Community	1
				Communication	1
				Religion	0
				Immigration	0
				Information	0

environment and the respondent's internal environment frequently were assessed. Interestingly, the political environment was assessed by only five questions, even though State and Federal governments exercised and continue to exercise considerable controls on life and affairs in Alaska's villages.

Two types of ambiguities appeared in some of the questions. One type makes possible more than one classification in some facets. It was difficult to determine whether some questions were intended to be general or specific (e); to focus on a specific life area or on the whole (f); to focus on a specific environmental resource, such as water, or on the space from which persons gained their livelihoods and their subsistence resources and to which they assigned significant symbols (d); and whether they were supposed to refer to self or to other individuals (c). These ambiguities are noted in the sentence maps where they occur (Table 3-l), and they are summarized in Table 3-3.

The other type occurred frequently and with one exception occurred exclusively in Section D (Income, Goods and Services). Five questions (17a through 17e) have ambiguous social (reference) groups, environments, and life areas for which normative criteria were applied.

In regard to resource environments in particular, ambiguities in four Section E questions (E33, E40, E41, and E51) between whether resources were supposed to be specific or general were not resolved. In addition, false conjunction of topics--which can vary independently from one another, including fish and game (A26, A27, E36, and E51), arts and crafts (E13), land and buildings (E40), and land and water (E41)--confounded

Table 3-3

AMBIGUITIES IN THE CLASSIFICATION OF SOCIAL (REFERENCE) GROUPS (C), PRIMARY OR SECONDARY **ENVIRO** NMENTS (D), AND ASPECT (E) OF LIFE AREA (F) IN 26 OF 65 **LIKERT-TYPE** APTITUDINAL QUESTIONS IN THE **AOSIS** INSTRUMENT

Ambiguous Questions

Social (Reference) Group (c)	Primary/Secondary Environments (d)	Aspect Of Life Area (e)	Type of Life Area (9
E29	D17a	E17	A26
	D17b		A27
	D17c		D17a
	D17d		D17b
	D17e		D17c
	E33		D17d
	E40		D17e
	E41		E3
	E51		E4
	E52		E11
			E13
			E19
			E20
			E21
			E26
			E32
			E35
			E36
			E40
			E41
			E46
			E51

classification as specific items on some questions.

The general term used by anthropologists, "local space," could be substituted for the conjoined topics in some questions, inasmuch as local space refers to a territory comprising naturally occurring and manmade resources which a group occupies and to which it assigns significant symbols. Yet this category cannot distinguish, say, increases in fish from decreases in game, or new and sumptuous buildings from fouled land.

In the overwhelming majority of Section E questions (42 to 9), and in the majority of all attitudinal questions (45 to 20), specific aspects of some life area were assessed. The range of the life areas was wide but not especially well balanced (e.g., 13 address economics, O address religion).

The attitudinal questions in the AOSIS instrument did not focus on group well-being, and in those questions in which the social (reference) group (c) whose well-being was being assessed on some life area (f) was some unit other than the respondent's self (c, through c_9), problems in eliciting responses from Native Alaskan respondents were anticipated and, indeed, occurred. The problem is not in assessing (f): the problem occurs when the respondent is asked to provide a normative judgment about some (c) other than himself/herself. We anticipated from our ethnographic observations that respondents would not speak freely about the well-being of other individuals in the family (c_1), the local village (c_2) or on the whole (c_3) because it is considered bad form and presumptuous to do so.

III.B. Some Problems and Remedies for the Assessment of Well-Being

Several features of Native Alaskan culture have distinguished it from non-Native

culture for generations. The AOSIS instrument addresses some of those features but not enough of them and not fully. Moreover, the assessments of well-being in the original instrument were primarily affective and fraught with validity problems. Cognitive and/or instrumental assessments, in addition to valid affective assessments, also are required. We sought to expand the multimethod, multidata approach with cognitive assessments about important features of Native culture. The OMB rules allowed deletions, but not additions, to the AOSIS instrument. We remedied the situation by introducing cognitive attitudinal topics in the KIP instrument. The KIP is the better method for eliciting such information because it does not force a choice from a restricted set of options.

In Table 3-2, Facet F demonstrates the life areas that were originally assessed in the instrument. No questions focused on religion, and few questions focused on family and kinship obligations, subsistence activities, the areas in which respondents reside, and the political power respondents exercise over their lives. These features are distinctive and persistent in Native culture, or they place limits on traditional Native culture that may affect Native cognition of their well-being.

Subsistence pursuits and the social acts that accompany them (sharing resources, labor cooperation) were inadequately assessed, as were political relations that influence Native attitudes about the plants and animals they harvest. No assessment was made of the attitudes Natives hold about the areas in which they live and the resources on which they depend. Nor were cognitive attitudes assessed in relation to access to political power, the locus of political power, and ownership over those lands and resources.

The harvests of renewable, naturally occurring resources--which are consumed by

the extractor and also shared among family and wider networks of kinspeople, elders, and friends--is one general feature of Native culture. Cooperation in various labor-sharing activities for subsistence, shelter, and transportation is another. Cooperation occurs among kinspersons, friends, partners, and other categories of associates. We recognized that attitudes about communitarian ethics as opposed to individual ethics should be assessed but were not adequately assessed in AOSIS.

The assigning of significant symbols, religious or spiritual in nature, to the spaces in which Natives were born and reared and in which they gain their livelihoods is another feature requiring assessment. Sentiments about space that are different from commodity values about land and other resources were not assessed through the AOSIS instrument, but they required assessment.

These topics are not easily assessed by way of forced choices in a questionnaire instrument. We created several open-ended questions that we added to the KIP instrument to collect information on these topics in wider context and greater depth than is possible in the questionnaire format. The original (Schedule A, 1987) and revised (Schedule B, Panel A, 1988) KIP instruments appear in the Appendix.

IV. SENSITIVITY: DEBRIEFINGS AND NONRESPONSES

As the term is used here, "sensitivity" implies a reluctance to respond to an item because the item violates social norms or conventions, invades privacy, or causes personal discomfort, even anguish. Sensitivity is not necessarily distinct from the problems of reliability and validity. Alert, well-trained interviewers quickly sense when an item causes discomfort or intrudes on a private area. Yet no matter how well trained

and alert the interviewers might be, it is always better to field test an instrument for sensitivity so that the problem can be minimized from the start. It is evident that the AOSIS instrument was inadequately tested prior to its submission to MMS by Braund, Kruse, and Andrews. This section outlines the results of our 1987 field test with respect to the sensitivity of iterns.

IV.A. Measures of Sensitivity

As a practical matter, the sensitivity of questions in the AOSIS instrument was measured in three ways. First, in a debriefing that followed each interview, R's were asked directly whether items were sensitive. The debriefings began with this standardized introduction:

> Do you have any questions or concerns about portions of the survey questionnaire? Which portions? Do you have any questions about the research project itself?

Eighty-seven of 332 R's[3] gave us a total of 143 comments, which we have classified into two categories: (1) concerns about the impact of minerals development on the environment, and (2) references to the instrument itself.

Those R's who expressed general concerns most often were fearful that OCS development would adversely affect the availability of fish and mammals and endanger subsistence activities. They wondered whether oil spills and development would force wildlife out of the region. Some R's wondered where and when development would begin, and several of them noted that oil workers were recruited from the lower 48 states while Alaska Natives were unemployed. The R's expressing opinions on this research

[3] Kaktovik was not added to the Schedule A sample until 1988. The following analysis is based on the 332 reapondenta in Schedule A as of 1987. The full Schedule A pretest sample, including Kaktovik, is N =342 (7A).

asked who was sponsoring the survey and what its purpose was. Some inquired whether it might not be used by the oil companies to promote mineral-development projects and not for the benefit of the local population. Some non-Native R's thought that the questionnaire overemphasized the concerns of Alaska Natives.

Twenty-five R's criticized the instrument, mentioning that it was too long, repetitious, complicated, and personal. These persons specifically advised our QI's to:

> 1. Eliminate repetitive items that show disrespect for R's, such as B1 and B2. (B I asks R's to divulge intimate and personal information about how they evaluate their own health. Item B2 asks R's to compare their health with the health of others and assess the discrepancy between what they think the state of their health is and what that state should be [the difference between the two is known as "relative deprivation" in the social science research literature].)
>
> 2. Not ask R's for information about other people because questions that pursue such information seek to make R's show disrespect for others. (B2, E16, E20, and E23 violate this custom. For example, E20 asks the R how well the members of R's family get along with each other, and E23 asks how useful the educations that children receive in the community are to those children. What may appear as an innocuous comparison about people in general to the persons who created the questions are interpreted as requests for the evaluations of specific persons by the R's.)
>
> 3. Make some items simpler, such as C6-C8 and especially D1A-F. (C6-C8 are, in fact, clumsy and complex questions that seek to determine the number of months in the preceding year in which R's "worked for pay for two weeks or more," in which they were unemployed "but wanted a job," and in which they "decided not to work for wages." Because the terms Employment, Underemployment, Unemployment, Employable, and Unemployable are not defined, the questions suffer from unknown construct validity. The R's were confused by the questions, as were the QI's, so the fit between the observation and the label is indeterminate. Questions C6-C8 must surely be restructured so that they measure employable only and so that they ask "in how many months . . ." rather than "last year during which months . . . ." Most importantly, employment and underemployment must be defined. The D1A-F provided another befuddling set of questions in which R's must generate household budget information on all utilities and repairs aggregated by warm months

and cold months while controlling for reimbursements. The questions should be rewritten for clarity and with examples to assist the Rs. The reimbursement question should be a separate variable.)

The suggestions from the interviewees about sensitive and confusing items were helpful, although three R's in four did not comment on the questionnaire instrument. Inasmuch as the response rate to the debriefing queries was so low, we suspect that the responses were highly self-selective. The question, then, is whether sensitivity assessments can be based on debriefing data that may be highly self-selective. We do not have sufficient controls to interpret the meaning of the self-selection.

We do know that the suggestions fitted our expectations about the sensitivity of several particular attitudinal questions (including B1-2, E16, E20, and E23 and 15 other items listed in Table 3-l). We also anticipated that the QI's would experience problems in eliciting responses for several objective (i.e., nonattitudinal) economic and household-finance questions, as well as questions pertaining to drinking (alcohol), even though we sought to accommodate potential problems in our QI-KI training session prior to entering the field. We were especially concerned about many questions in the D section and with items B12 and B12A (how much alcohol does the R consume).

Two indirect measures give a more objective assessment of sensitivity. The first of these is the burden hours or time needed to complete an interview. Long interviews may create sensitivity problems of particular kinds--boredom, failure to pay close attention, failure to respond, unwillingness to respond, incorrect responses because of fatigue or intentionally because of irritation, and so forth. The crosstabulation of burden hours and comments indicates a sensitivity problem:

	Length of Interview			
Comments	20-45 Minutes	46-60 Minutes	> 1 Hour	Total
No Comments	109	61	28	198
At Least One	27	28	25	80
Total	136	89	53	278

Of the R's who needed 45 minutes or less to complete the questionnaire, four out of five had no comment. Nearly half of the R's who needed more than 1 hour had comments, Recalling that the modal comment criticized the length of the interview, this relationship is expected.

Whereas debriefing focused on the sensitivity of some specific items, the response rate was too low to yield an objective measure. Burden hours, on the other hand, are easily tallied for most respondents. Hence, a tally of burden hours can yield a measure for almost all respondents. But the objective measure that burden hours yield says nothing about the sensitivity of particular items.

The second indirect measure, "nonresponse"--or the proportion of "don't know" responses to an item--is better suited to assessing sensitive questions than is burden hours. The R's who are reluctant for some reason to point out a sensitivity problem can avoid the problem through nonresponse. Items with disproportionately many nonresponses, then, suggest a sensitivity problem.

Given the original AOSIS instrument's many complicated conditional iterns, nonresponse rates were not obvious. For example, a nonresponse to D29A, "Do you consider your spouse to be Alaska Native, White, or some other race?," may suggest

either a sensitivity problem or that the R is unmarried. To account for conditionals, nonresponse rates were calculated from items that coders could agree were not conditional. We analyze nonresponse to items as sensitivity problems below.

IV.B. Sensitivity and Respondent Characteristics

We posed the question to ourselves whether some R's (respondents or types of respondents) were more or less likely to have "no opinion" on an item. If such were the case, we would suspect sensitivity problems. To explore this question, interview times and nonresponses were subclassified by various characteristics of the respondents, including the regions in which they reside, sex, age, ethnicity, marital status, education, longevity in the community, and household income.

It is well established in the survey-research literature on non-Native populations that older R's require more time to complete a questionnaire. If older R's require more time to complete the AOSIS questionnaire, the result is consistent with the expected results, so sensitivity is not an apparent issue for these R's. On the other hand, if elderly R's more closely adhere to traditional customs, they may well be less apt than younger R's to respond to questions that violate cultural customs about privacy; or about talking about friends, neighbors, relatives, and leaders; or about forecasting events and conditions.

Thus, even if the age/length of interview time fitted the expected survey pattern, we suspected that real and significant differences could obtain between older and younger R's on many of the AOSIS questions. We also hypothesized real and significant differences on the basis of gender and ethnicity (Native vs. non-Native), expecting males

to answer questions that females would be reluctant to answer (and vice-versa) and non-Natives to answer questions that Natives would be reluctant to answer.

Although not measured here, all QI's were Natives, speakers of their natal languages, and responsible for conducting interviews in their home regions. It is possible that the QI's, individually or collectively, could have biased the responses by conducting slowly paced interviews. The evidence suggests otherwise, however, as we will explicate as we proceed.

Regional differences for the 332 Schedule A R's were:

Calista	52.11 Minutes	4.78 Nonresponses
NANA	50.63 Minutes	7.48 Nonresponses
North Slope	60.63 Minutes	11.80 Nonresponses
Aleutians	49.04 Minutes	6.60 Nonresponses
Mean	53.22 Minutes	7.54 Nonresponses
S.D.	24.03	6.98

North Slope R's needed more time for the interview and gave more nonresponses but the differences were not statistically significant. The KI who oversaw the questionnaire researchers in the North Slope region also oversaw the questionnaire researchers in the NANA region. The interview time was the longest, on average, in these two regions, but the differences between the two regions in minutes (10) and nonresponses (4.32) are considerable. The KI suggested that it was the knowledge and interest of the North Slope Rs, and not the unusual personal qualities of the North Slope QI's, that account for the differences.

The North Slope region among the four in Schedule A is most intimately involved

in oil-related issues:[4] Prudhoe Bay is located on the North Slope. The oil-related operations there affected North Slope residents through a few direct jobs, through huge income transfers made possible by North Slope Borough bonding authority, and through State and Federal transfers related to North Slope oil. The precipitous decline in oil prices and, subsequently, income transfers and assistance of all kinds, have severely affected North Slope residents. Longer interviews in that region were very likely influenced by knowledge of oil-related problems as well as sophistication born of sundry studies conducted among them.

Longer completion time among North Slope Rs, then, may draw attention to important issues related to oil, the regional economy, and the R's situation within that economy.

To search for other differences, the following R characteristics were regressed on interview time and nonresponse:

Sex: male= 1, female = 0;
Ethnicity: Alaska Native = 1, other = O;
Education in years:
Household income in dollars:
Age in Years: 18-85
Marital status: married =1, other = O;
Years lived in the community

This method allowed us to assess the effects of each R characteristic on the two measures of sensitivity (while controlling for the effects of other R characteristics) and, also, to test the statistical significance of each effect. For interview time, the multiple regression was estimated as:

[4] See Human Relations Area Files 1987 Technical Memorandum S187-2. Alaska OCS Social Indicator System: Secondary Data and Key Informant Summary for Schedule A Communities.

Time = 21.0-3.54 Male + .59 Age + 8.71 Native + 4.64 Married
(3.02) (0.15) (4.79) (3.21)

+ .24 Education -.16 Years in Community + .09 Income
(.54) (.12) (.92)

So, on average, male **R's** took 3.54 minutes less than female R's, Native R's took 8.71 minutes more than non-Native Rs, and married **R's** took 4.64 minutes more than unmarried R's. Time required for an interview increased with age (.59 minutes on average for each year), education (.24 minutes on average for each year of education), and income (.09 minutes on average for each dollar of income) but decreased with the time an R had lived in the community (-.16 minutes for each year in the community).

Beneath each of the above parameter estimates, in parentheses, is the standard error of the estimate. Because the ratio of the parameter estimate to its standard error is distributed as a Normal deviate, these standard errors can be used to test the statistical significance of an effect. For a nominal 95-percent confidence level, we require a ratio larger than 1.96 in absolute value and, by that criterion, only the effect of age is statistically significant:

z = .59/.15 = 3.93

The relationship between time and R characteristics can be expressed more parsimoniously as Time = 21.0 + 0.59 Age

Thus, a 30-year-old R,

Time = 21.0 + 0.59(30) = 21.0 + 17.7 = 38.7 Minutes,

required 38.7 minutes on average for the interview while a 60 year-old R,

Time = 21.0 + 0.59(60) = 21.0 + 35.4 = 56.4 Minutes,

required 56.4 minutes on average. This result is consistent with the survey-research literature; older R's take longer. It is possible that older R's also find some questions more sensitive than do younger R's. This topic is pursued below.

As for our expectations that sensitivity problems would correlate with gender and ethnicity, we obtained no statistically significant relations between these variables and length of time to complete an interview. Nevertheless, we are skeptical that no sensitivity problem existed in the original version of the questionnaire for women as opposed to men, or for Natives as opposed to non-Natives. It is more likely that burden hours and sensitivity are more or less independent. Crosstabulating burden hours by nonresponse supports the following postulate:

	Length of Interview			
Nonresponses	20-45 Minutes	46-60 Minutes	> 1 Hour	Total
O-5 Nonresponses	75	42	21	138
6+ Nonresponses	61	47	32	140
Total	136	89	53	278

If burden hours and nonresponse are related, the relationship is not apparent from the above table. Here, we regress the same seven R characteristics on nonresponse:

Nonresponse = 10.5-2.17 Male +.06 Age -2.87 Native +.35 Married
(.56) (.03) (.88) (.60)

-0.23 Education + 0.05 Years in Community -0.44 Income
(.10) (,02) (.17)

In the foregoing, all R characteristics except marital status play a statistically significant role. Female and Native R's have significantly more nonresponses on average than males and non-Natives; nonresponse decreases with education and income but increases with years in the community and age. These effects are consistent with the conventional wisdom that female and Native R's are more reluctant to respond to any item (or are more likely to perceive the sensitive nature of any item) and that better educated and wealthier R's are less reluctant to respond and so forth (Sudman 1983).

By exercising a control for length of residence in a community, we continue to pursue the relation between age and nonresponse. When age is combined with the years an R has resided in the community, we obtain a strong indicator of the likelihood that older persons who are and have been ensconced in a community for long periods answer fewer of the questions we anticipated would violate Native customs and conventions than do persons who are young or who have not resided in their current communities for long durations.

This analysis does not demonstrate a sensitivity problem. Nonresponses still could be random within a demographic subpopulation. Yet, if nonresponse varies by type of item, then, it is most probable that a chilling sensitivity problem has been uncovered.

IV*C. Sensitivity by Item

Do some items invite nonresponse? If an item elicits disproportionately many nonresponses, its construct validity is suspect in the sense that the item measures not what it purports to measure. Such questions can indicate the sensitivity of an item, but

they also can indicate the ambiguity of an item. In the latter instance, an R may simply choose not to respond to a question that he/she does not understand. Some facet represented in the question can be sensitive (e.g., personal alcohol consumption) or some facet can be ambiguous (e.g., is a referent to self or community or the universe?).

In Table 3-1 (Sec. III.A.), an assessment of the 65 attitudinal questions in the AOSIS instrument lists ambiguities as well as potential violations of customs and linguistic conventions. Objective questions in the original version of AOSIS, although not mapped here because they were not attitudinal, also can violate customs and linguistic conventions and can be ambiguous and sensitive.

Table 3-4 lists 29 unconditional items with nonresponse rates greater than 10 percent. Of those items, 19 are attitudinal questions. In our analysis of the 65 attitudinal questions (Tables 3-1 and 3-2 [Sec. III.A.]), we specified potential problems among 16 of the 19 attitudinal questions that appear in Table 3-4. We specified another 15 attitudinal questions that posed potential problems but that do not appear in Table 3-4. The response rates for those questions was greater than 90 percent. Yet 2 of the 15 for which response rates were high (B1 and B2) were criticized by several R's during debriefing. Because B2 requires comparisons of other persons as well as making a forecast, we anticipated that it would violate Native customs. We held similar expectations for E3, E16, E20, E23, E26, E37, and E50. The response rates were high on these items, too.

We had no way to know whether or how R's would respond to the 34 attitudinal questions that posed potential problems. Nonresponse is one possible reaction. Below

Table 3-4

UNCONDITIONAL AOSIS ITEMS WITH NONRESPONSE > 10 %, SCHEDULE A, 1987"

Item	Prediction[b]		Table""[d]		N[e]	Nonresponse %	Topic
	S	A	3-1	3-3			
A27	+	+	+	+	91	27.4	Game/Fish Availability, Future
A36					71	21.4	Asked Elder for Advice
A26		+	+	+	50	15.1	Game/Fish Availability, Past
A37	+		+		38	11.5	Respect for Elders
B12A					240	72.3	Drinking
B12					123	37.1	Drinking
B11					60	18.1	Smoking
D17B	i-	+	+	+	176	53.0	Effectiveness of Government
D17E	+	+	+	+	145	43.7	Effectiveness of Government
D17D	+	+	+	+	122	36.8	Effectiveness of Government
D17C	+	+	+	+	110	33.1	Effectiveness of Government
D30					108	32.5	Ever Been Married
D7	+		+		95	28.6	Future Household Finances
D31					94	28.3	Ever Been Divorced or Separated
D17A	+	+	+	+	69	20.8	Effectiveness of Government
D2					56	16.9	Household income
D14					50	15.1	Recreation Other than TV
D18		+		+	50	15.1	Personal Impact on Community
D4					47	14.2	Income Household Requires
D5	+		+		46	13.9	Income Household Desires
D21					38	11.5	Voted in Last Election
E13		+	+	i-	112	33.7	Satisfied: Arts/Crafts
E51	+	+	+	+		21.4	OCS Impact on Fish/Game, Future
E28			+		71	16.6	Satisfied: Subsistence Time
E39			+		55	16.3	Satisfied: Influence on Local Affairs
E4		+	+	+	54	14.5	Satisfied: Amount Subsistence Acts
El 1		+	+	+	48	14.5	Satisfied: Listen to Stories
E38	+		+		48	13.9	Satisfied: Influence over Development
E24			+		46	13.6	Satisfied: Employment Opportunities
E36	+	i-	+	+	45	13.0	Satisfied: Influence over Fish/Game
					43		

[a] Entries with no + signify that the question is not attitudinal.
[b] Prediction: S - Sensitive, A = Ambiguous.
[c] Tables: 3-1 = Table S-1, Assessment of Sentence Mapping.
3-3 = Table 3-3, Ambiguities in Classification of Facets.
[d] Entries with + in Table 3-1 column signify attitudinal question for which neither sensitivity nor ambiguity was specified before the interviewing sessions commenced.
[e] N: Number of R's who did not respond to question.

we subclassify the attitudinal questions into those that were deemed to be sensitive because they were anticipated to violate cultural customs and those that may have been confusing merely because they were ambiguous. Some questions that may violate customs also may be ambiguous. These items are cross-classified by nonresponse rates of more than 10 percent and less than 10 percent. Two-thirds of the items we anticipated to be sensitive yielded nonresponse rates at more than 10 percent. Indeed, the average nonresponse rate of the potentially sensitive items was 26 percent. Of the 13 ambiguous questions, only 5 (circa 40%) had low response rates (nonresponse rates range from 14% to 33 %). Ambiguity is less a problem than violation of customs and conventions.

Nonresponse Rates of AOSIS Attitudinal Questions Predicted to be Sensitive or Ambiguous Schedule A, 1987

Response Rates	Sensitive Items [Some Also Ambiguous]	Ambiguous Items Only	Total
Nonresponse > 10 %	14	5	19
Nonresponse < 10 %	7	8	15
Total	21	13	34

For most of the items we predicted to be sensitive before interviews were conducted, the team had no way to know how persons would respond to the questions. Some R's could refuse to answer. Some could answer, albeit reluctantly. Some could provide answers the respondents knew to be false, and so forth. It is evident that the majority of questions deemed to be sensitive before they were administered yielded high

nonresponse rates upon administration. For questions that were merely ambiguous, higher response rates were more frequent. This does not mean that those questions were therefore valid. We analyzed variance and other issues before deciding whether to use questions in the second wave of research.

On the basis of the nonresponse analysis, candidates for exclusion due to sensitivity included two self-reported drinking items (B12 and B12A). Respondents either refused to answer these questions or they were reluctant to answer them. The nonresponse rates were so high (37% and 72%) as to render the results useless for statistical analysis. There is little doubt that the drinking questions strike very sensitive chords. There is also reason to suggest that the consumption of alcohol is considered to be a problem by many Rs, so much so that many refuse to divulge any information about whether and how much they consume. Information *on* alcohol consumption as a social indicator might be better procured through archival data (public records) and KI discussions.

Whereas attitudes about the effectiveness of various public agencies (regional and village corporations, city councils) are undoubtedly important topics in contemporary Alaska, questions D17A-E were ambiguous and required evaluations that violated Native customs. Moreover, non-Natives were not and are not franchised by Native corporations, nor are they stockholders. Thus only the city council question (D17A) provided comparability to Natives and nonNatives in relation to the governing body they are asked to assess.

The high nonresponse rates for D17B-E (33% to 53%) suggested to us that we

should excise the questions, or rework them. We chose to rework them and administer the revisions. For each item in the D17A-E series, we revised them to distinguish whether the question (1) refers to the effectiveness of an organization for the constituent or for the constituent's village, (2) distinguishes franchised constituents from nonfranchised residents, and (3) applies to the village and region in question: some villages have all of the organizations listed in D17A-E, other villages have only some of those organizations.

The marital history items (D30 and D31) yielded high nonresponse rates (33% and 21%). Question D30 was superfluous inasmuch as the face sheet provided information on R's marital status and D31 provided information on divorce and separation. Item D31 was interrater and intertest reliable (Gamma = .74, Chi-square .002 between D31 and K22, a question similar to D31 in the KI protocol). It was evident that D30 could be deleted, but we decided that D31 should be retained unless we determined that its sensitivity was offensive to the respondents. It was clearly reliable given the tests available to us after the first field research wave.

Household income (D2) produced a nonresponse rate of 17 percent, but it also correlated with a similar protocol question (K4) at Gamma = .89. In 1987, D2 proved highly reliable.

As we predicted, items asking for an assessment of the future pose sensitivity problems. Question A27, which sought R's forecast for the availability of fish and game in the future, also was ambiguous because fish and game, which were falsely conjoined, can vary independently (nonresponse = 27%). In some contexts, this and other

questions suffering from the same malady were corrected by splitting them into two questions. For example, A27 could be split into A27A, pertaining to fish, and A27B, pertaining to game. In this specific case, it made more sense to drop the question rather than to revise it. After all, upon debriefing, no R forecast the availability of game in the future. Those who commented on subsistence resources worried about OCS activities and wanted to know what resources would be available to them in the future. They had questions, not forecasts.

Question D7 asked the R to forecast whether the household will be better off, worse off, or the same 5 years hence. Twenty-nine percent did not answer. We excised D7 from the AOSIS instrument.

Most other items listed in Table 3-4 elicited nonresponses not due to sensitivity but due to semantic imprecision. Fish and game and arts and crafts items, for example, imply false conjunctions (see also A26, A27, E43, E51, and E13). Several R's told us in debriefing that "fish and game" questions could not be answered in that form because "fish" are different from "game" and cannot be equated as they are in the question; what is true of one is not always true of the other. The false conjunction ambiguities of A27 and E51 are compounded by requiring forecasts. Both of those items were dropped. Questions A26, E43, and E13 were repaired by dividing each into two questions, although E13A required some examples of arts (for the benefit of R's), and E13B required some examples of crafts (for the benefit of R's).

The implied ordinal scale of Section E presented a language-convention problem in Inupiaq and Yu'pik. The dialects in these languages and the social use of language in

those dialects do not discriminate increases of a variable property ("satisfied"). This undoubtedly contributed to the nonresponse phenomenon for the 19 attitudinal questions among the 29 high-nonresponse items (unconditional).

CHAPTER 4
VARIANCE AND RESPONDENT CHARACTERISTICS. 1987

If a questionnaire item is valid, responses are expected to covary with R (respondent) characteristics. If an item is invalid, responses and R characteristics are expected to be independent. If the Alaskan village populations are similar to the general population of the lower 48 states, we would expect that responses to health questions would vary by the R's age. But because real differences obtain between populations, significantly different correlations on some health items could, possibly, distinguish Alaska's village population from a standard cross section of the United States population. Diet, occupations, work habits, exercise, genetics, accidents, and differences in lifestyles by sexes[5] can cause significant differences to obtain between the health of populations by age. Therefore, whereas we would expect responses to health questions to vary by age, or by sex, they need not. And furthermore, if they do not we are challenged to assess the construct validity of the item. It maybe yielding valid correlations that are contrary to our expectations, or it may not be measuring the phenomenon we seek to measure.

Our expectations about the relation between age and health, or between sex and health, or among sex, age and health were prompted, then, by analogy with non-Native populations outside of Alaska. The referent we used in 1987 was empirical. Some expectations are not empirical, but commonsensical. For example, if we ask "What time is it?," we expect similar responses from all Rs. Item covariances with R

[5]In the recent past, "Gender" has become the politically correct referent for 'sex." We retain use of the term sex, following use in comparative social science where the "division of labor by sex," "sexual dimorphism," and other measurable concepts in which differences by sex are important have well-established currency.

characteristics provide a simple test of the item's construct validity.

In 1987, the AOSIS questionnaire items comprised about two-thirds ordinal and one-third nominal variables organized into five sections (A = traditional activities, particularly subsistence-related questions, B = personal health, C = education and employment, D = income, goods and services, E = perceived well-being). Each section included some nominal variables.

Bivariate correlations were computed for each variable with every other variable within each section. The bivariate correlations were measured with Proportional Reduction of Error statistics (PRE's)--Goodman and Kruskal's Gamma [I'] (for ordinal scales) and Phi [ϕ] (for nominal variables; Phi-square [ϕ^2] for four cells = Goodman and Kruskal's Tau [τ], a PRE statistic).

To reduce these large and complex matrixes to more manageable sizes, we sought to determine multiple regression parameters for these data comparable to the analysis in the preceding section. To do so, we checked the fit between the nominal and ordinal PRE measures with polychoric and polyserial correlations (Jöreskog and Sörbom 1986) for the same variables. These correlation coefficients are found by integrating a joint threshold function of the nominal variables with variables that have ordinal scales. This assumes that the nominal distributions and the ordinal scales are roughly approximated by a Normal process with ordinal categories defined by threshold points.

These assumptions were tested for each item. We then estimated the multiple regression parameters from the polychoric and polyserial correlations. Because the questionnaire iterns have no naturally defined unit, regression results are presented in

standardized form. This allows direct comparison among coefficients.

This technique for making comparable items with no scales (nominal) and items in which ranking of nominal items is assumed (ordinal scales) has gained favor among social scientists engaged in multivariate analyses in the past decade.[6] We used it as a means to discover whether items that we expected to covary met our expectations. If not, we wanted to learn why not. The technique proved to be a useful, but unanticipated, discovery procedure: we were able to recognize covarying items whose relations we had not thought about beforehand.

I. RESPONDENT CHARACTERISTICS WITH SECTION A ITEMS[7]

In the original version of the questionnaire and now, Section A is by far the most difficult and complex of AOSIS's five parts. The initial group of questions is drawn from a grid, or matrix of items that classify an R's extracting activities, camping practices, sharing and organizing of labor for traditional pursuits, attendance at traditional feasts and ceremonies, maintaining and repairing of useful technology, production of traditional goods, and so forth. Moreover, the R is asked with whom he/she engaged in these various activities (relatives within the household, relatives or friends outside the household, the nature of relationships--kinspersons or not kinspersons) and when or how often such activities were undertaken.

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[6] In the mid- 1970's, K. G. Jörskog and D. Sörbom (see in particular 1976, 1978) began publication of a series of papers that sought to estimate linear structural relationships by the method of maximum likelihood. Their method treats nominal and ordinal date as if they were continuous interval data. The multivariate method that allows researchers to integrate nominal, ordinal, and interval data in a single solution is known as LISREL. By the late 1980's, LISREL waa among the most frequently cited references in the Social Science Citation Index.

[7] Throughout this chapter, we refer frequently to variables by their simple variable names, such as D 1 or A26. To facilitate understanding, we have developed shorthand variable labels that we will present after each use of a variable name. Complete variable definitiona appear in the Appendix, and complete variable labels are provided the first time a variable is introduced in the chapter.

Some of these questions were common to all regions (A26-38). Yet some were specific to each region (Al-25). The region-specific questions yield far too many variables to be adequately addressed here. We classified these variables into 12 activities to provide comparability across regions. The first 3 distinguish activities on the basis of cooperation; the remaining 9 distinguish activities on the basis of common function.

1. Activities done alone.
2. Activities done with someone in R's household (Same Household).
3. Activities done with someone from another household (Other Household).
4. Fish includes "winter fishing," "fishing for herring," "harvesting reef food or shellfish," "hook fishing," and "blackfish trapping."
5. Birds includes hunting "waterfowl," "other birds," and "ptarmigan."
6. Land Mammals includes hunting "moose or caribou," "sheep," and "deer."
7. Sea Mammals includes hunting "ringed seal," "walrus," "bearded seal," "beluga," "other seals," "sea lions," "bowhead whales," and "fur seals."
8. Fur Trapping is restricted to "trapping fur bearers."
9. Gathering includes gathering "greens/berries," "eggs," "mouse caches" and "sourdock."
10. Maintenance includes making or repairing "boat;" "fish net, trap, or wheel;" and "sled' (Maintaining Equip).
11. Prepare/Support includes "camp as part of hunting/fishing activity," "sew skins," "maintain/use ice cellar," "cut fish for drying," and "gather firewood."
12. Ceremony includes only "attend traditional feast/ceremony."

The 12 activities do not exhaust the substantive' possibilities for the coding and rating of variables from the traditional activities matrix (AI-25). The activities we have focused upon for this analysis are well founded empirically in the contemporary research literature among Alaska Natives and also are central variables in most investigations of Native Alaskan culture.

Because the traditional activities and other Section A items did not apply to most non-Native R's in the 1987 sample, ethnicity was excluded from the analyses of these

items. Regression results for the Section A pretest sample are summarized in Table 4-1. The parameter estimates are standardized by each item's asymptotic variance. The row on which the variable label is located reports the correlations between that variable and the six respondent characteristics. The row immediately below it reports the standard errors of each correlation. Tests of significance are computed from the standard errors. Parameter estimates significant at the 95-percent-confidence level are marked with an asterisk (*).

Let us use an illustration from Table 4-1 to explain how the table should be read. In A26, the R was asked, "During the last 5 years, would you say that the amount of game and fish there is to harvest has *increased, decreased,* or *stayed the same?" This is* an ordinal scale variable with three ranks. If we inspect the regression of A26 (R-Square .058, last column on the right), we see that sex, marital status, and income all have negative effects on A26 (game and fish now) while age, education, and length of residence in the community all have positive effects. Ignoring signs, education's effect on A26 is more than 10 times larger than the effect of marital status.

For another example, the effect of sex on A26 is -.018 with a standard error of .055. The ratio of an estimate to its standard error is distributed as a Normal deviate; so, in this case, Z = -.018/.055 or -0.327. We conclude that this parameter estimate is not statistically different from zero--or the effect of sex on A26 in the Schedule A pretest sample is not statistically significant.

Table 4-1

SECTION A REGRESSIONS ON RESPONDENT CHARACTERISTICS[a]

	Sex	Age	Marital	Education	Residence	Income	R^2
Alone	.208*	.108	.098	.043	.373*	-.040	
	.409	.056	.052	.062	. 0 5 5	.059	.253
Same Household	.083	-.137'	.501"	.003	.113*	-.143'	
	.050	.057	.053	.083	.056	.060	.230
Other Household	.419*	-.201"	.036	.114	.109"	-.116	
	.050	.057	.052	.063	.056	.059	.236
Fish	,326"	-.065	.177*	-.002	-.060	-.154"	
	.052	.060	.055	.067	.059	.063	.143
Birds	.671"	-.228*	.108*	.083	.179	.011	
	.039	.045	.041	.050	.044	.047	.525
Land Mammals	.445"	-.228"	.237	-.141"	.219	.071	
	.047	.053	.049	.059	.052	.056	.325
Sea Mammals	.597'	-.222"	.267*	-.066	.135"	-.18s	
	.040	.048	.043	.051	.045	.048	.495
Fur Trapping	.561"	-.036	.067	.053	.055	.055	
	.046	.053	.049	.059	.052	.056	.332
Gathering	-.057	-.017	.085	.148"	-.034	-.106	
	.056	.064	.059	.071	.063	.067	.031
Maintaining Equip	.598"	-.171"	.176"	-.065	.210-	.047	
	.042	.048	.044	.053	.047	.050	.453
Prepare/Support	.083	-.165"	.194"	-.104	.116	-.094	
	.054	.062	.058	.069	.061	.065	.076
Ceremony	-.015	.022	-.053	-.094	.142-	.111	
	.056	.064	.059	.071	.062	.067	.037
A26	-.018	.089	-.023	.289*	.074	-.194"	
	,055	.063	.058	.070	.062	.066	.058
A27	.008	.075	-.1 3s	.227*	-.059	-.044	
	.055	.063	.058	.070	.062	.066	.059
A28	,115	.097	-.084	-.108	.402	-.168"	
	.044	.051	.047	.056	.050	.053	.394
A30	-.006	-.025	.219	-.133"	.272'	-.266'	
	.049	.056	.052	.062	.055	.059	.255
A32	.059	-.144*	-.037	-.139"	.271"	-.022	
	.053	,061	.056	.068	.060	.064	.124
A33	.063	.047	-.029	-.119	.1 9i-	-.142	
	.052	.060	.055	.066	.059	.063	.153
A34	-.33s	.024	-.233"	.005	-.079	.114	
	.051	.059	. 0 5 4	.065	.057	.061	.185
A35	-.108*	.123"	.060	.042	.303*	.044	
	.053	.061	.057	.068	.060	.064	.114
A35A	.085	-.098	-.081	.072	-.1 89*	-.089	
	.054	.062	.057	.069	.061	.065	.079
A36	.093	.019	-.102	.014	.149*	.126	
	.055	.063	.058	.070	.062	.066	.046
A37	-,145'	.196"	-.019	.329*	-.1 70*	-.218"	
	.053	.060	.056	.067	.059	.063	.132
A38	.164"	.163"	-.039	-.262"	.053	-.131"	
	.049	.056	.052	.062	.055	.059	.252

[a] Significant at P < .05.

Individual effects are interesting in and of themselves. Whereas males hunted sea mammals (.597) and maintained equipment required for subsistence activities (.598) more frequently than did females, females engaged in gathering activities more frequently than did males (-.057). But the effect of women on gathering was substantively small and statistically insignificant. The low negative-parameter estimate demonstrates that in 1987, men in the Schedule A sample engaged in gathering less than their female counterparts, but not significantly less.

For our purposes here, R-square statistics are more important than the estimate of any particular parameter or any particular measure of significance. This is not to say that individual effects are not important. They are clearly important in multivariate analyses. Nevertheless, in this assessment of AOSIS items in relation to R characteristics, we are interested in whether relations are real and determinate. Relations with R characteristics are good places to begin.

To do so, we must control for several sources of influence on each relation. Regressing A26 (game and fish now) on sex, age, marital status, education, years of residence in the community, and income, for example, gives an R-square of .058. In other words, 5.8 percent of the asymptotic variance in A26 is "explained" by sex, age, marital status, education, years of residence in the community, and income. That leaves 94.2 percent of the variance in A26 "unexplained." Our confidence in an item's validity is proportional to its R-square, statistic. We have greater confidence in the validity of A28 (wild foods yesterday) (R-square= .394) than in the validity of A26 (R-square = .058).

Validity, as we have endeavored to make clear, is more complicated than R-square coefficients and confidence levels. Yet these measures are useful diagnostics. Why, possibly, were such apparently important variables as A26 (game and fish now) and A27 (forecast of the amount of game and fish that will be available 5 years hence) so weak in their relations with R characteristics (.058 and .059), whereas the R-squares for A28 (wild food yesterday) and A30 (wild food day before yesterday) were nearly seven times and five times higher respectively in the pretest for Schedule A? It is evident that the false conjunctions (fish and game) in A26 and A27, compounded by the requirement to make a forecast, created invalid questions, i.e., questions that were not measuring what they were supposed to be measuring.

Also flawed were A33 (percent wild meat and fish) and A34 (arts and crafts), which were flawed by false conjunctions and yielded low R-squares. But they were repairable and provided enough information to suggest they should be revised: A33 yielded a significant although low parameter estimate with years resident in the village, and A34 appeared to correlate relatively strongly with women. We chose to rewrite and restructure those questions.

Although their R-squares were not so high as several among the 12 activities, A28 (wild food yesterday) and A30 (wild food day before yesterday) obtained high parameter estimates with years resident in the same community (D25) and income (D2) (income is negative). Item A28 was not ambiguous. It was a straightforward, objective question, to wit: "Was subsistence food a large part of any of the meals you ate yesterday?" Neither was A30 ambiguous. It asked "How about the day before yesterday;

did you eat any meals in which subsistence food was a large part of the meal?" The parameter estimates demonstrated that as residence in a community lengthens (in years) and income decreases, subsistence foods make up a large part of yesterday's meal and the day before yesterday's meal. Although A28 and A30 did not yield strong R-squares in the 1987 sample, each appeared to be measuring what it was supposed to be measuring.

Item A38, which measured the frequency with which the Native language was used at home, yielded an R-square with respondents' characteristics of .252 in 1987. Of interest in the set is the negative relation with education: the more the R's education (Cl), the less the Native language is used in the R's home. It suggested a weak tendency toward a decrease in Native-language use as education increased. Inasmuch as this relation is a standard prediction in modernization and economic-development hypotheses, the evidence suggested A38 (language use at home) should be retained.

Although A37's (respect accorded elders) R-square was lower (.132) than A38's (language use at home), it was of more theoretical interest than the latter. Item A37 asked "Would you say that elders get *more, less*, or *the same* amount of respect from people in your community now than they did five years ago?" This item violated Native customs about making comparisons about effect, particularly about persons or groups of persons and especially if the evaluation maybe negative. This may account for the low parameter estimates. Nevertheless, five of the six parameter estimates were significant. Women, older Rs, better educated R's, R's who were short-term residents in the villages, and lower income R's tended to think that elders received more respect in the village in

1987 than they did 5 years earlier.

Item A37 (respect accorded elders) is interesting because it suggests that older men who have been resident in the villages for long periods of time are different from women and from older men who have been resident in the village for shorter periods of time. In the 1987 sample, the former did not think that respect for elders had increased, whereas the latter did. This may indicate changing ideology and perceptions about older men, or it may indicate the way in which older men seek to retain traditions. Whatever the case may be, A37 recommended itself as a potential indicator at this point in the study.

Low R-squares were yielded by A35 (hear elder tell story), A35A (last hear elder tell story), and A36 (elder's advice), all three of which posed questions about hearing elders tell stories and obtaining advice from elders. Item A35 required that R's report whether "During the last week . . . you personally heard an elder tell a story?" This question was absolutely context dependent and irrelevant if the purpose was to determine whether R's heard stories on occasions when it was possible to do so. The question required revision.

Item A36 (elder's advice) was inappropriate and suggested a misunderstanding of Native teaching. Natives teach by precept, not by offering verbal advice. A younger person learns by observing an older person. In Native society, the following question is not empirically motivated or informed; it is a non sequitur: "When was the last time an elder gave you advice?" (R-square .046) has no construct validity.

It is evident (see Table 4-1) that the measures of activities in 1987 that were

elicited from the activities matrix and that required responses based on empirical recall, produced higher R-squares than did the forced-choice questions A26-38. The matrix questions were not ambiguous, did not require forecasts, did not require comparisons, did not pose false situations ("When was the last time an elder gave you advice?") and did not force a choice among false alternatives. The 1987 evidence suggested that the construct validity of the activities-list questions was not in doubt.

The gathering, preparation, and support for summer camp, as well as attendance at a ceremonial or feast, yielded low R-squares, but individual estimates within the sets of relations for each portend useful indicators. For example, the longer a person was resident in a village the more frequently he/she attended traditional feasts or ceremonies. Younger married couples were more apt to prepare for camp and to support campers in their annual harvesting activities.

We remind the reader that the "R Characteristics" validity analysis of Section A variables (traditional activities) was but one of several validity analyses conducted following the 1987 field session. Decisions about what questions to excise and what questions to revise before launching the second wave of research depended on results of all of those analyses. On the basis of the R Characteristics validity analysis, we classified the variables as follows:

Retain	*Retain*	*Revise*	*Excise*
Alone	Ceremony	A26	A36
Same HH	A28	A27	
Other HH	A30	A33	
Fish	A32	A34	
Birds	A35A	A35	
L Mammals	A37		
S Mammals	A38		
Fur Trap			
Gather			
Maintain			
Pre/Sup			

II. RESPONDENT' CHARACTERISTICS WITH SECTION B ITEMS

Section B of the AOSIS questionnaire instrument asks R's for a general assessment of their health. In 1987, the range of R-square statistics for Section B (from .05 to .62, see Table 4-2) is somewhat higher than the range for Section A. In part this resulted from using race/ethnicity[8] (Race in Table 4-2) as an independent variable. But higher R-squares also were expected because of the presumed importance of age and sex to health.

Items B7 (carry 25 pounds) and B6 (run 100 yards) obtained the highest R-squares in the set (.617 and .486)--B6 asks how easily R can run 100 yards, and B7 asks how easily R can carry 25 pounds 30 feet. Contrary to the expectations for the general United States population, older persons among the Schedule A pretest sample claimed to do both tasks more easily than younger persons, and women more easily than men.

[8]Race and ethnicity are used interchangeably, often together, throughout this study. The reason for this is that our basic distinction is between Natives and non-Natives. The term Native embraces several ethnically different Eskimo groups, Aleuts, and Athapaskans. The term non-Native embraces Anglos (including Scandinavian-Arnericans and all manner of white U. S. citizens), Asian-Americans (predominantly Filipinos), a few African-Americans, and other non-Natives. Thus, rhe non-Native race category embraces a wider variety of ethnic and presumably racial types than doea the Native category.

Table 4-2

SECTION B REGRESSIONS ON RESPONDENT CHARACTERISTICS"

	Sex	Age	Rata	Marital	Education	Residence	Income	R^2
B1	-.008	.153*	.774*	-.005	.045	-.442*	.011	
	.049	.056	.130	.052	.079	.093	.067	.260
B2	.120*	.213'	.208	-.012	-.059	-.047	-.154"	
	.050	.058	.133	.053	.081	.096	.069	.222
B3	-.075	-.028	-.183	-.027	.135	.099	-.114	
	.055	.064	.147	.058	.090	.106	.076	. 0 5 1
54	-.108'	.185"	-.193	-.116"	-.160	.080	-.123	
	.054	.063	.144	.057	.088	.103	.075	.089
B5	.304'	.122*	.161	-.026	-.016	-.107	.016	
	.053	.061	.140	.056	.086	.101	.073	.134
B6	-.365°	.341*	-.413*	-.024	-.468*	.303"	-.157"	
	.041	.047	.108	.043	.066	.078	.056	.486
B7	-.453'	.474"	-.162	-.223'	-.386"	.098	.003	
	.035	.041	.093	.037	.057	.067	.048	.617
B8	-.071	.285"	-.032	.070	-.393*	,105	-.042	
	.045	.051	.118	.047	.072	.085	.061	.385
B9	-.117"	.148'	1.063'	-.103	.270"	-.538"	.326*	
	.051	.058	.134	.053	.083	.096	.070	.207
B10	.172'	-.186*	.156	-.025	-.126	-.450"	.103	
	.052	.060	.137	.055	.084	.098	.071	.175
B11	.057	-.097	.925*	-.252'	.361"	-.366"	.207"	
	.049	.057	.131	.052	.080	.094	.068	.245
B12	.217	.135"	-1.162'	-.21 8"	-.239*	.487*	-.193"	
	.046	.053	,122	.049	,075	.088	.063	.345
B12A	.230'	.205"	.41 1"	-.369*	.031	-.181	.2319	
	.049	.057	.130	.052	.080	.093	.067	.256

* Significant at P < .05.

These results better fit the expectations for Native American populations in the lower 48 states than the general population. High mortality and high morbidity rates among Native American males, 25 to 45, correlate with high accident rates and alcohol-related problems. Older persons, as indicated by years resident in the community, and non-Natives (race) also effect claims about running and carrying.

We concluded from these parameter estimates that younger Native men, in the 1987 sample at least, were similar to their Native counterparts in the lower 48 states. Many were healthy, but some were not. Because some were not healthy at greater rates than women and non-Native men of comparable ages, the relation is nonlinear (not linear). Native women of younger and middle ages claimed abilities that also were claimed by non-Native men of similar ages but less frequently claimed by Native men of similar ages. There was a clear upturn in the claiming of competence to do these skills among older Native men (beyond age 45). Item B6 (run 100 yards) and B7 (carry 25 pounds) have construct validity according to our assessment of the effects of respondent characteristics upon them.

Item B8, which asked how easily the R could bite and chew on hard food, was affected by age and by education in the 1987 pretest sample, namely: the older the R and the more modest the education, the greater the difficulty in accomplishing the task. This item was interesting because it appeared to be influenced by fewer factors than those that influenced running and carrying. In particular, it was not significantly influenced by years resident in the village. Our expectations were that long-term residence in a village would indicate dental problems because we assumed that the

longer the residence the older the resident and the less likely that good dental care was available and that good dental hygiene was maintained.

Relatively high R-squares were yielded by B11 (smoke cigarettes), B12 (alcohol last week), and B12A (3+ drinks per day). The parameter estimates for each (does R smoke, did R drink last week, and how many days last week did R have more than 3 drinks) show that married men were more apt to engage in these practices than were women. Better educated, higher income, married Native men who were short-term residents in the villages in which they were interviewed were more apt to smoke cigarettes than were non-Native men or women. Less educated, low-income, and long-term Native residents and non-Native men were more apt to drink.

Because nonresponse rates were so high for these three items (18%, 37%, and 72%, respectively) --suggesting sensitivity problems, not language-ambiguity problems or some other problems in the question that could be patched up with some editing--we could not generalize to the Schedule A pretest sample from these R-square values. In the previous section, we recommended that they be dropped from the instrument. Item B11 (smoke cigarettes) appeared to be a useful indicator influenced by several respondent characteristics. The 1987 nonresponse rate suggested it was less sensitive than B 12 (alcohol last week) and B 12A (3+ drinks per day). We thought it could be revised and retained for the second wave.

Items B1 (general health) and B2 (how good should health be) were discussed above as violating linguistic conventions, violating cultural customs (comparisons with others and forecasting), and as being reported by some R's during debriefing as

offensive, i.e., sensitive in our usage. Nevertheless, the 1987 response rates for these questions were high. Descriptions of personal health were strongly and positively influenced by non-Natives and short-term residence in villages (B1). Favorable comparisons with the health of others (B2) was influenced, although less so than was the case for B 1, by non-Natives and short-term residents in the village. Older males and persons with lower incomes also influenced these comparisons. Thus, B1 (general health) and B2 (how good health should be) appeared to be valid measures that distinguished perceptions of non-Natives from Natives and short-term residents from long-term residents.

Items that inquired whether R suffered from an illness or disability (B3), could see clearly across the room (B4), and could hear what is said in a conversation (B5) fitted normal expectations for the general population. Vision and hearing diminish with age (vision declines slowly after age 40, and hearing declines slowly after age 50). Unexpectedly in the 1987 sample, women were more apt to see less clearly and men were less apt to hear less clearly. These estimates may be functions of work habits: Native women traditionally engage in fine, detailed work (e.g., sewing), whereas men much more frequently work outdoors in extreme conditions and around equipment that produces very high decibels (rifles, guns, motorboats, snowmachines, all-terrain vehicles, diesel generators, and the like).

We would expect injuries, illness, and disabilities (B3) to be low, hence to be little influenced by any particular respondent characteristic. So the low R-square for B3 met our expectation. The value of B3, we thought, would prove itself in multivariate

measures when controls are exercised for age, sex, occupation, time spent hunting, and so forth. Items B3 (suffer long illness or injury), B4 (see clearly), and B5 (hear clearly) were influenced by very few respondent characteristics, yet they appeared to have construct validity given this assessment.

Item B9 (recent illness or injury) clearly distinguished Native and non-Native populations on whether recent illness or injury had interrupted R's normal activities. Non-Natives, short-term residents, and persons with more education and higher incomes (all of which characterize non-Natives, in general, as well as some Natives) were more apt to have been recently restricted from engaging in some normal activities. In general, our expectations in 1987 and now are that sedentary office workers requiring more education and drawing higher salaries are more prone to short-term illness than are villagers who do not share those characteristics. Item B9 may distinguish sedentariness from a more physically demanding lifestyle. We recognized that in future waves, controls would have to be exercised for occupation to determine whether, say, commercial fishermen, subclassified for race/ethnicity, are more apt to have had their normal activities interrupted than are persons in sedentary occupations.

Item B1O (been struck or hurt) appeared to be a potentially sensitive question: "During the past twelve months, has anyone every intentionally struck you or physically hurt you in some way?" The response rate was high, so if it was sensitive it also was answered. The R-square for B1O is influenced by young persons, men, and short-term residents in a community.

On the basis of the R Characteristics validity analysis--and only the R

Characteristics validity analysis--of Section B items in the 1987 sample, we decided the following variables should be retained, revised and retained, or excised for B items in future applications of AOSIS:

Retain	*Retain in Revised Form*	*Excise*
B3	B1	B12
B4	B2	B12A
B5	B11	
B6		
B7		
B8		
B9		
B10		

III. RESPONDENT CHARACTERISTICS WITH SECTION C ITEMS

Section C asks about education and employment. Item Cl, which asks the R's education (in years), appears as an R characteristic in Table 4-3 (Education); and C2, which asks whether the R is a student, produced too little variance for meaningful analysis. Regression results for the other items of Section C in 1987 also appear in Table 4-3. The R-squares are relatively high for all of these items.

Items C3-5 ask whether and how easily R can read, add a column of prices, and solve a division problem. Because the attributes in the original instrument were ranked from 1. Easily to **4.** Can't Do It, the parameter estimates are negative between competence in the skill and increasing age, education and income. The parameter estimates between competence in the skill and decreasing longevity of residence in the village are also negative.

Table 4-3

SECTION C REGRESSIONS ON RESPONDENT CHARACTERISTICS"

	Sex	Age	Race	Marital	Education	Residence	Income	R^2
C3	.023	.368'	.847'	-.136'	-.146'	-.550"	-.020	
	.031	.036	.083	,033	.051	.060	.043	.694
C4	-.018	.946'	-.051	-.164*	-.383*	-.074	-.135"	
	.039	.045	.102	.041	.063	.074	.053	.539
C5	.047	.298'	-.050	-.059	-.566'	-.078	-.257'	
	.033	.038	.088	.035	.054	.063	.045	.662
C6	-.091	-.180'	-.280"	.050	.075	.135	.173	
	.050	.057	.132	.052	.081	.095	.068	.237
C7	-.216*	-.226*	1.365"	.187'	.455'	-.854'	-.065	
	.039	.045	.103	.041	.063	.074	.053	.536
C8	-.303'	.123"	-.216	.021	.018	.058	.159'	
	.051	.058	.134	.053	.082	.096	.070	.207
C12	.253'	.076	.577"	-.165"	.478"	-.445*	.172"	
	.051	.058	.134	.053	.082	.096	.069	.209
C13	-.269*	.126'	-.292"	-.162'	-.151	.054	.016	
	.053	.061	.140	.056	.086	.101	.073	.135

* Significant at P < .05.

The estimates of the parameters and the R-squares for C3-5 in relation to R characteristics were commonsensical and provided no unanticipated discoveries. Sex did not influence skills, but youth certainly did: younger R's read (C3), added (C4), and divided (C5) more easily than older Rs. Non-Natives read more easily than Natives, but Natives (insignificantly) added and divided more easily than non-Natives. Decreasing longevity of residence in the village (D25) significantly increased reading skills and influenced, but not significantly, arithmetic skills in the 1987 sample. Increasing income (D2) and increasing years of education completed (Cl) influenced division skills, adding skills and reading skills in that order. These results are commonly produced worldwide. The construct validity of these items as measured by R-characteristic covariance in 1987 was confirmed.

The awkward and complex structures of items C6-8 in the original AOSIS questionnaire have been discussed above. These were important questions that required attention before beginning the second wave of field research. But as administered in the Schedule A pretest, their construct validity was doubtful. The R-squares with respondent characteristics for C6 (months employed) and C8 (months voluntarily unemployed) were relatively low, but the parameter estimates for these items instilled confidence in their usefulness following appropriate revisions.

Item C6 asked R during which months he/she worked for pay for 2 weeks or more (made more difficult by also asking whether commercial fishing had been included in the answer). Just what was being measured and what was being included and excluded was not clear (employment, underemployment, self-employment). Younger

people and Natives influenced this question, which also correlated with higher incomes.

Item C8 asked in which months of the preceding year R decided not to work for wages (or commercial fish). This question was ambiguous because it falsely conjoined wages with work and commercial fishing and because it suggested complete unemployment without stating complete unemployment. Women influenced this item, as did increasing age, being a Native, and having a higher income. Thus, in the 1987 sample, women and elderly persons may have worked less (or not at all) than men and younger persons. Inasmuch as unemployable were not excluded, many female and elderly R's may have been unemployable (because no child-rearing surrogates were available or because persons were retired or infirm). Even if any of these possibilities were true, Natives decided to work less (C8) than non-Natives, and persons with higher incomes more often decided not to work than persons with lower incomes. The latter, we surmised, may have indicated participation in the seasonal fishing economy. In the 1987 version, AOSIS did not provide a means to determine whether persons participated in commercial fishing.

Item C7 (months unemployed) produced a higher proportion of explained variance (.536) than either C6 (months employed) or C8 (months voluntarily unemployed). Although this reflects collinearity in the independent variables, it also suggests that the R's had less trouble remembering episodes of unemployment (defined as looking for a job) than either episodes of employment or voluntary unemployment. It was apparent that C6-8 had to distinguish employable from unemployable and had to be rewritten so as to minimize the memory-retention issues that were entailed in each

item.

Item C12, which measures the time that R's were employed away from their homes during the preceding year, produced a relatively low R-square (.209). Yet it was strongly influenced by men, non-Natives, education, short-term residence in the village, and income. Non-Natives moved more readily in quest of employment. The analysis of C12 (employed outside village) with R characteristics commended its retention in subsequent studies.

Item C13, a complex question that asked R's how much of the subsistence activities that they wanted to do they actually had time to do (presumably, that they accomplished), yielded an R-square of. 135. Low but significant estimates were obtained with women, older people, Natives, and married persons. We thought this variable might be useful in revised form because it not only appeared to discriminate between Natives of various types but also between Natives and non-Natives.

On the basis of the R Characteristics validity analysis (yet depending on the results of other analyses in conducted in 1987), we decided to treat the C items in the following way before embarking on the 1988 field research:

Retain	*Retained in Revised Form*
C3	C6
C4	C7
C5	C8
C12	C13

Iv. RESPONDENT CHARACTERISTICS WITH SECTION D ITEMS

Section D asks about income, goods, and services available to the R. Where an

item is conditioned on ethnicity, the Native variable has been excluded from the model (D17B-E, D22-23). Regression results, shown in Table 4-4, range from more than 60-percent variance explained (D5 and D11) to nearly O (D17C-D). In the analysis of the AOSIS items for 1987 with respondents' characteristics, Section D includes some of the "best" and some of the "worst" items we assessed in the instrument.

Our analysis of the sentence mappings of all but one *attitudinal* question (D6--household finances now) in the D section predicted problems of construct validity in D5, 7, 17A-E, 18. Nonresponse rates were high on all of these items, but especially on those that required an evacuation of the performances of the regional and village corporations and the city council (the D17 series). Nonresponse rates also were high on D7, which sought a prediction about future household finances, and D18, which sought a person's evaluation of his/her impact on **community affairs.**

The R-squares for these variables were low, again suggesting that the construct validity was tenuous. Items D7 (household finances future), D17A (effectiveness of city council), and D18 (personal influence on local affairs) yielded high parameter estimates with non-Natives, short-term residence, younger Rs, or all three. We decided to carefully revise the D17-series variables (effectiveness of various governing bodies) to see continued if we could increase their construct validity during the Schedule B inquiry. The nonresponses were so high for items D17B-E (effectiveness of IRA, village corporation, regional profit corporation, regional non-profit corporation) in the series (29 to 53%) as to render them invalid.

Table 4-4

SECTION D REGRESSIONS ON RESPONDENT CHARACTERISTICS'

	Sex	Age	Rece	Marital	Education	Residence	Income	R^2
D3	.832"	.002	.623"	.180"	.484"	-.249"	.121	
	.049	.059	.136	.052	.085	.097	.068	.251
D4	.140'	.006	-.424"	.217'	.024	.261"	.376'	
	.040	.048	.110	.042	.069	.078	.055	.509
D5	-.053	.022	-.643'	.255*	-.008	.242*	.264'	
	.036	.043	.099	.038	.062	.070	.049	.604
D6	-.016	.201"	.503"	-.027	.190'	-.015	.080	
	.051	.062	.142	.054	.088	.101	.071	.178
D7	-.062	.169"	.302*	.012	-.010	.084	.167*	
	.052	.062	.143	.055	.089	.101	.071	.174
D8	-.162"	.070	-.462"	.169*	-.119	.275*	.205*	
	.049	.059	.136	.052	.085	.097	.068	.249
D9	-.001	.096	-.430'	.116'	-.002	.360'	-.281"	
	.055	.066	.151	.058	.094	.107	.075	.076
D10	-.082	.003	-1.213"	-.063	-.268'	.396'	-.111"	
	.041	.049	.114	.044	.071	.081	.057	.474
D11	-.208*	.011	-1.509*	-.046	-.420*	.684"	-.187*	
	.035	.042	.097	.037	.061	.069	.048	.619
D12	-.034	-.023	.010	.202*	.042	.135	-.210*	
	.055	.065	.151	.058	.094	.107	.075	.077
D13	.016	-.161"	.149	-.185'	.168	.114	.033	
	.053	.064	.148	.056	.092	.105	.073	.115
D14	.095	-.157"	-.926*	-.014	-.212	.463*	-.158'	
	.051	.061	.141	.054	.088	.100	.070	.191
D15	.176'	-.057	.420'	.166'	.103	-.082	-.081	
	.052	.062	.144	.055	.090	.102	.071	.164
D16	-.030	-.148'	-.096	.104	.061	.336'	.171"	
	.053	.064	.146	.057	.093	.105	.074	.112
D17A	.094	-.159"	.733'	.045	.241"	-.539'	.169*	
	.053	.063	.146	.056	.091	.104	.073	.133
D17B	.098	-.179		.022	.043	.161	.114	
	.088	.100		.110	.104	.068	.103	.068
D17C	-.065	-.022		.056	.136	.043	.023	
	.073	.079		.075	.097	.077	.081	.030
D17D	-.050	-.081		.048	.035	-.023	.087	
	.075	.082		.078	.091	.078	.071	.024

* Significant at P < .05.

Table 4-4
(Continued)

	Sex	Age	Race	Marital	Education	Residence	Income	R^2
17E	.038	-.054		-.028	.098	-.077	.123	
	.077	.088		.082	.095	.081	.082	.057
D18	-.021	-.122	.190	-.190*	-.100	-.388'	.015	
	.052	.063	.145	.055	.091	.103	.072	.145
D19	.050	.071	.059	.066	,109	.230'	.152*	
	.056	.063	.079	.055	.073	.071	.067	.103
D20	.160	-.010	.064	.014	.055	.250"	.141"	
	.058	.062	.080	.058	.073	.070	.068	.088
D21	.095	.092		.001	-.026	.221 "	-.104	
	.068	.076		.007	.081	.056	.073	.100
D22	.070	.049		.048	-.030	.302*	.024	
	.063	.076		.067	.101	.085	.071	.116
D23	. 0 1 3	.058		.020	.014	.278*	-.085	
	.042	.072		.064	.078	.053	.069	.099
D27	-.382*	.424'	-.866*	.199'	-.238*	.461 "	-.256"	
	.041	,049	.113	.043	.071	.081	.056	.478
D30	-. 198;	.171'	-.51 8*	-.366'	-.116	.269'	.094	
	.049	.059	.137	.052	.086	.097	.068	.240
D31	-.112	.104	-.084	-.184"	.034	.016	.102	
	.067	.076	.094	.058	.090	.081	.082	.060

Because D5 (income desired) had a high nonresponse rate (14%), we speculated about whether Natives would make the comparison sought by the question. The R-square for D5, .604, suggested to us that although a large percentage of R's did not respond, those who did respond accounted for a large amount of variance. Natives, long-term residents in communities, persons with higher incomes, and single persons desired greater incomes. It maybe that D5 (desired income) measures the wants of married Natives, especially long-term residents, as well as higher income earners, especially non-Natives. High nonresponse aside, we decided that some version of this item should be retained.

Item D6, which asked whether R thought his/her household was better off in 1987 than 5 years earlier, was clearly influenced by non-Natives, less so by higher education and age. It distinguished Natives from non-Natives and, we concluded, was a useful measure of the perception of income change by respondent characteristics.

Several other items were uncovered in the nonresponse analysis that suggested potential problems--in D4 (income household requires), D21 (vote tribal election), D30 (ever married), and D31 (ever divorced). The regression analysis in 1987 suggested to us that we should seek to increase the response rates on D4 and D5. Item D4 (income required) produced a high R-square (.509) and yielded very similar parameter estimates to D5 (income desired). Natives, married persons, long-term residents, and higher earners required more money than was the case for R's in other categories. This variable, too, appeared to be useful.

The other high nonresponse items posed several kinds of problems. For example,

D14 assessed recreational activities, but recreation was equated in the question with television viewing. This appeared to be a false conjunction or perhaps an errant classification. Apparently the persons responsible for creating the questionnaire did not know whether residents of Alaska villages considered viewing the evening news, say, as recreation. If information about recreation was sought, the question would have to be rewritten to measure leisure or recreation. Whichever topic was measured, it would be necessary to marshall ample and empirically warranted examples to ensure construct validity. We could not salvage this question.

In a more straightforward and less ambiguous way, D15 asked how many hours during the past week R sat down and watched television. The nonresponses (7%) were less than half the amount registered for D14 (recent recreation). Although the R-square is low, males, non-Natives, and married persons influenced television viewing according to the 1987 data. The variable appeared to provide valid measures of viewing by R characteristics. We did not determine whether the non-Native males who watch more television than the average village viewer are predominantly commercial fishermen whose spouses and children (if married with families) reside in Anchorage or in the Seattle area (a common practice of many commercial-fishing families).

All of the political questions, from those that evaluate the effectiveness of governing bodies to those that measure the frequency with which political franchises are exercised (D17A-23), yielded low R-squares. It was surely not a fortuity that the D17 series (effectiveness of various governing bodies), D18 (personal influence on local affairs), and D21 (vote in tribal election) had high nonresponse rates. Item D21 (vote in

tribal election) was influenced by length of residence in the village but no other characteristics of R. Items D19 and D20, asking whether R "happened' to vote in the last city and last Statewide elections were influenced by long-term residents and higher incomes, but most parameter estimates were close to zero. High incomes are much more frequently an attribute of non-Natives than Natives (race accounts for almost no variance in D19 and D20). So the evidence suggests that high earners (most non-Natives) and long-term residents (Natives and high earner non-Natives) vote Only long-term residence in the village influenced D22 and D23, which asked whether R voted in the last village corporation and regional profit-corporation elections. Only Natives are franchised to vote in these elections: income is not significant in accounting for the exercise of the franchise in Native elections.

In the original AOSIS questionnaire, the political questions, in general, appeared either to be sensitive or not to be measuring what they were supposed to measure, whether or not R's responded to them. On the basis of the R-characteristics analysis, we concluded D19-23 (questions measuring exercise of political franchises) should be retained even though they produced low R-squares. They were clear and unambiguous, and they discriminated within village populations.

We concluded that D30 (ever married?) was superfluous inasmuch as D29 measured whether a person was currently married and D31 measured whether a person had been divorced. Items D30 and D31 had nonresponse rates of 33 percent and 28 percent, respectively. However, we thought that these items, similar to D19-23, should be retained in some form for the 1988 research because they might prove to be sensitive

indicators in our multivariate analyses.

An especially nettlesome example of a false alternative was D3 (commercial fisherman or personal business). It was nettlesome because from the very first field session the importance of commercial fishing in distinguishing villages, as well as persons within villages, was evident. Also, D3 muddied the waters by asking whether R is a commercial fisherman or has his/her own business. These are false alternatives for persons who are commercial fisherpersons and have separate businesses, or are commercial fisherpersons and are established as independent (self-employed) business persons. But it also lumps together all manner of commercial fisherpersons with persons who are not commercial fisherpersons but have their own businesses. Commercial fishing and owning a business can be the same or independent from one another. We recognized that the question should be divided into several questions, but that option was denied by OMB guidelines. A commercial fisherman can work for someone or for himself. A person can own his own business and that business can, in fact, be commercial fishing.

It is unclear what D3 was measuring in 1987, but if we assume that it measured commercial fishermen, they were predominantly male, non-Native, better educated, and short-term residents. The incomes were not especially high--an unexpected outcome considering that Aleutian fishermen were high earners in 1987 and earlier, whereas the other Schedule A regions had relatively few commercial fishermen. The explanation may be that some of the commercial fishermen were crewrnembers rather than owner-operators and that some, particularly Natives, engaged in the business on a modest basis,

integrating it with subsistence-extraction pursuits during the fishing season.

While it was obvious that D3 (commercial fisherman or personal business) should be retained in some form, it had to be revised to enhance its construct validity.

High R-squares were yielded by D8 (rooms in house), D1O (culinary water disposal), and D11 (household waste disposal). All three were undoubtedly influenced by capital-improvement projects on the North Slope and sundry personal and village projects in the Aleutian-Pribilof region. Numbers of rooms in houses in the 1987 data were influenced by Natives, long-term residents, and higher incomes. The same factors except for higher incomes but with the inclusion of lower educations influenced household-waste and water-disposal systems.

The importance of income for some persons in determining rooms in their homes is not in dispute, but for many Natives the sizes of the houses and the waste systems that serviced those houses were determined by public sector activities in their regions and villages. These variables demonstrated acceptable validity on the R-characteristics analysis.

Although D9 (drinking water) and D12 (maintaining warm house) produced low R-squares, the parameter estimates with the R characteristics demonstrated the influence of Natives, long-term residents, and lower incomes on the difficulties in keeping the house warm and the troubles in getting sufficient good drinking water.

The low R-square for D13, which inquired about the visiting activities of R among friends and relatives in the past week, constituted a less vexing problem than did the discrepancy between casual observations and the responses to D13. Over the years

prior to 1987, but also including the 1987 field research, senior personnel, KI's, and QI's observed high incidence of visiting among village residents. Neighbors, friends, close cousins, married children, grandchildren, more distant collaterals and lineals regularly visited a person's home, much as that person visited persons who stood as neighbors, friends, married siblings, and so forth.

It is likely that D13 did not measure what it sought to measure--the amount of casual and less casually motivated contacts of all kinds that bring persons ii-em different households together in a convivial way, excluding work, public meetings, church-related affairs, and similar institutional gatherings. "Visit," we guessed, may have been the key word and may have suggested a formal visit in which an invitation was offered and accepted. If we were correct, a visit is not brief. We thought D13 was not measuring the visits in which persons casually stopped by R's home and ended up sharing a meal, or dropped by to borrow something and stayed to chat, or came to find children who had made their way to R's house and stayed to visit, albeit briefly. Accordingly, we felt that D13 should be revised to measure "visiting" in its ubiquitous and persistent village form.

The specificity of D27 (visits outside village) probably accounts for why it worked so well in 1987 whereas D3 (commercial fisherman or personal business) did not. Item D27 (R-square .478) asked how many *times* R left the community during the last year and visited relatives or friends. High parameter estimates were obtained with women, older persons, Natives, persons with lower educations, long-term residents in the village, and persons with lower incomes. Item D27 indicates the intervillage visiting engaged in by Natives. We expected similar results for intravillage relations.

Item D16 (attend public meetings) demonstrated that long-term residents, younger persons, and persons with higher incomes were more apt to attend public meetings than R's who did not share one of those characteristics. This question appeared ambiguous, inasmuch as public meetings were 'not defined but should have been. Thus, the low R-square may be attributable to the lack of specificity in the question.

The R Characteristics validity analysis for Section D items suggested the following treatment of the AOSIS questions before conducting field research in 1988:

Retain	*Retain in Revised Form*	*Excise*
D6	D3	D7
D8	D4	D17B
D9	D5	D17C
D1O	D13	D17D
D11	D14	D17
D12	D16	D18
D15	D17A	D30
D19		
D20		
D21		
D22		
D23		
D27		
D31		

V. RESPONDENT CHARACTERISTICS WITH SECTION E ITEMS

Section E--the heart of the well-being analysis as it was conceived by Braund, Kruse, and Andrews (1985)--asks about perceived well-being. The analysis of linguistic conventions and cultural customs before and after conducting the first wave of Schedule A research, coupled with analyses of sentence structures and nonresponses, demonstrated that many Section E items were either invalid or had tenuous construct validity. A

problem inherent to all Section E questions was the requirement that R's had to choose among five Likert-type responses ranging from "completely satisfied" to "not. satisfied." The Inupiaq and Yu'pik dialects do not discriminate increases in a variable property (satisfied) by adverbs.

The R-squares for the 1987 data determined by respondent characteristics and listed in Table 4-5 suggested that problems Section E items recognized earlier in the analysis also were problems for the analysis of respondent characteristics. The R-square values were the smallest of any section and, presumably, this reflected the weak construct validity of the items. In debriefing the Schedule A respondents, R's called Section E "silly" or made some other pejorative comment. The implied scale (violating a linguistic convention) of these items contributed to the problem, as did the violation of cultural customs about making forecasts and making comparisons (or discussing others or making comparisons with others in relation to R).

The facet analysis (sentence mappings) in Chapter 3 specified problems with E3 (feel game and fish) and E4 (feel subsistence activities), Ell (feel time listening to stories), E12 (feel social ties other villages), E16 (feel respect from others), and E17 (feel your accomplishments), E19 (feel fun you are having, feel family gets along) and E21 (feel visiting you do), E23 (feel utility of childrens' education), E26 (feel fellow employees), E29 (feel income), E32 (feel food you eat) E33 (feel water you drink), E35 (feel goods and services in village, feel local influence fish and game) and E38 (feel local influence education), E40 (feel your influence local affairs) and E41 (feel land and buildings in village), E46 (feel opportunities for children to grow up), and E50 (feel

Table 4-5

SECTION E REGRESSIONS ON RESPONDENT CHARACTERISTICS[a]

	Sex	Age	Race	Marital	Education	Residence	Income	R^2
El	.006 .056	.073 .064	-.064 .148	-.100 .059	-.189* .090	.021 .106	.129 .077	.040
E2	-.054 .056	.015 .064	.079 .148	-.024 .059	-.062 .090	.116 .106	.112 .076	.041
E2	.077 .055	.067 .064	-.396 .147	.044 .05B	-.264* .090	.108 .105	-.118 .076	.056
E4	.195" .0s3	-.090 .061	.202 .141	.225" .056	-.102 .0B6	-.034 .101	.027 .073	.132
E5	-.078 .055	-.113 .064	-.31 o" .146	.094 .058	-.225' .0B9	.372* .105	-.014 .076	.063
E7	-.035 .053	-.072 .062	.269 .142	.136* .056	-.054 .087	.081 .102	.037 .074	.114
E8	-.079 .059	-.036 .058	.689* .134	.017 .053	.12B .082	-.10B .096	.085 .069	.209
Ea	.097 .055	.057 .064	-.330" .146	.001 .058	-.287* .090	.174 .105	-.024 .076	.05.9
E10	.019 .046	.305' .053	.677 .122	-.026 .049	-.144 .075	-.404" .088	.294 .063	.342
El 1	.021 .051	.111 .058	.424" .134	-.093 .053	-.162? .082	-.244" .096	.021 .069	.209
E12	-.162* .051	.121" .059	.832* .137	-.045 .054	.099 .084	-.424" .09B	.251" .071	.180
E13	-.294" .053	.039 .061	-.124 .141	-.1 83* .056	-.121 .086	.098 .101	.041 .073	.124
E14	.056 .055	-.001 .064	.448* .147	-.103 .058	.180* .090	-.276* .106	.235" .076	.051
El 5	-.009 .056	.099 .065	.155 .150	-.010 .059	.031 .091	-.084 .107	.120 .077	.017
E16	-.053 .054	.045 .062	-.190 .144	-.032 .057	-.324" .088	.140 .103	-.055 .074	.094
El 7	-.113* .055	.140' .063	-.330" .145	.018 .05B	-.247* .089	.179 .104	.011 .075	.079
Ela	-. 12P .055	-.009 .064	.224 .146	.019 .058	-.076 .090	-.003 .105	. 1 .076	2 9 .058
E19	.037 .054	-.046 .063	.117 .144	-.169" .057	-.067 .088	.051 .104	-.010 .075	.086
È20	-.025 .055	.000 .063	.329* .146	.024 .058	.022 .0B9	.003 .105	.121 .075	.067
E21	.034 .055	-.117 .064	.066 .147	-.121" .05B	-.110 .090	.0B4 .105	.064 .076	.055
E22	-.062 .056	-,004 .065	.072 .149	.06B .059	..050 .091	.045 .107	.146 .077	.031
E23	-.128* .050	.066 .058	.779* .134	-.012 .053	.013 .082	-.424" .096	.107 .069	.215
E24	-.208* .054	.070 .062	.332" .143	.009 .057	.105 .087	-.038 .102	.302" .074	.105

" Significant at P < .05.

Table 4-5
(Continued)

	Sex	Age	Race	Marital	Education	Residence	Income	R^2
E25	-.132 .056	-.031 .064	-.088 .148	-.018 .059	-.167 .090	.096 .106	-.032 .077	.040
E26	.032 .054	-.053 .062	-.582* .143	-.045 .057	-.415* .088	.404* .103	-.144 .076	.100
E27	-.073 .055	.116 .063	-.334 .146	-.074 .058	-.220' .089	.269* .104	-.046 .075	.069
E28	.159 .054	-.008 .062	.000 .142	.028 .057	-.208" .087	.088 .102	-.051 .074	.113
E29	-.008 .052	.028 .060	-.436" .136	-.007 .055	-.195* .085	.148 .099	.227' .072	.159
E30	-.185* .054	-.071 .062	-.102 .144	-.032 .057	-.223" .088	.099 .103	.255* .074	.094
E31	-.273* .053	-.099 .061	-.501" .140	-.033 .056	-.323* .086	.434* .100	.014 .072	.140
E32	-.053 .055	-.135" .063	-.485" .146	.038 .056	-.343' .069	.348* .105	-.114 .076	.065
E33	.006 .055	-.20s .063	-.386* .145	-.031 .058	-.225" .089	.389* .104	-.125 .075	.077
E34	.146* .051	-.092 .059	-1 .086* .136	.024 .054	-.569* .083	.607" .097	-.179' .070	.190
E35	.049 .054	-.045 .063	-.012 .144	-.080 .057	-.240" .088	.168 .103	.106 .075	.090
E36	.172" .053	-.167" .062	.284" .142	.019 .056	.027 .087	-.097 .102	-.103 .073	.119
E37	-.060 .054	.051 .063	.453* .144	-.029 .057	.039 .068	-.112 .103	.105 .074	.092
E38	.010 .051	-.082 .059	-.917* .135	-.004 .054	-.628" .063	.666* .097	-.075 .070	.201
E39	.136" .052	-.009 .060	-.622" .139	-.007 .055	-.302" .085	.603* .100	-.117 .072	.156
E40	-.070 .053	-.041 .061	-.084 .141	-.102 .056	-.164 .066	.336" .101	.025 .073	.124
E41	-.033 .056	-.030 .064	-.253 .143	.041 .059	-.140 .091	.266* .106	-.124 .077	.036
E42	-.078 .054	-.001 .062	-.669" .143	-.004 .057	-.334' .067	.516" .102	-.193" .074	.106
E43	-.121" .052	-.073 .061	-.907' .139	-.055 .055	-.413* .085	.502' .100	-.104 .072	.147
E44	-.073 .053	-.085 .061	.388* .140	-.027 .056	-.050 .086	-.024 .101	.038 .073	.136
E45	-.048 .046	-.076 .056	1.037 .128	.074 .051	.177- .078	-.356" .092	.190" .066	.285
E46	.042 .054	-.184* .062	-.065 .143	.026 .057	-.295" .087	.140 .103	-.065 .074	.104
E48	.110* .051	.052 .059	.912' .135	.043 .054	.250* .082	-.431" .097	.088	.202

overall life quality) and E51 (heard that Federal Government is thinking of letting oil companies explore locally). The nonresponse analysis in Chapter 3 demonstrated high nonresponse rates for E4, El 1, E13 (feel your arts and crafts), E24 (feel opportunities for job), E28 (feel time for subsistence), E36, E38, E39 (feel local influence over development), and E51.[9] The average R-square value for these 25 items in 1987 was about .11, and 14 of the items yielded R-squares of. 10 or less.

Among the items with the highest values (.20 to .34), those most strongly influenced by the ethnicity were E8 (feel time with relatives in other households), E1O (feel your ability in Native language) and E11 (feel time listening stories), E23 (feel utility of childrens' educations), E38 (feel local influences over education), E45 (feel time with friends and relatives), and E48 (feel childrens' opportunities for subsistence skills). Excluding E38 (feel about local influence over local education) --because it violates Native customs and because of its high nonresponse rate (14%)--the parameter estimate that most influenced the R-square value of each of the remaining six items was "non-Native."

There is no doubt that some of the items in this section discriminated Natives from non-Natives in the responses. One group of questions that yielded relatively high and significant parameter estimates on factors that were predominantly "Native" (Native; low education; long-term residence; and, variously, either younger persons or lower incomes), was distinct from a group of questions that generated relatively high and significant parameter estimates on factors that were predominantly "Non-Native" (non-

[9]Items also identified as problematic in the analysis of linguistic and cultural conventions appear in bold.

Native, high education, short-term residence, and high incomes). We called these items "Dominant" in 1987. Their importance became more apparent as our research unfolded.

Another set of questions also distinguished Natives from non-Natives. These items produced very low R-square values and only one (race or ethnicity if one only) or two significant parameter estimates (usually low education for Native and high income or short-term residence for non-Native). We called these items "Weak" in 1987.

A third set of questions yielded low R-squares and either one significant parameter estimate for an R characteristic or no significant estimates at all. In 1987, we called the set "Nothing."

We were in a quandry as we completed this portion of the analysis in 1987. If we eliminated all E items whose construct validity was suspect, and if we also eliminated all E items whose R-square values were very low and for which R characteristics (as independent variables) exercised little or no effect on the items, very few items would be retained in the E section. We were concerned that eliminating all of the items was too drastic an action because some of them could be revised and could prove useful in subsequent research waves. It was obvious by this point that we would have to alter the scale on which items were ranked.

It will be instructive to list the E items on the basis of the classification of significant respondent characteristics in 1987. In the following list, items in *italics* were determined to be ambiguous, or to violate language conventions and/or cultural customs, or both. Items with an asterisk had high nonresponse rates. Small y's signify items influenced by younger Rs.

Native and Non-Native Characteristics That Exercise the Dominant Effects on E Items

Dominant Native	*Dominant Non-Native*	*Weak Native*	*Weak Non-Native*	*Nothing*
ES	E8	E3	*E20*	E l
E26	E1O	E9	E23	E2
E27	*E11**	*E17*	*E24**	*E4**
E29	*E12*		*E36**	*E7*
E31	*E14*		*E37*	*E13**
E32y	*E45*		*E44*	*E15*
E33y	*E48*			*E16*
E34y				*E18*
*E38**				*E19*
E39*				*E21*
E42				*E22*
E43				*E25*
				*E28**
				E30
				E35
				E40
				E41
				E46

Items that discriminate between Dominant Native and Dominant Non-Native, excluding those for which nonresponse rates were high, have interesting distributions: items that distinguish Natives ask R's how they *feel* about the extent to which they respect elders (E5) and about their community overall (E42). These are surely traditional concerns and should distinguish Natives from non-Natives. Another Dominant Native set inquires about how R's *feel* about their work and finances, including the people with whom they work (E26), the work itself (E27), their income (E29), and their overall comfort and financial status (E43). **Three** items that selected for younger R's asked how R's *feel* about the food they have to eat (E32), the water they have to drink (E33), and how safe they feel in the community (E34). Although the questions

selected by Braund et al. (1965) sought personal feelings and individual traits, the items that distinguished Natives tilted toward communitarian concerns, including feelings about the community, feelings about respect for elders, and feelings about people with whom they work. The last, apparently, was sufficiently general to allow for a comparative response.

The Dominant Non-Native items more clearly focused on individual rather than communitarian or traditional issues. Items E8, the time you spend visiting relatives in other households,[10] and E1O, the ability to speak the Native language (predominantly English), received high ranking from the non-Natives, as did E12, social ties to people in other communities (almost all non-Natives relocated to Alaskan villages from outside Alaska). Other affective questions that distinguished non-Natives from Natives include E14, how R's feel about their health and physical condition; E45, how they feel about the opportunities children have to grow up to be adults of which R can be proud; and E48, how they rate their overall life quality.

The Weak Native items focused on how R's *feel* about the amount of available harvestable resources (E3), their cooperative undertakings (E9), and what they are accomplishing in life (E17). The first two items are traditional concerns.

The Weak Non-Native items focused on how R's *feel* about how well family members get along (E20), the usefulness of local educations for children (E23) (non-Natives in the Aleutian region frequently relocate when children attain school age, especially secondary school age), the amount of influence they exercise over local

[10]Non-Natives correlate weakly with visits to friends and relatives (D13 and D27), so apparently a few or no visits are sufficient 'or non-Natives.

education (E37), and the time spent with friends and relatives (E44).[11]

VI. RESPONDENT CHARACTERISTICS AND VALIDITY: A SUMMING UP

Given the large N=332, most of the R-square statistics in Tables 4-1 through 4-5 are statistically significant. Lacking an accepted substantive definition of a "good' R-square statistic, we relied on a relative definition to make sense of these results. For the 1987 version of the AOSIS questionnaire, we defined a "good" R-square statistic as greater than .15, the (approximate) median R-square. Breaking the R-squares in Tables 4-1 through 4-5 at the median and crosstabulating by section:

	Section A	Section B	Section C	Section D	Section E	Total
R-square < .15	10	3	"1	15	35	64
R-square > .15	14	10	7	13	11	55
Total	24	13	8	28	46	119

In 1987, A and E were the "problem" sections of the AOSIS instrument, as measured by variance explained by respondents' characteristics.

With respect to Section A, the problem items were concentrated in the region-specific activities grid (A1-A25), particularly those items that form the indices for Gathering, Prepare/Support, and Ceremonies. With respect to Section E, the problem items were legion. Items of Section E that appeared not to present a problem in 1987 were exclusively influenced by non-Native R's: E8 (feel time with relatives in other households), E1O (feel ability in Native language), E12 (feel social ties other villages), E23 (feel utility of childrens' educations), E38 (feel local influence over education), E45

[11] As with E8, E44 is contradictory when correlated with D 13 and D27. Regarding non-Natives, the evidence with D 13 and D27 and with ES and E44 suggests that they are satisfied with a little contact with relatives.

CHAPTER 5
RELIABILITY: TOWARD STATISTICAL CONCLUSION VALIDITY, 1987

In Chapters 1 and 2, we point out that statistical conclusion validity requires external and internal validity checks. The analysis of variance and covariance of AOSIS topics (1987 data set) in relation to respondent characteristics is an important step toward establishing statistical conclusion validity. The multivariate analysis within topics reported in this chapter is another important step toward establishing statistical conclusion validity.

In Chapter 1, we defined several types of reliability tests, including test-retest, interobserver, and equivalent-tests. Here, we focus on the question of reliability, assessing reliability as a threat to construct validity and statistical conclusion validity by analyzing variables qua variables within the five AOSIS sections. Let us use an example from the E items discussed in the previous chapter to review the general meaning of reliability as it is used in statistical analysis and explain how unreliable measures are threats to validity.

Although E2 ("How do you feel about your life as a whole?") and E49 ("How do you rate your overall life quality?") ask similar affective questions, 22 R's (respondents) who felt "Not Satisfied" on E2 rated the quality of their lives "Excellent" on E49. Discordant responses in 1987 might have been due to construct validity problems in one or both items. If the **22** discordant responses were distributed randomly across the sample, a reliability problem was more likely than a validity problem.

To illustrate the difference between reliability and validity, imagine trying to judge the size of an object resting on a lake bottom. Because any object looks systematically

large or small depending on the angle of vision, angle of vision is analogous to validity. Ripples, currents, and other perturbations that might affect an estimate of the object's size; are analogous to reliability. On a windy morning, independent observers might disagree on the object's size; hence, the observations are not reliable.

In more formal terms, imagine an item that measures precisely what it purports to measure. If this perfectly valid item elicits different responses at different times, one, or perhaps both, must be in error. Or if two interviewers get different responses from the same R, one or both must be in error. In either case, item reliability is expressed as the proportion of concordant measures (or one minus the proportion of discordant measures). The concept is generalized when reliability is defined as the proportion of an item's (statistical) variance explained by some underlying "true" construct (Bohrnstedt 1983).

The reliabilities of E2 (feel about life) and E49 (feel about life as whole) are defined, then, as their (squared) correlations with an underlying "true" well-being construct. Whereas true constructs are unknown in practice, factor analyses can assist in locating a trustworthy construct. It does so by allowing us to infer reliabilities from statistical contrasts of like and unlike items. An item drawn at random from Section A, for example, is "similar" to other A items and "dissimilar" to items in other sections.

Following this logic, polyserial-correlation coefficients were obtained between every pair of variables in each section, A through E. The logic we followed is that items within a section, by design, are more similar than they are to items outside a section. We use these coefficients in our factor-analytic method to assess item reliabilities.

In building our confirmatory factor-analytic models from iterns in each section we were able to take a more microscopic look at variables that, by design, were supposed to address a common topic, such as health (B) or personal well-being (E). Given the many possible structures, modeling was restricted to sets where construct correlations are nonorthogonal and where unique errors are correlated within constructs or factors. This will be clarified by example as we begin with the items of Section A.

I. TRADITIONAL **ACTIVITIES** AND SUBSISTENCE FOOD

We begin with a standard exploratory factor analysis of the iterns in Section A for 1987. While not appropriate for assessing item reliability, this analysis suggested that the items of Section A classify into three factors. The first factor is based on items A26 (game & fish now), A27 (game & fish future), and A37 (respect elders). Because each of these items asks the R to characterize change, we call this factor *Change. The* second factor is based on items A28 (wild food yesterday), A30 (wild food day before yesterday), A32 (eat with relative), and A33 (percent wild food); and, because each of these items mentions food or eating, we call this factor *Food*. The third factor--based on items A34 (arts & crafts), A35 (elder tell story), A36 (elder's advice), and A38 (language use)--is called *Tradition* because these items ask about traditional activities of the Native culture. Maximum-likelihood parameter estimates for this factor-analytic model appear in Table 5-1.

The confirmatory maximum-likelihood factor model consists of 11 equations, 1 for each item. Above we assessed the compounding of fish and game in A26. Yet A26,

Table 5-1

TRADITIONAL ACTIVITIES AND SUBSISTENCE FOOD
MAXIMUM-LIKELIHOOD-FACTOR MODEL

	Change	Food	Tradition	Error
A26	.423		--	.821
A27	.861	--	--	.259
A37	.820		--	.327
A28	--	.778	--	.395
A30	--	.893	--	.202
A32	--	.820	--	.327
A33	--	.732	--	.464
A34	--	--	.361	.869
A35	--	--	-.631	.601
A36	--	--	.015	1.000
A38	--	--	-.988	.023

Change	1.000		
Food	-.147	1.000	
Tradition	.074	-.431	1.000

Goodness of Fit Index = .963

even in its illogical form, proved to be an important variable in 1987. The equation for item A26, for example, is written as

$$A26 = .423 \text{ Change} + .906$$

Here, .423 is the standardized maximum-likelihood-factor loading of *Change* on A26 (game & fish), and .906 is the measurement error in A26. In plain words, the smaller the measurement error, the more reliable the measure. By this criterion, A26 was not very reliable in 1987, nor did we expect it to be, given its definitional problems. Squared, the standardized factor loading and error sum to unity (the Error in Table 5-1 has been squared to facilitate interpretation). Reliability of A26 is expressed simply as

$$\text{Reliability} = 1-.821 = .179$$

In this case, the expressed reliability of A26 can be interpreted to mean that 17.9 percent of its variance is due to the *Change* construct. If we require item reliabilities of, say, 50 percent, then items A26 and A34-A36 would be discarded from AOSIS. This assumes that the three factors implied in Table 5-1 are true and correct. Our nonresponse analysis demonstrated high nonresponse for A36 (elder's advice), so we then had two reasons to suggest rejecting or revising the item. This and all other models presented here were estimated so that errors could be correlated within factors only. We know that A26 (game and fish now) and A27 (game and fish future) in the *Change* factor (A26-27, A37) suffered from conjoining "fish and game." Also, A27 suffered from a high nonresponse rate, as did A37 (respect elders). We suggested that the harvests of naturally occurring resources were of sufficient importance to Alaska Natives to warrant revising the fish and game questions to avoid false conjunctions. We were less sanguine

about the forecast required to be made by respondents in A27 (fish and game future). Yet, the low error measured for A27 commended its retention in some form.

The measurement errors in A26-27 and A37 could be intercorrelated, but these errors could not be correlated with the errors of items in other factors, such as A28 (wild food yesterday).

The four items in the *Food* factor had low error rates. We decided that all were worthy of retention for the 1988 research wave on the basis of this analysis.

Three of the four items in the *Tradition* factor produced very high error estimates. In part, the errors may have been functions of the conjoining of independent items (A34, arts and crafts), a question that didn't ask what it was intended to ask (A35, hear eider tell a story), and had a very low response rate because of a Native cultural *non sequitur* (A36, asking elders for advice). We decided that A34-35 had to be revised and that A36 either should be dropped or revised so as to measure precept rather than "asking elders for advice."

We correlated the three factors obtained from the 1987 data (bottom of Table 5-1). The high correlation (-.43 1) yielded by the *Food* and *Tradition* factors was consistent with our understanding of Native culture: Native food is naturally occurring; it is harvested for subsistence; subsistence harvests for consumption are traditional.

The R's perceptions of change according to the 1987 measures, on the other hand, were relatively independent of both *Food* and *Tradition*. Our analyses suggested that "*increased, decreased, stayed the same*" items in the 1987 version of the AOSIS instrument generally were unreliable, especially as Native forecasts. The results of our factor

analysis confirmed that opinion. Although subsistence concerns are crucial to Natives, these items were not eliciting reliable responses from Native Alaskan Rs.

The confirmatory factor analysis of Section A items prompted us to make the following changes to AOSIS before conducting the second wave of research:

Retain	*Retain in Revised Form*
A37	A26
A28	A27
A30	A34
A32	A35
A33	A36
A38	

II. HEALTH

The factor model for health, derived from items in Section B of the AOSIS questionnaire instrument as administered in 1987, also produced three factors: *General, Specific,* and *External* health. The *General* health factor is based on items B1 (general health), B2 (how good health should be), B3 (long illness or injury), and B9 (recent illness), which asked R's to characterize their general health; for example, "How would you describe your health?" The *Specific* health factor, in contrast, is based on items B4-B8,[12] which asked about specific dysfunctions such as sight and hearing. The *External* health factor is based on items B10-B12,[13] which asked about assault, smoking, and drinking, respectively.

Parameter estimates for this model, presented in Table 5-2, lead to a few strong

[12] B4 (see clearly), B5 (hear clearly), B6 (run 100 yards), B7 (carry 2S pounds), and B8 (bite and chew).

[13] B10 (been struck or hurt), B11 (smoke cigarettes), B11A (cigarettes per day), B 12 (alcohol last week), and B12A (3 + drinks Per day)

Table 5-2

HEALTH
MAXIMUM-LIKELIHOOD-FACTOR MODEL

	General	Specific	External	Error
B1	.927	--		.140
B2	.573	--	--	.671
B3	-.999		--	.000
B9	.406	--	--	.835
B4	--	.687	--	.528
B5	--	.467	--	.781
B6	--	.885	--	.216
B7	--	1.000	--	.000
B8	--	.586	--	.657
B10	..	--	.793	.371
B11	--	--	-.899	.192
B12	--	--	-.022	.999

General	1.000		
Specific	.397	1.000	
External	-.030	.191	1.000

Goodness of Fit Index= .932

conclusions about the item reliability of Section B in the original instrument. Notably, item B 12, which asked the R to characterize his or her drinking behavior during the last week, lacked any reliability whatsoever. Given apprehensions harbored by the QI's about the sensitivity of the drinking questions and the high nonresponse rates for those questions as well, these results were anticipated. Moreover, even if B12 and B12A had demonstrated stronger measures of reliability, their high nonresponse rates rendered them unacceptable for our statistical analysis. Item B11 (smoking cigarettes) produced a strong reliability measure, but it suffered from a high nonresponse rate. Item B1O (been struck or hurt) was the sole variable in the factor for 1987 that could be retained.

More complete analyses, too lengthy to report here, failed to establish minimal standards of item reliability for B12 (alcohol last week) and/or B12A (3+ drinks per day). While these items may have reliably measured something, that something does not seem to have been related to health. Otherwise, each of the three factors contained at least two minimally reliable items.

Although some objections to B1 (general health) and B2 (how good should health be) were noted in the debriefings, B1 had very high reliability, so we opted to retain it. Item B2, which asked for a rather vague comparison, had much lower reliability, and it could have been dropped or retained on the basis of this analysis. However, we kept B2. We opted to be conservative here and almost everywhere else in the instrument and kept items for the second wave if possible. Item B9 (recent illness), which yielded a high error, was related to items in sectors other than health in these 1987 data. We decided to revise and retain B9 at least through the pretest Schedule B analysis.

High error scores (or low reliability) were generated by B4 (see clearly), B5 (hear clearly), and B8 (bite and chew). All were influenced by age, sex, occupation, and other factors as we demonstrated above. We decided to retain these items, even B5 (error =.781), through the 1988 research year. However, B5, which inquired about R's hearing acuity, remained the most obvious candidate for exclusion in the *Specific* factor.

Our suggestions for future use of B items as determined by the reliability analysis in 1987:

Retain	*Retain in Revised Form*	*Excise*
B1	B9	B2
B3		B12
B4		B11
B6		
B7		
B8		
B10		

III. EDUCATION AND EMPLOYMENT

Section C produced two factors, *Education* and *Employment*. The *Education* (or, more appropriately, "literacy") factor is based on items C3-C5,[14] which asked the R to characterize his or her ability to read, add, and subtract. The *Employment* factor is based on items C6-C8,[15] which asked the R to recall how many months he or she was employed and unemployed (forced and voluntarily) in the last year and items C12-C13,[16] which asked the R *to* recall whether he or she worked in another community during the

[14] C3 (read easily), C4 (add easily), and C5 (divide easily).

[15] C6 (months employed), C7 (months unemployed), and C8 (months voluntarily unemployed).

[16] C12 (employed outside village), C12C (months employed outside village), and C13 (time engaged in desired subsistence activities).

last year (presumably because no work was available locally) and whether the R had enough time to do all of the hunting and fishing that he or she would have liked to do.

The problems of understanding the complex questions C6-8 and C12-13 are discussed above. Inasmuch as the error estimates for these items dwarf those of the other C items, it was reasonable for us to conclude that if we were to retain reasonable measures of employment, underemployment, unemployment, and the pursuit of work, these items would have to be revised.

As the parameter estimates in Table 5-3 demonstrate, items C3-C5 were highly reliable in 1987 as measures of *Education*. Except for C6, however, none of the items reliably measured employment. Analyses of each of these items and questionnaire debriefing data supported this conclusion. Significantly, many of the monthly responses to C6-C8 were contradictory. For example, R's told us that the apparently sharp distinctions between forced and voluntary unemployment did not apply to their personal situations. Given this, R's found that precise monthly estimates of employment (or unemployment, or looking for work, or not looking for work) were difficult. Also, R's criticized items C12 and C13 on similar grounds. In any event, for whatever reason, in 1987 only C6 seemed to be a reliable measure of *Employment*.

On the basis of the reliability analysis alone, we thought we should drop C7-8 and C12-13. But our assessment of these items suggested that revision would be the better decision. This also would allow us to measure what they were supposed to measure, employment.

Table 5-3

EDUCATION AND EMPLOYMENT
MAXIMUM-LIKELIHOOD-FACTOR MODEL

	Education	Employment	Error
C3	.987	.-	.033
C4	.974	--	.015
C5	.883	--	.224
C6	.-	.895	.222
C7	..	.240	.918
C8	--	-.130	.985
C12	--	-.521	.726
C13	.-	.158	.944

Education	1.000	
Employment	-,466	1.000

Goodness of Fit Index = .968

Retain	*Retain in Revised Form*
C3	C6
C4	C7
C5	C8
	C12
	C13

IV. INCOME, GOODS, AND SERVICES

The Section D items were the most difficult among the 1987 AOSIS items to fit into consistent factors. Exploratory analyses of these items suggested *Income, Recreation,* and *Political Participation* factors based on the items listed in Table 5-4. The model below provided the best parameter estimates among all of the items in the set. Each of the *Income* items proved highly reliable.

In Chapter 3, we noted that several of the D iterns were convoluted and complex (D1A-F)[17] or were ambiguous and in violation of Native customs (D5 [desired income], D7 [household finances in future], D17A-E,[18] and D18 [influence of opinion locally]). These D items and D2 (income) and D14 (recent recreation), to mention only those germane to the analysis here, also had high nonresponse rates (Chapter 4). With this information as a refresher, let us inspect Table 5-4.

We defined item D1 (total household expenses) as the sum of D1A-D1E; item D2B represents an ordinal scale of income, and iterns D4 (minimum income required) and D5 (desired income) are the R's assessments of an ideal income. In contrast, only

[17] D1A (heating costs), D1B (electricity costs), DIC (housing costs), DID (telephone costs), D1E (utility costs), and D1F (repair costs).

[18] D17A (effectiveness of City Council), D 17B (effectiveness of IRA), D 17C (effectiveness of village corporation), D 17D (effectiveness of regional profit), and D17E (effectiveness of regional nonprofit).

Table 5-4

INCOME, GOODS, AND SERVICES
MAXIMUM-LIKELIHOOD-FACTOR MODEL

	Income	Recreation	Political	Error
D1	.752	--	--	**.434**
D2B	1.000	--	--	**.000**
D4	.953	--	--	**.092**
D5	.790	--	--	**.376**
D13	--	-.027	--	**.999**
D14	--	-,157	--	**.975**
D15		.999	--	**.000**
D27	--	.018	--	1.000
D16	--	--	.792	.373
D17A		--	.939	.110
D18	--		.001	1.000
D19		--	.001	1.000

Income	1.000		
Recreation	**-.205**	1.000	
Political	**.206**	**-.120**	1.000

Goodness of Fit Index = .947

one *Recreation* item (D15, hours of TV last week) reliably measured this construct. Attending public meeting (D16) and perceived efficacy of the city council (D17A) were highly reliable measures of *Political Participation*; voting in elections (D19 [vote city council] and D20 [vote State]) did not reliably measure this same construct.

The *Income* factor proved to be highly reliable, but we thought it likely that the D1 series on housing expenses would be improved by making them less complex and by revising D4-5 (measures of required and desired income) as suggested in Chapter 3. Item D2 (total household income) suffered from high nonresponse, but its intravariable reliability as measured here, and its interobserver and equivalent-test reliability (reported in Appendix D, OMB-Required Analysis of Item Validity/Sensitivity, 1987) commended its retention.

Items D13 (visit friends and relatives) and D14 (recent recreation) in the *Recreation* factor had very high error rates. Both questions had to be revised as proposed in Chapter 4. Item D27 (visit outside) yielded a high error factor, but it distinguished Natives from non-Natives. We concluded the entire factor should be retained for the 1988 research wave, revising variables as necessary.

In the *Political* factor, D16 (attend public meetings) and D17A (effectiveness of city council) produced low error statements. This analysis confirmed the decision we reached in Chapter 4 that the variables should be revised and retained for another round of research. In that chapter, we pointed out that D19 provided the only voting measure in which both Natives and non-Natives could participate. Although the error for D19 was high, we decided to retain it for the 1988 research wave to assess its utility for the

research. The 1987 version of D18 (influence of opinion locally) suffered from ambiguity, high nonresponse, and low reliability. It had little to commend it for future research.

Given the many items in Section D in 1987, we note that, while the factor model presented in Table 5-4 was the statistically "best" model of all those we examined, with the exception of *Income,* the "best" left much to be desired.

Retain	*Retain in Revised Form*	*Excise*
D15	D1	D18
D27	D2	
D19	D4	
	D5	
	D13	
	D14	
	D16	
	D17A	

V. PERCEIVED WELL-BEING

The factor model in Table 5-5 organizes the 45 E items into 10 constructs: (A) *Self,* (B) *Family, (C) Others,* (D) *Community,* (E) *Material Needs,* (F) *Subsistence, (G) Political Control,* (H) *Tradition,* (I) *Opportunity,* and (J) *Education.* The factor loadings in Table 5-5 show that no Section E item in the 1978 sample was more than 73 percent reliable. Yet the internal reliability was somewhat higher than anticipated: 18 items were between 50 percent and 73 percent reliable--the majority between 50 percent and 60 percent. Another 10 items were between 40 percent and 50 percent reliable. The remainder were less than 39 percent.

Table 5-5

PERCEIVED WELL-BEING
MAXIMUM-LIKELIHOOD-FACTOR MODEL

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	Error
E14	.674	--	--	--	--	--	--	--	--	--	.546
E15	.324	--	--	--	--	--	--	--	--	--	.895
E17	.854	--	--	--	--	--	--	--	--	--	.271
E18	.7'42	--	--	--	--	--	--	--	--	--	.449
E19	.707	--	--	--	--	--	--	--	--	--	.500
E8	--	.656	--	--	--	--	--	--	--	--	.570
E20	--	.766	--	--	--	--	--	--	--	--	.413
E444	--	.650	--	--	--	--	--	--	--	--	.577
E7	--	--	.668	--	--	--	--	--	--	--	.554
E9	--	--	.684	--	--	--	--	--	--	--	.532
E12	--	--	.685	--	--	--	--	--	--	--	.531
E16	--	--	.569	--	--	--	--	--	--	--	.676
E21	--	--	.429	--	--	--	--	--	--	--	.816
E26	--	--	.366	--	--	--	--	--	--	--	.866
E34	--	--	--	.742	--	--	--	--	--	--	.449
E35	--	--	--	.507	--	--	--	--	--	--	.743
E40	--	--	--	.718	--	--	--	--	--	--	.484
E41	--	--	--	.557	--	--	--	--	--	--	.690
E42	--	--	--	.794	--	--	--	--	--	--	.369
El	--	--	--	--	.466	--	--	--	--	--	.783
E2	--	--	--	--	.810	--	--	--	--	--	.344
E25	--	--	--	--	.607	--	--	--	--	--	.632
E27	--	--	--	--	.640	--	--	--	--	--	.590
E29	--	--	--	--	.402	--	--	--	--	--	.838
E30	--	--	--	--	.637	--	--	--	--	--	.594
E31	--	--	--	--	.777	--	--	--	--	--	.396
E33	--	--	--	--	.371	--	--	--	--	--	.862
E43	--	--	--	--	.717	--	--	--	--	--	.486
E3	--	--	--	--	--	.673	--	--	--	--	.547
E4	--	--	--	--	--	.800	--	--	--	--	.360
E28	--	--	--	--	--	.711	--	--	--	--	.494
E36	--	--	--	--	--	--	.812	--	--	--	.341
E37	--	--	--	--	--	--	.740	--	--	--	.452
E38	--	--	--	--	--	--	.750	--	--	--	.438
E39	--	--	--	--	--	--	.755	--	--	--	.430
E4	--	--	--	--	--	--	--	.711	--	--	.494
E10	--	--	--	--	--	--	--	.446	--	--	.801
E11	--	--	--	--	--	--	--	.560	--	--	.686
E13	--	--	--	--	--	--	--	.374	--	--	.860
E24	--	--	--	--	--	--	--	--	.409	--	.833
E31	--	--	--	--	--	--	--	--	.545	--	.703
E45	--	--	--	--	--	--	--	--	.845	--	.286
E46	--	--	--	--	--	--	--	--	.639	--	.524
E22	--	--	--	--	--	--	--	--	--	.42a	.817
E23	--	--	--	--	--	--	--	--	--	.630	.603

Although not one of these iterns was as reliable as the most reliable items in Sections A-D, they generally were quite reliable. This didnotsuggest tous that Section E was "better" than the other sections. Of the 18 Eitems, 8whoseerrors were less than 50 percent suffered from all of the following problems: high rates of nonresponse (Chapter 4), either ambiguity and/or violation of customs (Chapter 3), and low R-squares (including low parameter estimates for the influences of respondent characteristics on the items) (Chapter 4).

These 8 items were E4, E18, E19, E28, E36, E38, E39, and E40.[19] Another 5 of the 18 E items whose reliability was high suffered from low R-squares ("nothing" in our Chapter 4 typology) and/or the violation of customs or conventions (E17, E19, E20, E2, and E37).[20] Only items E31 (feel opportunity good housing), E34 (feel safe in village), E42 (feel land and water near village), E43 (feel about community), and E45 (feel time with friends and relatives) passed all of the tests.

As the preceding summary attests, the large number of items that were reasonably reliable in the E section (28 at greater than 40%) also raised serious problems of validity. So, at the conclusion of this research in 1987, we decided it was wise to retain the E items listed in Chapter 4, dropping from further analysis only those items whose reliability was less than 39 percent.

A bit of analogous reasoning may help clarify our problem at this point. Item

---

[19] E4 (feel subsistence activities), E18 (feel about yourself), E19 (feel about fun you are having), E28 (feel time for subsistence), E36 (feel goods and services in village), E38 (feel local influence over education), E39 (feel local influence over development), and E40 (feel your influence over local affairs).

[20] E17 (feel your accomplishing), E19 (feel about fun you are having), E20 (feel family gets along), E2 (feel life), and E37 (feel local influence fish and game).

reliability is an important issue in any assessment of validity because responses to questions must be reliable in order to demonstrate that a relation is real (covaries) in a statistical sense. But perfect reliability often masks a fatal threat to construct validity. Responding at two points in time to two or more investigators, for example, a longitudinal sample drawn at random from an Indian community in the Great Basin may uniformly answer a question about whether witchcraft is practiced in the community in the same way, namely: witchcraft is not practiced.

The answer is highly reliable (by interrater or test-retest criteria), but its construct validity is doubtful. The item does not measure witchcraft, Instead, Indians may be reluctant to provide the correct answer either because they fear repercussion or because they suspect that the questioner would not understand and may misuse the information that they are told. Hence, it is a sensitive question well understood by anthropologists who have worked with modern Indian communities for more than 1 year. In the case of witchcraft, they know that they may elicit an invalid but nevertheless reliable answer. "Too much' item reliability, purchased at the expense of construct validity, is just as bad as "not enough' item reliability.

For the many questions in the original AOSIS questionnaire's E section, we used the means at our disposal to ferret out construct validity: opinions of Native researchers (QI's), understandings of senior project personnel (KI's, SI's, PI's), debriefings of Rs, analysis of nonresponse, analysis of variance and covariance in relation to the characteristics of the respondents, and factor analysis of item reliabilities. As a group, the E items were tenuous.

We decided that the following E items should be retained for the 1988 research wave, assuming that we changed the variable from a five-point to a three-point scale:

Retain	*Retain in Revised Form*
E3	E4
E8	E5
E1O	E7
E12	E9
E14	E20
E17	E25
E27	E26
E29	E31
E32	E34
E33	E35A
E37	E35B
E42	E23
E43	E40A
E44	E40B
E45	E41A
E48	E41B

VI. A CONCORDANCE OF ANALYSES OF THE ORIGINAL AOSIS INSTRUMENT: CHANGES FOR 1988

VI.A. Traditional Activities

Whereas well-being (Section E) was the theoretical heart of the original AOSIS instrument as envisaged by Braund, Kruse, and Andrews (1985), traditional activities (Section A) sought to measure the heart of Native culture and should have provided marked contrasts with non-Native behavior. Our analyses of the version of AOSIS administered in 1987 demonstrated that some of the A items conjoined items that should have been separate (fish and game), some violated Native customs about forecasting (how much ---- will there be 5 years from now), some were empirical *non sequiturs* in

Native society (when was the last time an elder gave you advice), and some asked important questions but were presented such that they yielded little information on the item sought (during the last week, have you *personally* heard an eider tell a story).

Table 5-6 provides a concordance of the changes and deletions we decided to make on the bases of our several separate analyses of Section A items. Any item not listed was retained and used in its original form. For various reasons cited above, we decided to revise and retain some items that failed all of our tests. (Note that in Table 5-6, as in subsequent similar tables, the column heads “Rev” means “revised and retained’ and "Exc" means “excised.”)

We reorganized Section A to begin with a list of 33 traditional activities. We instructed QI’s to determine the number of days in the last year spent on each activity, whether it was done alone or with someone; and, if not alone, whether it was done with a member of another household. We especially wanted to lmow whether that someone was a relative or a friend. But we learned from the pretest interviews in Schedule A that “relative’’--without specification of sibling, cousin, uncle, aunt, grandparent, or affine (brother-in-law, mother-in-law)--is no more informative than “friend.” We requested that the interviewer determine the nature of the relationship. Inasmuch as almost all Aleuts and Eskimos employ kinship terminologies similar to American kinship terms, the task appeared to be simple.

Asking Native R’s for information on "others"--especially by name--raises the issue of sensitivity. The R’s consistently declined items of this sort and pointed out the sensitivity issue in their debriefings. So we instructed interviewers to seek categories of

Table 5-6

CONCORDANCE OF CHANGES TO SECTION A ITEMS

Sentence Mapping, Cultural and and Linguistic Analysis		Nonresponse Analysis		Respondent Characteristic Analysis		Reliability Analysis	
Rev	**Exc**	**Rev**	**Exc**	**Rev**	**Exc**	**Rev**	**Exc**
A26	A27	A26	A27	A26	A36	A26	
A33	A37	A37	A36	A27		A27	
A34				A33		A34	
A36				A34		A35	
						A36	

relatives in 1988, not names of persons.

Another revision suggested in debriefing affected A26, which asked whether game and fish had increased, etc. More than one R noted that A26 was really two questions. We changed A26A and A26B to refer exclusively to game and to fish, respectively. Items that referred to game and fish and other conjoined items that, in fact, could vary independently from one another were likewise broken into two items, such as A34 (arts and crafts). This was not necessary for A33 (meat and fish) because the question deals with a gross estimate of consumption.

A27 conjoined game and fish and also asked R's to predict the future. This request violates a custom for many Natives and produces high nonresponse rates. We dropped this and similar iterns.

The R's and interviewers alike found the conditional A items to be confusing. To avoid this confusion, we changed them (see A28-31).

We deleted the probe from A33 (percent wild food), choosing to teach probing techniques to QI's prior to the onset of field research. We deleted A34A-B (arts and crafts) because the in-formation sought is collected in the face sheet in a straightforward fashion. We reduced A35 (elder tell a story last week) and A35A (last time heard elder tell story) to a single question (A35) that best collects the information that is sought. Item A35A, renumbered as A35, satisfied that goal.

Item A36 (elder's advice) suffered from asking a question that does not fit Native reality. Alaska Natives are instrumental, seldom didactic. Teaching and learning take place by precept, supplemented by discussions between accomplished extractors, trappers,

mariners, and the like. Natives listen intently to accomplished persons--whether elder or junior--but accomplished persons do not lecture the unaccomplished, nor do they offer unsought advice. Even when information is desired, an accomplished Native is apt to tell a person how he or she does things, rather than how things should be done.

So to make the distinction clear between lecturing and teaching by precept, Natives do not offer advice that is not requested; and, should it be requested, they provide examples of their knowledge byway of example or by way of story, often in discussions with others. They do not specify rules, lecture about do's and don'ts, or criticize a person's efforts. The recipient of information watches, or listens intently to, experiences related by a person or listens to exchanges between persons as they recount their experiences. To accommodate the Native situation, we made a simple semantic change to A36 (elder's advice).

VI.B. Health

The most common general complaint by R's in 1987 was that the instrument was too long. This complaint was aggravated by apparent redundancies and seemingly needless conditionals. Table 5-7 lists the recommendations from each of our analyses of the B items.

Our several analyses suggested that B2 should be eliminated in part because of its complexity, in part because it requires a vague comparison, and in part because it is unreliable.

Because items B11 and B11A suffered from high nonresponse, we felt they suffered from threats to construct validity, i.e., they did not measure what we intended to

Table 5-7

CONCORDANCE OF CHANGES TO SECTION B ITEMS

Sentence Map, Cultural and Linguistic Analysis		Nonresponse Analysis		Respondent Characteristic Analysis		Reliability Analysis	
Rev	**Exc**	**Rev**	**Exc**	**Rev**	**Exc**	**Rev**	**Exc**
B1	B2		B11	B1	B12	B9	B2
	B12		B12	B2	B12A		B11
	B12A		B12A	B11			B12

measure. We eliminated them. Also eliminated were B12 and B12A, which asked about alcohol consumption--undoubtedly sensitive questions--and did not pass any of our tests. In debriefing, R's said that B12 and B12A were offensive.

VI.C. Education and Employment

In 1987, the respondents answered questions about employment (C6-8 and 12-13), but neither Rs, interviewers, senior personnel, nor data-management assistants found it easy to work with the questions (see Table 5-8). It is likely that the cumbersome questions, which required considerable memory and quick analysis to answer, influenced the low R-squares for all but C7 (months unemployed) and the low reliability scores for all but C6 (months employed).

Neither R's nor interviewers appreciated the fine distinctions among C6, C7, and C8 (months voluntarily unemployed). We revised these items so as to require less memory about specific contexts and specificity--specific behavior for specific periods during specific months stretched over an entire year.

Because of difficulty in establishing uniform variable codes for items C9 (main kinds of work last year), C1O (employed by what kinds of businesses last year), and C11 (type work preferred), they proved difficult to rate. We had difficulty producing univariate distributions for these variables because the probes associated with C9 and C1O appear to have been confused with Cll so that either inappropriate want lists or desires were reported, or the request for business information was a *non sequitur* and produced no response or an inappropriate response. These questions were rewritten, as were the C12 series (C12, employed outside village; and C12A, type work outside village;

Table 5-8

CONCORDANCE OF CHANGES TO SECTION C ITEMS

Sentence Map, Cultural and Linguistic Analysis		Nonresponse Analysis		Respondent Characteristic Analysis		Reliability Analysis	
Rev	**Exc**	**Rev**	**Exc**	**Rev**	**Exc**	**Rev**	**Exc**
C6				C6		C6	
C7				C7		C7	
C8				C8		C8	
				C13		C12	
						C13	

C12B, place of work outside village; and C12C, months worked 2weeksor more outside village) series and the befuddling C13 ("In the last year, how much of the subsistence activities that you wanted to do did you actually have the time to do: all, most, some, few, or none?").

Item C1O inquired about the kinds of businesses in which the R worked during the last year. "Business" makes little empirical sense in the smaller Alaskan villages (less than 1,000 persons), but public-sector employment makes good empirical sense because the public sector is the major source of employment in the smaller villages.

VI.D Income, Goods, and Services

Table 5-9 tallies the changes to the D iterns. Item D7 required predicting the future in violation of a common Native proscription. We excised it.

The D17 series violated the custom of making critical comparisons and evaluations of others in the community. The questions also were ambiguous because the referent was either to constituents or to the village. Nonresponse rates to D17A-E and R-square values for them were low, suggesting sensitivity problems and validity problems. We revised the D17 series.

The other "political" items of this section (D18-D23), except for D18, did not raise sensitivity or validity problems. Item D18 failed all of the tests, so it was dropped.

Finally, D30 and D31 were cited as "too personal" by R's. The nonresponse rates were consistent with this objection. Yet D31 had high equivalent-test reliability and interobserver reliability. We dropped D30 but retained D29 and D31 inasmuch as those two provided all of the information that was sought with D29-31 (D30 was redundant).

Table 5-9

CONCORDANCE OF CHANGES TO SECTION D ITEMS

Sentence Map, Cultural and Linguistic Analysis		Nonresponse Analysis		Respondent Characteristic Analysis		Reliability Analysis	
Rev	**Exc**	**Rev**	**Exc**	**Rev**	**Exc**	**Rev**	**Exc**
D17A	D5	D14	D7	D3	D7	D1	D18
	D7	D17A	D17B	D4	D17B	D2	
	D17B	D17C		D5	D17C	D4	
	D17C	D17D		D13	D17D	D5	
	D17D	D17E		D14	D17E	D13	
	D17E	D18		D16	D18	D14	
	D18	D30		D17A	D30	D16	
		D31				D17A	

Items related to housing (D8-D12) did not seem to present any problems of note. The condition item D11A was so rare that it was eliminated with no loss of information.

V'I.E. Perceived Well-Being

As is clear in Table 5-10, the items of Section E posed a practical dilemma. Almost every item failed on some test or was a candidate for revision. The E items were almost exclusively affective and without exception violated Native linguistic conventions by requiring discriminations in the amount of personal satisfaction that Natives feel. These items were called "silly" by some R's. Criticisms to the contrary notwithstanding, the E iterns proved simple to administer, took little time, and only a handful seemed particularly sensitive.

Still, judging from the sentence analyses of ambiguities, the analysis of the violation of customs, the correlations with R characteristics, and the reliability analysis, not one item is unequivocally valid. Given the length of the instrument, and the "redundancy"[21] comments of R's, some of these items could be cut with no loss of information. Based on the criterion of failing two or more tests, El-2 (feel house, feel life), E13 (feel arts and crafts), E15-16 (feel you handle problems), E18-19 (feel about self, feel about fun you are having), E21 (feel visiting you do), E28 (feel time for subsistence), E30 (feel standard of living), E46 (feel opportunity children to grow up) and ES 1 (have you heard about Federal Government oil exploration) were dropped.

[21] One rationale for several questions in Section E was to provide measures of some questions asked elsewhere in the questionnaire. So, some redundancy was entered in the questionnaire as a check on reliability.

Table 5-10

CONCORDANCE OF CHANGES TO SECTION E ITEMS

Sentence Map, Cultural and Linguistic Analysis		Nonresponse Analysis		Respondent Characteristic Analysis		Reliability Analysis	
Rev	**Exc**	**Rev**	**Exc**	**Rev**	**Exc**	**Rev**	**Exc**
E3	E16	E4	E51	E11	E1	E4	E1
E4	E20	E11		E24	E2	E5	E2
E11	E23	E13		E36	E4	E7	E13
E13	E26	E24		E38	E7	E9	E15
E17	E29	E28		E39	E13	E20	E16
E19	E37	E36			E15	E23	E18
E21	E37	E38			E18	E25	E19
E32	E50	E39			E19	E26	E21
E33	E51				E21	E31	E28
E35					E22	E34	E30
E36					E25	E35	E46
E40					E28	E40	
E41					E30	E41	
E46					E35		
					E40		
					E41		
					E46		

Many of these items also were redundant, providing another reason to drop them (E2, E15-16, and E18-19). Though E14 (feel your health) and E39 (feel local influence over development) also were redundant, redundancy alone was not sufficient reason to drop them.

The statistical problem with all of the E items, not just the set listed above, is that there is too little variance in the responses, as we learned by simple perusal of the univariate frequency tables. In E26, for example, no R was "not satisfied' with the "people you work with." If we had based our recommendations strictly on statistical criteria, several E items would have been eliminated: E5 (feel respect for elders), E7 (feel sharing you do), E20 (feel family gets along), E25 (feel present job), E26 (feel fellow employees), E27 (feel about your work), E42 (feel land and water near village), E43 (feel about community), and E44 (feel about personal health).

On the rationale that too much item reliability purchased at the expense of construct validity is just as deleterious for our research as not enough item reliability, we decided to retain all of the reasonably reliable items for the second research wave (items whose reliability was greater than 40%). Nevertheless, a host of retained items required revisions. These included E5, E7, E25, and 1326. Six items required revision to clear up problems encountered in either asking the question or analyzing the response (E20, E22 [feel utility of your education], E23 [feel utility of childrens' educations], E35 [feel goods and services in village], E40 [feel your influence over local affairs], and E41 [feel land and buildings in village]). And two problematic items, E32 (feel about food you eat) and E33 (feel about water you drink), were combined into a single item.

About one-half of the items in the AOSIS instrument administered in 1987 failed one or more reliability, sensitivity, or validity tests. Because of the close attention paid to construct validity, sensitivity, reliability, and statistical testing validity of the AOSIS items, a large number had to be dropped from the instrument and others had to be rewritten before we entered the field for the second wave of research in 1988. The consequences for the research are that a shorter and revised instrument, albeit an instrument with much greater construct validity and reliability than the original, was administered to reinterviewees (8A2) and to pretest respondents (8B) in 1988. Subsequent comparisons between the pretest respondents in the Schedule A sample (7A) and subsequent samples, even when the same persons are reinterviewed in the A panel (8A2 and 9A3), are restricted by the number of AOSIS items that survived the analyses undertaken for the report mentioned above.

PART THREE: ANALYSES OF RELIABILITY, STATIONARINESS, TESTING ARTIFACTS, AND THEORETICAL CONTRASTS AT TWO POINTS IN TIME

CHAPTER 6
WHAT WE LEARNED FROM THE SECOND WAVE OF FIELD RESEARCH (1988)

A major goal of our research program in 1988 was to learn whether our sample design was working as we had intended. Our reentry into the field took us to all 21 of the villages studied in 1987, as well as to 10 new villages. Our design allowed us to create a reinterview sample from the original sample respondents interviewed in 1987 (referred to as *Panel A*), and compare their responses in 1988 to their responses to identical questions in 1987 and to the responses of the new sample of respondents (pretest) which was drawn from 10 of our Schedule B villages (sample villages located in the Bristol Bay, Kodiak, and Bering Straits regions).

Although we could make comparisons at only two points in time on completion of the 1988 field research, measures at two points, in time would indicate the stationariness of variables. So, at this juncture we had a powerful tool at our disposal to assist in the evaluation of the reliability and validity of the AOSIS questions which had survived the tests described above.

1. PANEL STABILITY AND THE MEASUREMENT OF CHANGE

The nested panels (one for Schedule A and one for Schedule B) in our sample design were intended to increase statistical power over time. That increase, we assumed, would be incremental--year by year. As will be come evident, statistical power increases as reliability increases and as threats to internal validity are controlled.

During the 1988 field session, 115 respondents were drawn at random for reinterviews (RI) from the initial (I) sample of 342 respondents in the Schedule A

sample for 1987 (7A). We drew this panel (8A2) in order to apply explicit controls for the threats to AOSIS's internal validity posed by history and regression. As explained above, these threats occur only if an AOSIS indicator (questionnaire item) is unstable. In statistical terms, an unstable item is nonstationary. It is necessary to compare measures at three points in time (initial [t_1], transitional [t_2], change [t_3]) to validly attribute change in an indicator to some specific factor, such as history, regression, OCS development, or a non-OCS factor. In 1988 it was too early in the research design to discriminate among the most likely causes of change, but it was the exact time to determine whether items were stable and would facilitate the measurement of change in 1989 and 1990. So our task was to determine whether and which of the AOSIS items were temporally stable.

To measure the temporal stability of AOSIS items we correlated 1987 (I, 7A) responses on AOSIS questionnaire items with 1988 (RI, 8A2) responses on those same items by identical respondents from a nested subsample.[1] In practice, given a 10-percent-absolute change in an AOSIS indicator, validity is proportional to the temporal stability of the indicators used in other data sets and other methods in our multitrait, multimethod (or triangulation) design. We would not have measures of the temporal stability of KI protocol items or AOSIS items from the B Panel or a second subsample of the A Panel until we completed field research in 1989. So in 1988 we addressed an

[1]Although redundant, in Part Two we explain how 72 original AOSIS items were either rejected or revised because they proved to be invalid, unreliable, sensitive, or ambiguous. Thus, in 1988 we were working with a more carefully analyzed and tested instrument than the version used in 1987. Yet in 1988, the research team harbored reservations about the validity of some items that were retained from 19S7, even though revised. Most of the items that caused reservation were intended to measure attitudes about well-being (located, for the most part, in section E of the instrument), and because attitudes about well-being were important goals in the RFP as specified by TR 116, these items were employed again.

issue that was logically and empirically prior to multitrait, multimethod analysis. The AOSIS items had to demonstrate stability at two points in time because each AOSIS item posed a threat to internal validity.

Our pretest-posttest nested panel design provides a temporal measure of the stability of AOSIS items (see Sullivan and Feldman 1979: 56-66). With little or no random measurement error, repeated applications of a measurement should produce identical or nearly identical results. Across the identical group of respondents measured in two waves 1 year apart, the correlation for each item should be very high (and positive). Random error, of course, will reduce over-time (measured at 3 points in time) correspondence for each individual in the panel. Whereas the absence of high correlation is taken as an indication of unreliability (a distinct threat to internal validity), some change can be expected. Indeed, our goal in 1988 had not changed from our goal in 1987: we sought to develop a parsimonious set of indicators that was sensitive to OCS and non-OCS factors in causing change.

Braund et al. (1985) developed and field tested the AOSIS variables for MMS with the intention of creating items that were sensitive to change. Thus, if any substantive change takes place, the correlation between that variable, as measured by the response to the first and second waves, will underestimate the true reliability of the measure. And contrariwise, if true stability is sought, the responses to the variable at each wave must be perfectly reliable. When we have no more than a pretest-posttest measure from two points in time, the reliability coefficient r_{12} is confounded. This problem is rectified when a third wave is introduced (and when other nested subsamples

are correlated over time). On completion of the 1989 field inquiry, we were able to measure reliability from three correlations:

$$r_{12}, r_{23}, r_{13} \text{ by way of } r_{13} = a^2 \cdot r_{12}/a^2 \; r_{23}/a^2 = r_{12}r_{23}/a^2.$$

In order to assess substantive change in 1989, the AOSIS variables had to pass our first temporal test for stability. The variables had to correlate highly and positively with themselves over the two waves. In our sundry tests of validity and reliability at the conclusion of the 1987 field season, we determined that each variable in the AOSIS instrument and the KI protocol must obtain three or more $r^2 \geq .50$ or Gammas (γ = PRE or proportional reduction of error coefficients) $\geq .50$ in order to be considered for retention in the study. In our pretest-posttest of Schedule A, the same rule applied. If we were to reject null hypotheses in 1989, even .50 was a high risk indicator of stability.[2]

We assessed the stability of the panel as a necessary prelude to assessing change in 1989. As in *Part Three,* the analysis is organized by sections or topic domains within AOSIS. For the most part, the AOSIS variables that passed the tests administered in 1987 also passed the stability tests administered in 1988. In general, items that ask questions whose empirical referents are obvious and, allowing for error, can be recalled (years attended school, injuries sustained in the past year, household size, dollars invested in subsistence harvests, access to potable water), yield responses over the two waves that correlate highly and positively. On the other hand, items for which direct

[2] In 1988 we made three or four exceptions to this rule. In one or two instances Gamma (γ) coefficients of .49 were accepted as stable, provisionally so, because of their potential. In a similar fashion, some Phi-squares (ϕ^2) were retained that provided values of only .05, but these low values are functions of the dissimilar marginal sets. Phi (ϕ), being a function of r, is highly sensitive to marginals. In the dichotomous variables employed here, we were especially interested in high loadings in the a or d cells. Heavy loadings in either yield marginal sets that are not identical (four marginal total of the exact same size), but they frequently yield identical or nearly identical sets for first row-first column and second row-second column. The small Phi-squares in such instances belie the relations of inclusion that are often stable, very high, and positive. Gamma coefficients, a measure of inclusion in a four-cell table, provided checks on low Phi-square values. If the Gamma was high and positive, the dichotomous variable was retained.

counts are not possible and items whose direct referrents are obscure (or nonexistent) or that require impressions for responses are less stable. Many such items do not pass the stationary test. Attitudinal questions, opinion questions, and some questions which require some analogic reasoning by the respondent are vulnerable to low stability.

More than half of the attitudinal variables, particularly those intended to measure well-being (Sec. E), yielded low stability (That is, they were nonstationary.). In Chapters 4 and 5, we learned that many of these items either did not pass the validity, reliability, or sensitivity tests administered in 1987, or they passed only marginally. These items were retained for the second research wave because of their presumed importance to the hypotheses about personal well-being advanced in the RFP. The unstable behavior of many of these items caused them to be rejected from further administrations by the instrument.

The analyses that follow are more than what is necessary for the assessment of the stationariness of the variables. Yet because this study is so large in scope and because of its importance to future OCS activities, Native Alaskans, and the environment, we provide some analysis of each AOSIS item administered in both 1987 and 1988.

LA. Stability of Items Measuring Traditional Activities and Subsistence Food (A)

Seven items from the original version of AOSIS were comparable between the 1987 instrument administered in the pretest for Schedule A respondents (henceforth 7A)

and the 1988 instrument administered to Panel A respondents (henceforth 8A2).[3] Table 6-1 provides the tit, Gammas (γ), Pearson's r's, and Phi's (ϕ) for the seven A items. The correlations are high and positive for all but the attitudinal question (A37) which asks whether "elders get similar respect now to what they received 5 years earlier." We will return to A37.

Among the 115 respondents, most people who answered "yes" in 1987 about whether subsistence foods were eaten "yesterday" and the "day before yesterday" answered in the same way in 1988 (A28, A30). "No's" increased by 8 percent in the former and 2 percent in the latter. Both values are within the range of chance variation as well as expected change. We could not assess change at this juncture, so we assessed the plausibilities that change had occurred as we reviewed the variables.

Meals eaten with relatives outside the household appear stable, registering slight increases in persons eating 1 to 3 meals with kinspersons and a slight decrease in persons who ate no meals at all with kinspersons outside the household (A32). A general increase between 1987 and 1988 in the percentage of meat and fish (from naturally occurring resources) in the respondents' diets measured an 8-percent increase among persons who said they gained 75 percent of more of their diets from these sources (A33).

Whereas item A34 appears to be highly stable in measuring the respondents'

[3]Aa explained in Part Two, Chapter 2, 7A refers to the 1987 pretest (PRE) sample for Schedule A. The 8A2 refers to the A Panel drawn from 7A and reinterviewed in the 1988 (second) research wave. An entire matrix of traditional extracting activities measured in 7A was altered prior to 1988, so the 7A and 8A2 responses on those items were not correlated here. Several correlations of indices derived from each are analyzed below. Furthermore, four variables that were retained from the original were revised so extensively that correlations between the 7A and 8A2 waves were not calculated. The following items appear in the AOSIS instrument as administered in the 8A2 and 8B samples: A26 (a game and fish harvest variable) provided a false conjunction and was divided into two variables. Several other variables had low construct validity and were redesigned and rephrased as ordinal variables. They are A31 (food harvested by another), A35 (last time you heard an elder tell a atory), and A36 (last time you asked an elder for advice).

Table 6-1

CONTROL FOR CHANGE AND STABILITY--CORRELATIONS BETWEEN RESPONSES OF IDENTICAL INFORMANTS (N= 115) TO SEVEN AOSIS ITEMS ON TRADITIONAL ACTIVITIES AND SUBSISTENCE FOOD (SECTION A), 1987-1988"

Traditional Activities	Ordinal	Quantitative	Nominal
	Gamma	r	Phi
A28 Subsistence food part of mea 1s yesterday	.588	-----	.308
A30 Subsistence food part of mea ls day before yesterday	.737	-----	.426
A32 Number of meals eaten with relatives outside the household last week	.629	.442	-----
A33 Percent meat and fish in total diet last year	.690	.582	-----
A34 Made arts and crafts last year	.909	. . ..-	.613
A37 Respect elders get now vs. 5 years ago	.350'		
A38 Speak Native language at home	.876	-----	-----

[a]All correlations significant at < .001.

[b]Signifies that the variable is unstable and is being removed (rejected) from the AOSIS instrument. Question A37, an attitude variable, exemplifies the validity and reliability problems inherent in the attitude variables in the AOSIS instrument, most of which have been removed.

participation in arts and crafts production, there is a slight shift downward of 4 percent and no evidence that production or decreased production reflects worsening economic conditions. These modest differences are most safely attributable to random error. Question A35, which asks whether elders currently gain respect similar to that which elders received 5 years earlier, bristles with reversals. The considerable variation is a significant indicator of instability. Respondents fluctuated by 50 percent in the "more" category, 66 percent in the "same" category, and 50 percent in the "less" category. This item is far too unstable to retain.

Question A38 was a highly stable item in 1988, yet it registered an increase of 10 percent between 1987 and 1988 among people who spoke their Native language "most of the time or always." Whether this should be attributed to change or to random error was not clear in 1988.

LB. **Stability of Items Measuring Personal Assessments of Health (B)**

The entire set of personal health assessment items correlated highly and positively over the two instances of their measure (the 1987 and 1988 waves). Table 6-2 lists the variables and their interwave correlations for the 115 respondents in 7A and 8A2. As was the case for the variables measuring traditional activities, there was a tendency for respondents to provide assessments suggesting an improvement in their health and faculties between 1987 and 1988. On its face, the improvement made sense in relation to personal injuries from which a person could recover, and even for vision with assistance from new glasses, but not for hearing or perhaps even for vision unless we could determine whether glasses, hearing aids, or therapy had intervened between 1987

Table 6-2

CONTROL FOR CHANGE AND STABILITY--CORRELATIONS BETWEEN RESPONSES OF IDENTICAL INFORMANTS (N= 115) TO TEN AOSIS ITEMS ON RESPONDENT HEALTH (SECTION B), 1987-1988"

Personal Health Assessment	Ordinal	Quantitative	Nominal
	Gamma	r	Phi
B1 My health is (very good.. poor)	.778	-----	-----
B2 Do you suffer from a disability or injury (a lot.. .)	.789	-----	-----
B4 I can see (very clear ly...)	.555	-----	-----
B5 1 can hear conversations (very clear ly...)	.555	-----	-----
B6 I can run 100 yards (with no difficulty. ..)	.705	-----	-----
B7 I can carry 25 pounds (very easi ly...)	.863	-----	-----
B8 I can bite and chew hard foods (very easi ly...)	.648	-----	-----
B9 Does i llness or injury prevent some activities	.518	-----	.192
B1O Have you been struck or intent i ona lly hurt by someone	.838	-----	.276
Bll Do you currently smoke cigarettes	.988	-----	.826

"All correlations significant at < .001.

and 1988 to improve (change) the conditions of the respondent. The changes within each variable fitted within the range that reflects random error but that may well reflect change. As we have repeated often, three waves and measures of intervening variables (causes) are necessary to ferret out probable causes.

The statement of personal health, Bl, demonstrated that about 4 percent more respondents claimed good health in 1988 than in 1987 (80%-76%) and about the same number of people thought that their health had improved (23) as thought that it had worsened (21). The measure was stable, but it may be affected by regression. Statement B3, which asked whether a person suffered (currently) from a disability or injury yielded a 7-percent overall improvement (20 persons claimed improvements and 13 claimed they were debilitated in some way). Statement B4 showed a 10-percent overall improvement in vision (19 improved, 8 worsened); B5 showed that 31 claimed some improvement in their hearing, whereas 8 worsened.

In the subset that assesses physical ability--running, carrying a heavy load, biting and chewing hard foods--the trend among the variables was to worsen between 1987 and 1988, but not by much (5% aggregate). Statement B6 (running) appeared stable (13 improved, 18 worsened), as did B7 (carry 25 pounds: 7 improved, 9 worsened); and B8 (bite and chew: 14 improved, 19 worsened).

The questions on illness and injury, B9 and B1O, were stable. In the former question, about the same number improved as worsened (13 to 12). The latter question, however, demonstrates almost no variation (102 of the 115 were not hurt by someone in either year). Only 2 persons who were hit in 1987 also were hit in 1988. The lack of

variation in B 10 suggested too much reliability, hence a problem of construct validity. Below we check this response against the responses to the same question in the 8B pretest sample. The smoking question (B11), too, appeared too stable. The variation suggested that 8 quit and 2 started smoking between 1987 and 1988.

I.C. Stability of Items Measuring Education and Employment (C)

The responses in 1987 and 1988 to questions in Sections C and D were noticeably different from the responses to questions in Sections A and B. As we had anticipated, questions that had empirical referents yielded higher positive correlations between the two waves than did questions that required speculation, analogic reasoning, or impressions. The majority of items in Section C represents questions whose empirical referents are obvious to the respondents. Yet at least one Section C question had a vague referent and was open to misinterpretation. Separating random error from mistakes of all kinds was not easily done in some of these questions, perhaps because the correlations obtained between 1987 and 1988 responses were high and positive. In 1988, the modest variation suggested considerable stability, yet when we assessed the variation in each item in Section C, we were puzzled about the causes of the variation. We decided to revise our field-training instructions, requesting that the Key Investigators work closely with Questionnaire Investigators to determine the causes of some inexplicable variation in the responses to Section C questions, even if the variation was less than 10 percent. We wondered if some Section C questions posed construct validity problems for only a tiny proportion of the sample respondents.

Table 6-3 provides the interwave correlations for the Section C variables on

Table 6-3

CONTROL FOR CHANGE AND STABILITY--CORRELATIONS BETWEEN RESPONSES OF IDENTICAL INFORMANTS (N= 115) TO SEVEN AOSIS ITEMS ON EDUCATION AND EMPLOYMENT (SECTION C), 1987-1988"

Education and Employment	Ordinal Game	Quantitative r	Nominal Phi
C1 Number of years education completed	.927	.843	-----
c2 Currently enrolled in school	.650	-----	.223
C3 Ability to read Newsweek (easily...)	.952	.....	-----
C4 Ability to add list of 15 prices (easily...)	.885	-----	-----
C5 Ability to divide (easily.. .)	.831	-----	. ----
C12 Worked away from community last year	.835	-----	.456
c13 Number of subsistence activities you had time to pursue (all, . ..)	.187'		

"All correlations significant at <.001.

[b]Signifies that the variable is unstable and is being removed (rejected) from the AOSIS instrument.

education and employment. The coefficients obtained for the 1987 and 1988 waves were very high and stable, overall, but internal variation requires some assessment. For example, questions Cl, C3, C4, and C5 posed rather similar problems for interpretation. The Gamma (γ) for Cl (number of years of education completed) was .93 for the A Panel. Eleven respondents claimed to have completed more education in 1988 than 1987--an obvious and unchallengeable measure of change through increased schooling during the year. But 8 respondents reported completing less education in 1988 than they reported in 1987. The ability to read *Newsweek (C3)* posed a problem similar to Cl: 8 respondents improved, but 4 worsened.

It would be expeditious to relegate the fluctuations in responses to Cl and C3 to random error, but, when we look at C4 (add easily) and C5 (divide easily), the problem recurs, even though these variables, too, are statistically stable. Ten respondents improved and 12 worsened in their ability to add, and 11 worsened and 13 improved in their ability to divide. For these last two questions, slight changes for respondents between wave one and wave two may have been consequences of the imprecision of the ordinal categories. For example, in the addition question (C4), 9 of 91 who could add 15 prices “easily” in 1987 had “some difficulty” in 1988; and of 17 who had “some difficulty” in 1987, 8 could do it “easily” and 3 could do it only with "great difficulty” in 1988. To reiterate, education and practice can help improvement, but the loss of ability must be due to some factors other than chance. The imprecise nature of the ordinal scale, misrepresentations by respondents in 1987 and/or 1988, and mistakes by interviewers or the persons who entered the data all might be factors in accounting for the variation.

The variables are, nevertheless, stable even if the retrogressions cannot be explained.

As should be evident, a stable variable can easily mask personal changes. The stability of C2, for example, belies personal changes: 11 of 15 respondents who were enrolled in 1987 did not enroll in school in 1988, and 7 of 98 who were not enrolled in 1987 were enrolled in 1988. Enrollments are down slightly (about 4%). Working away from the community is another stable variable. Five-percent fewer respondents worked away from their home communities in 1988 than in 1987: 12 who worked away stayed home in 1988, and 7 who stayed home in 1987 migrated out for work in 1988.

In this section only the attitudinal question, C13, was unstable. It asked whether there was sufficient time for respondents to engage in the number of subsistence activities in which they wanted to engage. Seventy-six of the 115 respondents in the A Panel reported changes--43 had more time, 33 had less. Question C13 was too unstable to retain.

I.D. Stability of Items Measuring Income, Goods, Services, Political Behavior, and Demographic Characteristics (D)

Table 6-4 lists the correlations obtained for the AOSIS items that measure a wide range of topics from household income and local utilities to voting and marriage. The topics are far more mixed than is the case for the other sections with the exception of Section E. But Section E exhibits uniformity in that it is composed of attitudinal questions, almost all of which take the same affective form. The Section D AOSIS items for the first two waves of the A Panel were highly positive and stable. Two were

Table 6-4

CONTROL FOR CHANGE AND STABILITY-- CORRELATIONS BETWEEN RESPONSES OF IDENTICAL INFORMANTS (N= 115) TO THIRTY-TWO AOSIS ITEMS ON INCOME, GOODS, AND SERVICES (SECTION D), 1987-1988[a]

	Income, Goods, and Services	Ordinal Gamma	Quantitative r	Nominal' Phi/V
DIA	Heating costs[b]	[-4301		
D1B	Electricity costs	[.2601		
D1C	Housing costs	[.6721		
DID	Telephone costs	[.4891		
DIE	Utilities costs	[. 6681		
DIF	Repairs costs	[.4211		
D2	Household income	.700	.780	-----
D3	Commerci al fishermen or have your own business	.945	-----	.686
D3A	Amount invested in fishing or business'	.346	.....	-----
D4	Sma l lest income per month the household requires	.500	-----	-----
D5	Income per month you would li ke to have	.710	-----	-----
D6	Household finances now vs. five years ago	.587	-----	-----
D8	Number of rooms in house excluding bath	.790	.677	-----
D9	Abi lity to get good drinking water	.781	-----	-----
D10	What happens to waste water	.685	-----	.521 (V)[d]
D11	Toilet faci lities	.996	-----	.910
D12	Difficulty in heating house	.734	-----	-----
D13	How many days last week did you visit friends	.491	.409	-----
D14	Number of daya last week you spent 1/2 hour on retreat i on	.267[c]	.229°	
D15	Number of hours last week that you watched TV	.372"	.308"	
D16	Number of public meetings that you attended last month	.657	.503	.....
D18	Impact of your personal opinion on the communi ty	.458"		
D19	Vote in last city council election	.878	-----	.535
D20	Vote in last statewide election	.945	-----	.627
D21	Vote in last tribal council election	.905	-----	.623
D22	Vote in last vi llage Native corporation election	.701	.....	.356
D23	Vote in last regional Native corporation election	.739	-----	.310
D24	Where were you born	.960	-----	-----
D25	How many years have you Lived here	.952	.739	.....
D26	Where did you live before moving here	.767	-----	-----
D27	Last year how many visits did you make outside the vi 1 lage	.515	.402	-----
D28	Race of respondent	.999	-----	.915
D29	Currently married	.989	-----	.852

[a] All correlations are significant at < .001.

[b] The D1-series variables are. highly and positively correlated, but discrepancies in the ratings have beers noted. The variables are being retained in the study, but they are currently being rerated to ensure that all items are properly accounted for and that persons who claimed no utilities expensea are treated as zero expenses end not missing data (one of the discrepancies between the response to the interview and the electronic recording of that response that we have noted).

"Although this variable provides useful information, it invites ambiguity if not closely attached to D3. Aa a measure of change, it has considerable utility if, and only if, persons who respond "No" to D3 do not respond at all to D3A. In the 8B sample it appeara that persona who aaid "No" to D3 provided answers to D3A, plausibly confusing investments in subsistence fish harvests with commercial fishing.

[d] ϕ and V measure correlation in nominal variables. V is employed for tables larger than 2X2 (4-cells).

'Signifies that the variable is unstable and is being removed (rejected) from the AOSIS instrument.

rejected (D14, D 15) because they had no obvious motivation; the way a rather ambiguous but nevertheless instructive question was administered had to be changed in subsequent waves (D3A); and one unstable opinion question had to be dropped from the questionnaire (D18).

According to our KI and QI investigators, the set of questions (D1A-D1F) assessing household utilities and maintenance costs drew careful responses. Respondents frequently brought bills and receipts from drawers, folders, and files to calculate their annual expenses. But in checking the ratings, we discovered that variation by certain villages and/or by characteristics of certain respondents was systematically confused and the data were entered in such a way as to produce certain bias. For example, some persons who used utilities but did not pay for them because of public transfers were incorrectly rated as "'missing." We attempted to rectify these problems case by case. We also decided to administer the D1A-D1F series in 1989, even though considerable problems were encountered in assessing their stationariness, construct validity, and reliability.

Household income (D2) and self-employed fishing or other businesses (D3) appeared stable, although D3 was a bothersome conjunction of participation in one industry with ownership of all possible other businesses. Indeed, it was problems with the conjunction of commercial fishing with all other businesses that, we aver, caused the instability of D3A. Question D3A was unstable almost surely because persons who were neither commercial fishermen nor owners of small businesses were asked how much they invested in their businesses (D3A). They should not have been asked, but when they

were, they probably confused their investments in subsistence harvests with investments in their businesses. We rectified this problem in the data set and rectified it as well in instructions to QI's and KI's prior to 1989 and 1990 field research.

Questions D4 and D6 were stable measures of estimates about the income the household required and the differences between current income and income of 5 years earlier, but the variation was higher than for most other items in the section. These results were consonant with our analysis of item reliability and validity at the conclusion of the initial wave of research. Questions that require reflections and opinions on family financial history over several years, rather than direct empirical responses (tallying last year's expenses and preparing for current expenses) invite variation because they require speculation about vague parameters.

Seventy-three of the 115 respondents to D4 felt they needed more (37) or less **(36)** than they felt they needed in 1987. Most of these respondents (57) changed their estimates by only one amount category, up or down, so the correlation is high. The response to D6 produced somewhat less variation than D4: 23 thought their finances had worsened, and 20 thought that they had improved. It is doubtful that respondents have kept such close tallies of differences between 1982 and 1987, and 1983 and 1988. The balance in "worsening" and "improving" throughout questions such as these maybe functions of regression, a distinct possibility that we checked in 1989" and 1990.

Question D5, "income per month that you would like to have," was stable for the first two waves of the A Panel. Yet stability was purchased at a perplexing price: 21 desired more than they wanted in 1987, and 31 wanted less. The variation in the

responses to this question also suggests regression. At the conclusion of the 1987-1988 comparisons, we anticipated that questions D4-D6 would not be stable when measured at a third point in time against external variables from the KI and/or secondary data sets.

The subset of items dealing with rooms in the house (D8), access to potable water (D9), disposition of liquid wastes (D1O), and toilet facilities (D I 1) were very stable, if not especially informative. Potable water, toilet facilities, and liquid-waste systems are features of village infrastructure. Asking each respondent to answer these questions provided little information that we had not also acquired from city and village appointees (planners, managers, corporation presidents, and the like). Variation was modest on all of these questions in the 1987-1988 correlations. Forty-four persons moved within their villages (D8) and had to be located again by the QI's. We anticipated that this variable would provide a reliable and valid measure of change in subsequent waves. Some of the moves the occurred between 1987 and 1988 entailed more difficult access to potable water, but some improvements occurred because of changes in village supplies (D9). The removal of waste water (D1O) improved in 26 cases, essentially because of changes in village infrastructure. Toilet facilities were affected the least (D11).

Question D12 asked about the difficulty in heating the respondent's house. Conceivably this question required a complex response encompassing information about house construction, insulation, access to heating agents (coal, wood, gas, electricity), and finances. Fifty-two responses were similar in 1987 and 1988, but 53 thought that it was more difficult to heat their houses. The likely explanation is changes in finances or

income. Seventy-seven respondents to D2 reported that their incomes had not changed, or that they had dropped (by one class interval). Inflation, alone, but also inflation coupled with a drop in income for 32 of those 75 respondents may account for the change.

Question D13 (visit friends or relatives) does not obtain a value of .50, but the mode for the two waves is 2 days with about as many persons claiming to have increased as decreased their visiting. Although marginal with some indication that the responses were attributable to regression, we decided to retain this variable for the 1989 research wave, and also to compare the A Panel responses in 1988 with the responses to the same question by respondents in the 8B sample (pretest). Question D27, which measures the number of visits that the respondents made outside their village between 1987 and 1988, like D13, obtained a rather low coefficient. The variation maybe due to regression (26 increased and 24 decreased their visits)!

Questions D14 (days spent in recreational activity last week) and D15 (hours spent watching television last week) produced high variation between waves. The questions appear to be unmotivated, but the reasons for their inclusion in the questionnaire may be rather transparent. It is frequently suggested, from local parent-teacher organizations to the halls of the United States Congress, that television viewing

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[4] "Statistical Regression" is always to the population mean of the group and is always a threat to interns] validity (see p. 268 below and see Cook and Campbell 1979:52-53) in a pratest-postteat design where high pretest scorers score lower on the posttest, and low pretest scorers score higher on the posttest. The factors which account for regression are not obvious or, as Cook and Campbell say, the causes of regression in pretest-postteat measures of the same respondents on the same items are not intuitive. Respondent memories may lapse between pretest and posttest or they may supply an estimate as a response in the pretest and a different estimate in the posttest; indeed, any number of factors may operate to increase scores for some and decrease them for others in a pretest-poatteet design. The changes are not due to error. According to Cook and Campbell (1979: 53), the magnitude of a regression "depends both on the test-retest reliability of a measure and on the difference between the mean of a deliberately selected subgroup [our panel] and the mean of the population [Pretest, Schedule A] from which the subgroup was chosen. The higher the reliability and the smaller the difference, the less will be the regression."

causes persons to be indolent (hence unfit, unhealthy, and ignorant) or violent or sexually abusive or that it accounts for the degradation of America's youth and for America's faltering economy (the Nation is losing out in the struggle with Japan and Germany). Inasmuch as research has not connected any of the presumed consequences to the presumed causes (watching television [D15] rather than engaging in healthy recreation [D 14], or working assiduously to develop intellectual skills that can be applied in the marketplace), the motivation for the questions remains unclear. Whatever the motivation for the questions may have been, D14 (recreation) yielded 60-percent variation and D15 (television) 70 percent. We dropped them from the questionnaire.

The series of empirical questions dealing with public and political participation was stable in the A Panel (D16, D19-D23). The opinion question (D18) about the impact of the respondent's opinion on the community, however, was vague and the responses unstable. It was dropped from subsequent waves.

The demographic questions (D24-D26) appeared to be stable, yet they also appeared to be ambiguous and suggested that all QI's did not administer them in the same way over the two waves of the panel. We sought to correct these problems in the 1989 field season. Question D24 obtains a coefficient of .96, yet region appears not to be clearly differentiated because fifteen respondents who said that they were born "in this region" in 1987 but responded "in Alaska" in 1988. An identical problem occurs in D26 which asks "where did you live before moving here." In this question, region (which most likely was interpreted as area and not ANCSA region), Alaska (which may mean 25 miles away or 500 miles away but within Alaska), and elsewhere (which may mean from

5 miles away to New Orleans) invited problems between the construct and the measure. Question D25 was also stable, but in an analogous way to D26 and D27. Changes occurred as expected (from 1 to 2-5 for 6, and from 2-5 to 6-10 for 2). There also was problems that we had to resolve in 1989, to wit: 37 respondents who claimed longer in 1987 claimed 6-10 in 1988. The question is, in what way or ways did respondents interpreted longer? A second question which we did not address is the way or ways in which the QI's interpreted "longer." We sought to correct this problem by providing more careful instructions to the QI's.

The race of the respondent (D27) produced three puzzles that we assigned to mistakes either by the QI's or the persons who entered the data, but whether those mistakes occurred in 1987 or 1988 was not known until we reviewed every questionnaire (in 1989). Three persons who were classified as non-Natives in 1987 were classified as Natives in 1988. Four persons who were married in 1987 were not married in 1988 (D29).

I.E. Stability of Items Measuring Personal Well-being (E)

In contrast to the stationary behavior of 92 percent of the variables tested in Sections A through D, only 48 percent of the AOSIS items that were intended to measure personal well-being appeared to be stationary in the A Panel. In addition, only 6 of the 15 variables that appear to be stationary yielded Gammas at .60 or higher. Eighty percent of the A through D variables for the 1987 and 1988 waves of the A Panel yielded γ 2.60. Sixty-three percent obtained .70 or higher. The subset of Section E variables that were retained from 1987 bristled with problems of construct validity as we

have noted in previous sections. Little assessment is required here. The average Gamma for the 1987-1988 correlations within the A Panel for El, 3-4, 8-9, 11, 21-22, 24, 28, 32, 36-37, 39-40, and 49 was .35. Table 6-5 provides the list of coefficients on which the stability analysis was based.

The questions in the Section E that were most stationary also were the questions that required the least speculation and for which comparisons were the least recondite. Natives may have interpreted the questions as abstruse or even irrelevant. The evidence available to us from KI observations and traditional ethnographies clearly emphasize the empirical and instrumental manner in which Eskimos, in particular, address topics dealing with their lives, especially their subsistence and general problem solving. The attitudinal questions in Section E required forced choices that have no direct translation into Eskimo languages or Eskimo practice. Nevertheless, the questions that required responses closest to something directly measurable in Eskimo experience proved to be the most stationary in 1988. Question E1O, which evaluates the respondent's attitude about his/her ability to speak his/her Native language, fared well, as did E50 (respondents feel that the oil search will create jobs), E51 (respondents feel that oil activities will reduce the amount of fish and game), and E52 (respondents were mixed but consistent, oil can hurt more than it can help, but it will do both).

The following questions were rather stable, so we retained them for the 1989 research wave: attitudes about what the respondent is accomplishing (E17), the standard of living (E30), access to good housing (E31), community safety (E34), goods and

Table 6-5

CONTROL FOR CHANGE AND STABILITY--CORREIATIONS BETWEEN RESPONSES OF IDENTICAL INFORMANTS (N= 115) TO THIRTY-ONE AOSIS ITEMS ON PERCEIVED WELL-BEING (SECTION E) , 1987-1988"

Perceived Wel l-being	Ordinal Gamma	Quantitative r	Nominal Phi
El How do you feel about] your house (completely satisfied ..)	.493'		
E3 [] the game and fish that are avai lable	.333'		
E4 [1 the amount of subsistence activities you do	.367[b]		
ES [1 the time spent with relatives not in your house	.439'		
E9 [] the cooperative work that you do	.368[b]		
E10 [1 your abi l i ty to speak your Native Language	.849	-----	-----
E11 [1 the amount of time that you listen to stories	.390'		
E12 [1 the social ties You maintain with other communities	.538	-----	-----
E17 [1 what you are accomplishingin your life	.541	-----	-----
E21 [1 the amount of visiting that You do	.475'		
E22 [1 the usefulness of your education	.471'		
E23 [] the usefulness of education these days	.528	-----	-----
E24 [1 job opportunities available to you	.400'		
E28 [1 the amount of time that you spend on subsistence activities	.420'		
E29 [1 the income you have	.596	-----	-----
E30 [] your standard of living	.547	-----	-----
E31 [1 our opportunity to live in good housing	.613	-----	-----
E32 [1 the food that you eat	.263'		
E34 [1 the safety of the community	.614	-----	-----
E35 [1 the goods and services available	.516	-----	-----
E36 [] local influence exercised over fish and game regulations	.388[b]		
E37 [1 local influence over educational policiess	.357[b]		
E38 [1 local influence over development	.306'		
E40 [1 the condition of the land and buildings in the community	.349'		
E41 [1 the condition of land and water in the community	.572	-----	-----
E45 Cl the opportunities to learn subsistence skills	.557	-----	-----
E49 Have you" heard that oil companies might look for oil nearby	.227'	-----	.099'
E50 Willoil search create more jobs	.863	-----	.564
E51 How will oil affect the amount of fish and game available	.810	-----	-----
E52 Uhat are your overall feelings about the search for oil	.720	-----	-----

" All correlations are significant at <.001.

[b]Signifies that the variable is unstable and is being removed (rejected) from the AOSIS instrument.

services available (E36), the condition of land and buildings in the community (E41), and the opportunity to learn subsistence skills (E46). In 1988, these and other Section E items followed a familiar pattern that may have been conditioned by the nature of the ordinal categories, categories that do not have direct correspondences with Native speech or Native practices.[5]

II. TESTING ARTIFACTS AS A THREAT TO VALIDITY

We were concerned that the respondents selected in 1988 for reinterviewing (R) as a subsample from Section A would be influenced by the responses they gave to the same questions in 1987. If a pretest generates a reaction (or reactivity in statistical terms) that biases the posttest, the assumptions of the statistics we employ to test for change have been violated. 1988 was the first year in our design in which we could control for testing artifacts. As the design unfolded over 4 years, controls for testing artifacts were coterminous with each wave of reinterviews.

Inasmuch as we were testing a reinterview panel drawn in 1988 from persons initially interviewed in Schedule A villages in 1987, with an initial interview panel drawn from Schedule B villages in 1988, we were wary of finding a large number of test artifacts caused, in part, by differences between the cultural histories and populations of

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‘As is reported in previous sections, before we ventured into the field, the research team anticipated that the Section E variables posed construct validity problems. The problems were many, from vagueness and invasion of privacy to requiring ordinal choices ranging from ‘not satisfied” to “completely satisfied” through three intervening ranks (somewhat, mostly and very). Inasmuch as Natives do not make those distinctions in the Eskimo languages and dialects, and because they do not make those distinctions in English either, we anticipated that the respondents, in general, would answer “not” or "something positive” but that they would not discriminate among the positive responses. The very low reliability between responses in Section E for the two waves by the identical respondents demonstrates unrectifiable problems in the forced choice responses, if not in the questions themselves-at least for this population. Consistently throughout the entire range of Section E questions, persons who responded “completely” in 1987 responded “very” or "mostly" in 1988. And persons who responded “mostly” (the middle choice) in 1987 were as apt to choose a response below it on the scale as above it. overall, it is the rare 25-ceil table (five ordinal choices along each dimension) that is empty: second responses can go anywhere, but they tend to go down one or two ranks if they were high the first year, and up a rank if they were low. Many fewer than half of the responses in each table were the same for both waves.

Schedule A and Schedule B regions (for examples, two of the three Schedule B regions have long been engaged in the commercial fishing industry, but only one of four Schedule A regions has been so engaged). For the 1988 tests for test artifacts, we decided to sample the questionnaire questions (variables), rather than to test all variables. We reasoned that the 1989 and 1990 research would provide a sounder basis from which to measure test artifacts, and would also avert the risk of jettisoning variables worthy of retention.

In 1988, we employed the Schedule B (8B) results to check on testing artifacts in the Schedule A (8A2) reinterview results. The question we sought to answer in 1988 was whether significant differences occurred between the distributions of the same variable for the two samples that could be attributed to pretest bias. The Schedule B sample (N=206) was drawn from different ANCSA regions than the four used in the Schedule A sample; hence, A Panel (N= 115) was drawn. For comparability, the same variables that were employed to test for differences in the various theoretical contrasts in the total sample (N=548) were used to test for differences between (8B) and (8A2). Where the Schedule B responses were used in the analysis of the total sample, the reinterview responses for the A Panel (8A2) have more specialized functions within a nested panel: they were employed to assess reliability and change. In subsequent waves (1989 and 1990), the A and B Panels served this function. And if panel responses proved stationary and devoid of test artifacts, panel results satisfied threats to validity posed by the ecological fallacy, or specification error. Therefore, the N= 115 panel from schedule A (8A2) tested here was not replaced in the total sample, nor was the N=342 panel (7A)

from which it was drawn. Thus, neither the parent sample nor the panel became redundant features capable of masking significant differences or creating biased significant differences in the total sample.

Table 6-6 tests for the significance of differences between eleven quantitative AOSIS variables. These variables survived the validity, reliability, and sensitivity tests employed in 1987 and the stability-reliability test for 1988 (see above). The table demonstrates the sample means for each sample of respondents. The t-test for the significance of difference between means is employed to test the null hypothesis (H_0) of no difference. Because two of the three regions in the Schedule B sample are located in the most robust areas of the Alaskan commercial fishery, an industry in which many residents of these regions participate successfully, we anticipated higher incomes and lower household sizes for the 8B sample. We had no reason to predict that the differences would be significant, but such an outcome would not have been unexpected.

Employing $p \leq .04$ (from separate and pooled variate estimates) as the rejection point for the null hypothesis, the differences between only two sets of means--"household size" and "number of public meetings attended last month"--proved significant and warranted rejection of H_0. The question we sought to answer here was whether the results suggested a testing artifact in 8A2. We did not think so for the following reasons.

We expected household size to be larger in the reinterview sample than in the Schedule B sample. The reason for that expectation was that the 1987 sample comprised the areas that possessed the least infrastructure for private market activities in the AOSIS sample area (with the noted exception of the North Slope oil business, a business

Table 6-6

CONTROLS FOR TESTING ARTIFACTS--SIGNIFICANCE OF DIFFERENCES OF MEANS BETWEEN SCHEDULE B INITIAL INTERVIEW [1] RESPONDENTS (N =206, 8B) AND SCHEDULE A REINTERVIEW [R] RESPONDENTS (N1 15, 8A2) ON 11 QUANTITATIVE VARIABLES, AOSIS QUESTIONNAIRE INSTRUMENT, 1988"

	HHSize	A32	A33	cl	DIC	DIE	D2	D3A	D8	D13	D16
Schedule A [R] [8A2]	4.39*+	1.90	3.05	3.26	4.70	5.32	4.51	4.70	2.63	2.54	2.03*+
Schedule B [11 [8B]	3.61	1.74	2.81	3.19	4.61	4.80	4.34	4.58	2.44	2.52	1.61

[a] Significance of differences is derived from the t-test. Means for each sample on each variable appear in the columns. The means are determined from the class intervals. Probabilities of separate variate estimates ≤ .04 are designated with *.

Probabilities of pooled variate estimates ≤ .04 are designated by +. The variables in this analysis are HHSize = Household size, A32= Number of meals eaten with relatives outside the household last week, A33= Percent meat and fish eaten last year, Cl= Number of years education completed, D1C = Housing costs, D1E= Utilities cost, D2= Household income, D3A=Amount invested in the fishing business, D8= Number of rooms in house excluding bath, D13= Number of days visited friends last week, DI 6= Number of public meetings attended last month.

over which Natives exercised neither ownership nor control). Public sector dependencies of several kinds and active subsistence extraction and consumption of naturally occurring resources were widely practiced throughout most of the areas in the 1987 sample. We noted large household sizes in these areas in 1987, with the smallest households occurring in the Aleutian-Pribilof Islands. We expected the Bristol Bay and Kodiak sample to be more similar to the Aleutian subsample than to the total 8A2 sample, but we also expected household income to be larger in 8B than in 8A2. It was the reverse, but not by much (D2, "Household income").

The regions that were lumped together and sampled during 1987 were not chosen to balance the various geographic areas of the coast from Kaktovik to Kodiak. Rather, the areas we sampled in 1987 were those that were scheduled for the earliest OCS lease sales.

These areas are located north and west of Bristol Bay and Kodiak, two of the three prime fishing regions in central western Alaska (the Aleutians being the third). We learned from the schedule A sample that even though incomes in the Aleutians and the North Slope were high, household incomes appeared to have only modest effects on many variables that we considered to be traditional, such as "eating meals with relatives outside one's own household (A32), and "visiting friends and relatives" (D13). The differences were small and insignificant (see Table Y).

In the Aleutians and on the North Slope, household income correlated inversely with the percentage of naturally occurring meat and fish in the diet, but even then it sunk below 50 percent only in the Aleutians. For this reason, we anticipated that the

meat and fish in the respondents' diets (A33) would be lower in 8B than in 8A2. It was, but not significantly so.

The number of years of education completed (Cl), utilities costs (DIE), and housing costs (D1C) were slightly lower in 8B, as we expected because of the generally southern climate and the more extensive infrastructure and superstructure in Kodiak and Bristol Bay. The Bering Straits respondents most likely increased 8B values on the utilities and housing costs.

The sole unanticipated difference was "attendance at public meetings" (D16). As we learned in our controls for regional effects (see below), Kodiak and Bristol Bay respondents attended far fewer public meetings than did the residents of the more northerly regions. This result posed another puzzle (We sought to remove the puzzle through analysis of theoretical contrasts, not by regional contrasts, which of themselves did not and do not explain anything.).

And finally for this set of controls, the question on "amount invested in fishing (commercial) or business" (D3A) appeared to be answered by persons who were not commercial fishermen (briefly mentioned above), but who responded to the question about their investments for subsistence harvests. These responses probably biased the measure. There was, then, no evidence of testing artifacts in the variables we tested for 8A2 and 8B in 1988.

Next, we turned to fifteen dichotomous variables to determine whether they demonstrated reactivity. Table 6-7 lists the variables and the proportions in each sample that answered yes to each variable. Our tests for the significance of difference of

Table 6-7

CONTROLS FOR TESTING ARTIFACTS--SIGNIFICANCE OF DIFFERENCES OF PROPORTIONS BETWEEN SCHEDULE B INITIAL INTERVIEW (1) RESPONDENTS (N=206, 86) AND SCHEDULE A REINTERVIEW [R] RESPONDENTS (N= 115, 8A2) ON 15 DICHOTOMOUS NOMINAL VARIABLES, AOSIS QUESTIONNAIRE INSTRUMENT, 1988'

		Schedule A [R] [8A2] (N=115) P	Schedule B [11 [881 (N=206) P	Significance of Difference of (Binomial) P
A28	Subs i stence foods yesterday	60.0	60.2	N.S.
A30	Subs i stence foods before yesterday	62.6	57.3	N.S.
RSEX	Males	49.6	52.7	N.S.
C6A	Employed last January	59.1	41.7	-2.80*
C6B	Empl eyed last February	61.7	43.7	-2.85
C6C	Employed last March	59.1	43.2	-2.71
C6D	Employed last April	59.1	44.7	-2.18
C6E	Employed last May	60.0	47.6	-2.11
C6F	Employed last June	56.5	55.8	N.S.
C6G	Employed last July	56.5	55.3	N.S.
C6H	Employed last August	66.1	53.9	-2.08
C61	Employed last September	64.3	52.4	-2.05
C6J	Employed last October	63.5	50.0	-2.34
C6K	Employed last November	60.9	49.0	-2.08
C6L	Empl eyed last December	61.7	43.7	-2.85

• Significance of differences of proportions is derived from the z-test. ● z scores ≥ 2.06 are significant at ≤ .04. P for each variable = "yes," Q = "no." The proportion P for each variable for each contrast appears in the columns.

proportions uses z-scores ≥ 2.06 for rejection of HO. No differences occurred in "subsistence foods eaten yesterday or the day before yesterday" (A28, A30), nor were there differences in the sex of the respondents. There were, however, a series of predictable differences in the proportion of employed respondents in the two samples over the 12 months prior to the interviews administered in February and March of 1988.

The twelve variables measuring employment demonstrated an 8-point range for 8A2 respondents throughout the year. In only 2 months did employment in the A Panel dip below 59 percent. In the Schedule B sample, employment never climbs to 59 percent. Although respondents from the Bering Straits are included in the B sample, the employment profile by month was influenced by the short fishing season in which Kodiak and Bristol Bay residents engaged--many fewer Bering Straits residents were commercial fishers, and fishing seasons in the Bering Straits region are appreciably shorter than those from near the Pribilof Islands southward. The instability (seasonality) of employment in Schedule B villages belies the incomes that seasonal work generated, as we demonstrate below in the controls for regional effects. In 1988, the Bering Straits region had among the lowest income averages and, hence, the least regular employment. We rejected the null hypothesis for 10 of the 12 months. These results were not unexpected. The evidence did not yield any testing artifacts in the 8A2 responses. Thus, we concluded in 1988 that the assumptions of the t-test and the test for the significance of difference of proportions were not violated by 8A2 responses, and the results were not biased.

111. THEORETICAL CONTRASTS: MERGING THE PRETEST SAMPLES

The 1988 field research year provided the first opportunity to determine whether our sample design (test-retest with embedded panels) was working as intended. Theoretical contrasts, rather than regional contrasts alone or contrasts between every pair of villages, were basic to our design. On administering the AOSIS questionnaire to the Schedule B pretest sample (8B), we had completed all initial interviews among the pretest samples for the two schedules (7A and 8B). By combining these pretest samples, noted as 78X, all regions and all village types were represented, and we achieved sufficient sample size (N= 548) to conduct tests of our theoretical contrasts.

As we have pointed out in the preceding discussion, the controls for stability (stationariness, reliability) and for testing artifacts yielded several nonstationary items that required removal from the AOSIS instrument and one ambiguous item to which persons responded who should not have responded (D3A). Although we were in a very early stage of the research in 1988, the nested panel design was behaving as we anticipated--eliminating some threats to internal validity and specification error (ecological fallacy). Here we focus on the theoretical contrasts, again turning to a sample of the AOSIS variables rather than the entire list and doing so for the same reasons that we employed samples of AOSIS variables to measure stationariness and test artifacts. In 1988 we sought to evaluate the sensitivity of our theoretical contrasts in detecting differences between populations whose characteristics, we hypothesized, should be different and that should be important in MMS planning.

It will be recalled that the Solomon Four Group Design is intended to increase statistical power as the test-retest panels unfold, as pretest and posttest samples are

interviewed, and as cross-sample tests are employed (i.e., as pretest or posttest samples are drawn, interviewed, and compared with panel responses obtained during the same wave as the appropriate pretest or posttest sample).

Table 6-8 organizes the same eleven quantitative variables we employed to control for testing artifacts to test for theoretical contrasts. In testing for the differences between 8B and 8A2 on these variables, two significant differences were obtained ("household size" and "attendance at public meetings"). We presumed that the paucity of differences was to be expected given the nature of the two samples: both comprised respondents drawn from several ANCSA regions but not the same regions. The differences that emerged are explainable, but we had no theory to account for them. Such is not the case here. The theoretical contrasts yielded differences we could account for and which we anticipated when we responded to MMS's request to provide analyses of a sample of persons in coastal Alaska that represented ethnic differences, hub and peripheral communities, and communities with high likelihood and very low likelihood of being affected by OCS activities. The results of the contrasts from our stratified random sample in 1988 demonstrated the effectiveness of our sampling design, as implemented.

Thirty-four of the **55** theoretical contrasts *are significant* at $p \leq .04$ (t-test for the significance of difference between means). We took great interest in differences between *Borough:Not-Borough* responses in the combined 1987-1988 pretest sample. At that time, *Borough* respondents demonstrated significantly smaller households, lower housing costs, smaller houses, and higher utilities costs than *Not-Borough* respondents (HHSize, A32, A33, DIC, DIE, D8). We expected households to be smaller in

Table 6-8

TESTS FOR THE SIGNIFICANCE OF DIFFERENCES BETWEEN THEORETICAL CONTRASTS, ELEVEN QUANTITATIVE VARIABLES, AOSIS QUESTIONNAIRE INSTRUMENT, TOTAL AOSIS SAMPLE (N= 548), 1987-1988"

Theoretical Cent rasts	HHSize[b]	A32	A33	CI	DIc	DIE	D2	D3A[c]	D8	D13	D16
Borough/	2.90*+	1.69	2.94	3.08	2.51*+	4.06*+	4.27	5.30	1.75*+	2.60	1.67
Not Borough	4.11	1.69	2.77	3.20	3.14	2.77	4.19	4.40	1.91	2.51	1.61
Hub/	3.47	1.60*+	2.65*+	3.34*+	3.33*+	3.61*+	4.77*+	5.08	1.98*+	2.55	1.61
Periphery	3.98	1.81	3.06	2.92	2.36	2.86	3.52	4.11	1.68	2.54	1.67
Test/	3.52	1.64	2.70*+	3.24*+	3.12*+	3.54*+	4.60*+	5.26*+	1.95*+	2.54	1.61
Control	3.96	1.78	3.05	3.01	2.53	2.86	3.61	3.58	1.68	2.55	1.66
Mixed/	3.32*+	1.62	2.62*+	3.24*+	3.12*+	4.60*+	4.26*+	5.26*+	1.95*+	2.54	1.61
Native	4.05	1.78	3.06	2.96	2.59	2.82	3.47	4.16	1.75	2.56	1.60
Alcut/[d] -----	1.46*	2.40*	3.41*	1.84*	1.44*	4.85*	-----	1.68*	2.54	1.61	
Yupik/	3.37*	1.68	2.75	3.17	3.77	4.18	4.26	4.65	2.17	2.40	1.52
Inupiaq/	4.08	1.81	3.06	3.05	2.63	3.35	4.06	4.85	1.65	2.70	1.75
Siberian Yupik		1.68	3.33	2.76	1.10	1.32	2.60		1.33	2.61	1.85
Means		1.69	2.84	3.15	2.89	3.28	4.22		1.85	2.55	1.62

" significance of differences is derived from the t-test. Means for each sample on each variable appear in the columns. The means predetermined from the class intervals. Probabilities ofseparate variate estimates ≤ .04are designated with *. Probabilities ofpooled variate estimates ≤ .04are designated by +. The variables in this analysis are HHSize=Household size, A32=Number ofmeals eaten with relatives outside the household last week, A33=Peroent meat and fish eaten lastyear, CI= Number of years education completed, D1 C= Housing costs, D1 E= Utilities coat, D2=Household income, D3A=Amount invested in the fishing business, D8= Number of rooms in house excluding bath, D13= Number of days visited friends last week, D16= Number of public meetings attended last month.

[b] Incomplete ratings for the majority of Schedule A respondents (N= 185).

" Amount invested in fishing or business is a subsample of respondents (N= 195).

[d] F tests for the one-way analysis of variance are employed for the language contrasts.

* The variance between groups is significant ≤ .04.

boroughs, and we anticipated that borough residents would invest more in fishing or other business ventures than not-borough residents. The *Borough:Not-Borough* contrast did not produce a significant difference on this variable. Initially, we thought the failure to detect a significant difference was a function of sample size (N = 195), but subsequent *Borough:Not-Borough* contrasts in 1989 and 1990 did not bear this out. Rather, more and more villages became organized into boroughs as our work progressed and as the Alaskan economy nosed downward, so that the value of the governmental contrast became less obvious.

In 1988 we realized our reasons for anticipating high investments in personal businesses or commercial fishing among *Borough* residents was flawed. At that time (1988), two of the dominant commercial fishing areas were organized into boroughs (Naknek and Kodiak), whereas two were not (Bristol Bay and the Aleutian-Pribilof Islands), so the failure to reject the null hypothesis caused us to change our expectations. Subsequently, NANA (Schedule A), parts of the Aleutians (Schedule A), and Bristol Bay have organized into boroughs. The smaller household sizes in the *Borough* contrast were expected, either through more housing available in boroughs (especially the North Slope and Kodiak), or wider distribution and greater availability of utilities of all kinds into existing houses, making more houses habitable. Housing costs were partially borne by the North Slope Borough for its residents, affecting DIC ("housing costs"). In 1988, this theoretical contrast produced some measures of the differences attributable to local governments, the revenues to which they had access to, and which they, in turn, redistributed. But because of the considerable increase in the number of villages in our

sample organized into boroughs, the utility of the contrast is dubious in 1991.

Hub:Periphery contrasts were more pronounced than the governmental contrasts in the combined 1987-1988 pretest sample. *Hub* and *Periphery* villages proved significantly different from one another on several measures. *Hub* respondents ate fewer meals with relatives outside the household (A32), had less meat and fish in their annual diets (A33), completed more years of education (Cl), paid more for their housing (D1C) and their utilities (DIE), earned greater incomes (D2), and resided in larger houses (D8) than their counterparts in *Periphery* villages. " These differences, and others that were not significant but that were in the direction we anticipated (e.g., smaller households in *Hub* than in *Periphery* villages), demonstrated that costs were higher but that benefits were also higher in the *Hubs. The* populations there earned more and completed more years of education. The infrastructure and superstructure of the *Hubs,* then, fitted our expectations and provided empirical contrasts for further analysis.

The Test: Control contrast yielded another set of significant differences that overlapped with the *Borough:Not-Borough* and *Hub: Village* contrasts but were not identical with either. This, too, was expected. *Test* villages may have infrastructures similar to *Hubs* or may have only a portion of the infrastructure present in *Hubs* or may have very little infrastructure. As infrastructure increases, services normally increase as well. Some of the villages classified as *Test, are* such because of their proximity to OCS developments--developments that are underway, planned or anticipated. *Test* and *Control* villages yielded significant differences from one another on several contrasts. Respondents in Test villages had smaller proportions of meat and fish in their annual

diets (A33), completed more years of education (Cl), paid more for housing and utilities (D 1C, DIE), earned higher incomes (D2), and invested more in commercial fishing or personal businesses (D3A) than did their counterparts in Control villages.

The *Test: Control* contrasts for the combined 1987-1988 sample were interesting specifically because the difference between the number of meals eaten with relatives outside the household (A32) was not significant, and because the respondents in *Test* villages invested more in commercial fishing or other businesses than did respondents in *Control* villages. In 1988 we thought that the difference in investment may have been due to a simple function of distance from fisheries inasmuch as some of the *Control* villages, such as Anaktuvuk on the North Slope and Aniak in Calista are located long distances from the sea. Yet many Aniak residents on the upper Kuskokwim fish commercially in Kuskokwim Bay and elsewhere. The A32 contrast is endlessly interesting in this research because it measures "traditional" practices. That *test* respondents performed differently from *Hub,* but not *Borough* respondents on these measures was instructive. *Test* and *Borough* were similar in that respondents may or may not have resided in villages of considerable infrastructure and superstructure, and may or may not have resided in villages whose ethnic populations were mixed. Fewer traditional features were muted in the 1987-1988 contrasts of *Borough:Not-Borough* and *Test: Control* than was the case for *Hub:Periphery*.

The Mixed:Native contrasts detected significant differences in eight of eleven measures. Respondents in *Mixed* villages resided in smaller households (HHsize), had smaller proportions of naturally occurring meat and fish in their annual diets (A33),

completed more years of education (Cl), paid more for utilities and housing (D1C, DIE), had higher incomes (D2), invested more in commercial fishing of other businesses (D3A), and resided in larger homes than did respondents in *Native* villages. By combining *Mixed, Hub,* and *Test* villages, it was apparent that we would obtain the most powerful (statistical) contrast, but in so doing, the variation among the three, noted in Table 6-8, would be obscured. For example, "household sizes" and "numbers of meals eaten with relatives outside the household," which do not differentiate in four of six contrasts, would surely be altered. Hence, important information for planning, especially for *Test* villages likely would be lost through combining.

The contrasts by traditional language areas provided significant differences on all variables but number of days visited friends last week (D13), number of public meetings attended last month (D16), and the amount invested in commercial fishing or other personal business (D3A). We anticipated that traditional language areas would be powerful reflectors of historical continuity, much more so than ANCSA regions. The reasoning behind our expectations was empirically sound, but our measures of traditional language areas did not provide sufficient data on the number of respondents who spoke the Native languages traditionally spoken in the areas where they were interviewed. In the commercial fishing regions of Bristol Bay, Kodiak, and the Aleutian-Pribilof Islands, there are large numbers of non-Natives in our sample. We came to be skeptical of the construct validity of this contrast. If we turn our attention to Table 6-8, it is evident that there were abundant significant contrasts obtained in the 1987-1988 sample, but there were problems as well.

Sample size varies greatly. There are very few Siberian *Yupik* speakers and even fewer *Aleut* speakers. Because of insufficient responses for the *Aleut* and *Siberian Yupik* on (D3A), only *Yupik* and *Inupiaq* were tested on that variable, and because some household data for the Aleut and Siberian Yupik were being rerated in 1988, they were not included in thetest for household size (HHSize). We used the F-test for the one-way analysis of variance to discriminate among all four languages, so the asterisk identifying significant differences is placed behind each Aleut mean. The *Siberian Yupik* sample was much smaller than the others ($N = 21$), and it most frequently was at greatest variance Ii-em the mean value. It is doubtful that this outcome is a function of sampling error. The *Siberian Yupik* population of St. Lawrence Island is very different from the mainland populations. We know this from intensive and protracted field work among the island's residents on Gambell and Savoonga (see Little and Robbins 1984, Jorgensen 1988), and we know it from our subsequent work there on this project. Nevertheless, because of problems in classifying the speech of respondents among the other languages, we do not know what the F-scores mean.

It is probably not a fortuity that respondents in *Inupiaq* and *Yupik* (both) areas produced higher means on the traditional subsistence measures (A32, A33) than did respondents in the *Aleut* area. Among other things, the variety of resources in the *Aleut* area is smaller, and income is generally higher (D2). Also, there are more non-Natives in the *Aleut* area than all but the Koniag (Pacific Yupik) area of Kodiak Island. On the other traditional measure, "visiting with friends" (D13), differences are not significant among the language areas.

Turning our attention to the household finance measures, *Yupik*-area respondents (including the predominantly non-Native villages of Dillingham and Kodiak) pay more for all utilities and also earn high incomes but not so high as the *Aleut*-area respondents. Undoubtedly, the Dillingham-Kodiak income averages are pulled down by the low incomes in the Yupik-speaking Calista area. The language contrasts were not created to discriminate among OCS and non-OCS effects that bear directly on jobs or dislocations, but at the conclusion of the analysis of the combined pretest sample in 1988, we anticipated, particularly in light of the results of the traditional measures, that these contrasts would prove useful in detecting differences on cultural variables that were peculiar to specific, historically related people. Our expectations were dashed because of the problems in the classification of language areas: what appeared to be clearly interpretable responses on the items assessed above were not so clear. We nevertheless continued to explore the idea, suggested by the foregoing, that *responses* to dislocations or to increased employment would be reflected in culture-specific variables.

IV. CONTROLS FOR REGIONAL EFFECTS

IV.A. Problems Posed by Regions as Heterogeneous Units

The MMS desired to account for effects from OCS activities that might be felt differentially among ANCSA regions. ANCSA regions are recent artifacts of Federal planning pursuant to the provisions of the Alaskan Native Claims Settlement Act. No ANCSA region comprises a homogeneous ecosystem, although the North Slope region comes closest *in* this regard. No region comprises a relatively undifferentiated language area, but again the North Slope region comes closest in this regard. No region

comprises a homogeneous market sector, although the Aleutian-Pribilof Islands, Bristol Bay, and Kodiak regions share high participation in the commercial fishing industry. The ANCSA regions are administrative and service areas, and recent in origin. Some are more similar internally than others based on environmental, historical, economic, and governmental criteria. We test below to determine in what ways each region may differ significantly from all other regions (as an aggregate).

IV.B. Testing for Differences Between Regions

Unlike the previous test where 55 contrasts were sufficient to demonstrate the detection powers of the theoretical dichotomies, here we tested for 140 differences (eight dichotomous nominal variables, seven ordinal variables, and five quantitative variables). Thirty-four of the 140 tests allowed us to reject the null hypotheses.[6]

In each of the three sets of tests, we sought to determine whether regional differences were detected in variables that measured traditional culture (what respondents ate, who they ate with, who they visited, whether they spoke their Native language, and whether they produced arts or crafts). We also tested for assessment of personal health, desiring to know whether health was better in some region(s) than others, and if so, why. We asked as well about educational abilities (can they solve division problems and read Newsweek). We asked questions about political participation . (voting in various elections); and we asked demographic and financial questions about age, sex, longevity of residence, and income. These questions were representative of the range of questions in AOSIS and provided a good indication of the discriminatory power

[6]The theoretical contrasts provide 62-percent rejection of the null hypotheses of no difference. The regional contrasts allow us to reject 24 percent of the null hypotheses of no difference.

of regional contrasts.

Table 6-9 demonstrates that NANA, North Slope, and Bering Straits residents were more likely to have eaten subsistence foods (harvested naturally occurring, renewable resources) than the total, but Aleutian-Pribilof Islands, and Kodiak respondents were unlikely to have eaten subsistence foods as often as the total sample. These differences lumped the most northerly vs. the most southerly and those most intimately engaged in commercial fishing against those unengaged or least engaged. The Calista and Bristol Bay populations were identical to the total on the subsistence food measures (A28, A30).

In 1988, the Bering Straits was the only region where arts and crafts production (A34) was significantly different from the total. Inasmuch as every single Gambell household had at least one ivory carver, and Shishmaref also had about one artisan per household, those respondents made the difference. The other exceptional contrast in this table occurs in the measurement of voting in the last city council election (D19). Kodiak respondents were less apt to vote (by a wide margin) than were the residents of any other region. Kodiak, then, the largest of the villages in the sample (78X), with high transiency and few Natives **(14$%0),** fitted the general trend in the U.S. toward low voter turnout. Kodiak and also Bristol Bay (heavily weighted by the *Mixed:Hub* community, Dillingham), were significantly different from the total in voting in the most recent statewide election. The Calista and the North Slope regions exercised the franchise significantly more than the total. NANA and Bering Straits respondents exercised the franchise in greater proportions than the total, but not significantly so. Nothing

Table 6-9

CONTROLS FOR REGIONAL EFFECTS--SIGNIFICANCE OF DIFFERENCES OF PROPORTIONS BEIWEEN EACH ANCSA REGION AND THE TOTAL SAMPLE," EIGHT DICHOTOMOUS NOMINAL VARIABLES, AOSIS QUESTIONNAIRE INSTRUMENT, 1987-1988b

	Calista (N=92) C T	NANA (N=65) N T	North Slope (N=91) NS T	Aleutian-Pribilof (N=99 AP T	Bering Straits (N=82) BS T	Bristol Bay (N=74) BB T	Kodiak (N=50) K T
A28 Subsistence food yesterday	67 63 N.S.	77 62 2.33*	81 60 3.72*	41 68 -5.08*	74 62 2.15*	63 63 N.S.	30 67 -5.09*
A30 Subsistence food day before yesterday	65 61 N.S.	76 59 2.70*	77 58 3.30*	41 66 -4.52*	66 61 N.S.	64 61 N.S.	34 64 -4.22*
A34 Made arts and crafts last year	34 36 N.S.	31 36 N.S.	34 36 N.S.	28 37 N.S.	51 32 3.47*	38 35 N.S.	30 36 N.S.
B9 Does illness/injury prevent activities	20 19 N.S.	19 19 N.S.	16 20 N.S.	14 20 N.S.	20 19 N.S.	26 18 N.S.	22 18 N.S.
B10 Have you been struck/ hurt by someone	7 5 N.S.	2 6 N.S	3 6 N.S.	4 5 N.S.	8 5 N.S	4 5 N.S.	10 5 N.S.
D19 Vote in last city council election	74 68 N.S.	75 68 N.S.	72 68 N.S.	71 68 N.S.	67 69 N.S.	62 70 N.S.	52 70 -2.72*
D20 Vote in last State-wide election	81 75 4.78*	83 76 N.S.	87 75 2.48*	7377 N.S.	78 76 N.S.	64 79 -2.85*	64 78 -2.20*
RSEX	55 50 N.S.	46 51 N.S.	58 49 N.S.	37 53 -2.86*	62 49 2.16*	42 52 N.S	54 50 N.S

" Total sample P's will vary because the total size varies. Each region's data are removed from the total when that region is being compared and returned to the total when the next region is being compared. P= yes in this table.

[b] Significance of differences is derived from the test for the significance of difference between proportions (P-Q) ;z-scores ≥ .206 ara significant at ≤ .04 and are designated with ".

exceptional was learned here, except that the most successful regions in terms of penetration of the market economy were those that had the lowest respondent voter turnout (note the direction of the Aleutian-Pribilof Islands voting behavior). As discussed in Chapter 2, we thought a better contrast to ferret out some of the differences in government might be a theoretical contrast between percentage of all income derived from the fishing industry (a *Commercial Fish:Noncommercial Fish* contrast).

Aleutian women comprised a greater proportion of respondents than was the case in other regions, and in the Bering Straits, men comprised a greater proportion of respondents than elsewhere.

The ordinal variables, Table 6-10, yielded seven significant differences among 47 tests (the Kolmogorov-Smirnov two sample nonparametric test for ranked variables was employed). In short, regions did not discriminate on the wide majority of variables. North Slope and Aleutian-Pribilof Islands respondents were significantly different from the total with respect to the number of meals they ate with relatives outside the household: North Slope respondents ate with relatives more often and Aleutian-Pribilof Islands less often. Inasmuch as each region had high income households (see the following table), we had no obvious explanation for the differences. We thought perhaps traditional differences would account for the differences, but that approach appeared to be fruitless. If tradition made the difference, we would expect the Bering Straits, Calista, and NANA regions to be similar to the North Slope. It is possible, however, that we should reject the null hypothesis and presume that high incomes and traditional practices combine in the North Slope (to account for the North Slope regional difference). In the

Table 6-10

CONTROLS FOR REGIONAL EFFECTS--MOST EXTREME DIFFERENCES AND SIGNIFICANCE OF DIFFERENCES BETWEEN EACH ANCSA REGION AND THE TOTAL SAMPLE, EIGHT ORDINAL VARIABLES, AOSIS QUESTIONNAIRE INSTRUMENT, 1987-1988a

	Host Extreme Dif f erences bv Regions						
AOSIS Variables	Calista (N=92)	NANA (N=65)	North slope (N=91)	Aleutian Pribilof (N=99)	Bering Straits (N=82)	Bristol Bay (N=74)	Kodiak (N=50)
A32 Meals eaten with relatives outside the household last week	-.028	.04.4	. 183*	-.175*	.043	.062	-.156
B4 I can see (clear ly...)	-.028	.130	.095	.035	-.153	.035	-.154
B6 I can run 100 yards (easily...)	-.018	.064	.067	-.081	-.192*	.145	-.084
B8 I can bite and chew hard foods (easily...)	-.124	.117	.058	-.154	.035	.145	-.036
C3 I can read Newsweek (easily...)	-.145	-.091	.129	-.143	-.059	.128	-.190
C5 I can divide... (easily...)	.094	-.083	.115	-.118	-.077	.119	-.117
EIO Ability to speak Native language (completely satisfied. ..)	.180	.145	. 276*	-.166	-.188*	-. 406*	.472*

[a] Kolmogorov-Smirnov two-ssmple test employed, Significance of differences at ≤ .04andare designated with*.

pretest, high incomes were conspicuously lacking in NANA, Calista, and the Bering Straits.

For no apparent reason, Bering Straits respondents are (significantly) less able to run 100 yards than the respondents from the other regions (B6) (see the age of respondents in the following table). The measures of personal health and personal educational skills do not discriminate.

The ability to speak one's Native language (E1O) yielded four significant differences, two negative and two positive. These were not easily interpreted because they asked whether the respondent was completely satisfied (or something less than that) with their ability to speak their Native language. Whether persons were referring to English, Spanish, Tagalog, Danish, Norwegian, or an Alaskan Native language was unclear, and whether they spoke it well but were unsatisfied, was also unclear. Aleutian-Pribilof Islands, Bering Straits, and Bristol Bay respondents were significantly "less satisfied" than were North Slope and Kodiak respondents. Inasmuch as most Kodiak respondents were non-Natives and most North Slope respondents were Natives, we realized that we would have to train the interviewers to explain that Native language referred to Eskimo, Aleut, and Athapaskan dialects, but construct validity problems were evident.

Regional contrasts are not theoretically interesting, nor do the results prompt much other than strained speculation about why the significant contrasts that occurred happened to occur.

In the final set (Table 6-11), comprising five quantitative variables, only household income (D2) and the years that the respondent had resided in the village in which he/she was interviewed (D25) were discriminating--with one exception: Kodiak respondents were significantly less apt to visit friends as frequently as were the total respondents (D13). The last question mentioned fits the profile of Kodiak that was developing from many of the preceding tests. Kodiak residents had resided in Kodiak a significantly shorter time than was true for the total (a measure of transiency).

The residence and income variables demonstrated that Aleutian-Pribilof Islands and Kodiak respondents made significantly higher incomes and had resided in their communities a significantly shorter time than the total. Only the Bering Straits respondents made significantly less and had resided in their villages a significantly longer time than the total. The other regional contrasts were mixed. Calista and NANA respondents had significantly lower incomes, and the North Slope respondents resided in their villages for a significantly longer time than was true for the total. As for the other measures, then, household finances were the powerful discriminators in the combined pretest sample. Household finances, however, were better accounted for by the theoretical contrasts (*Hub:Periphery, Mixed:Native*) than by regional contrasts.

V. CONTROLS FOR EQUIVALENT TESTS RELIABILITY

In preparing the KI Protocol (KIP), we developed four topics which provide information that was important to the inquiry, but also that provided information that was equivalent to some information obtained from the AOSIS instrument. We did not seek large overlaps because the KI sample is a 3 l-percent subsample, drawn at random,

Table 6-11

CONTROLS FOR REGIONAL EFFECTS--MEANS AND THE SIGNIFICANCE OF DIFFERENCES BETWEEN THEM FOR EACH ANCSA REGION AND THE TOTAL SAMPLE, FIVE QUANTITATIVE VARIABLES, AOSIS QUESTIONNAIRE INSTRUMENT, 1987-1988[a]

		Most Extreme Differences by Regions						
	Cat ista NANA		North slope	Aleutian Pribi lof		Bering Straits	Bristol	Kodiak Bay
	(N=92)	(N=65)	(N=91)	(N=99)	(N=82)	(N=74)	(N=50)	
AOSIS Variables								
RAGE	Reg.	36.9*+	43.4	44.6	39.1	41.9	44.5	42.3
	Tot.	42.5	41.3	40.9	42.1	41.5	41.1	47.5
HH Income	Reg.	3.67*+	3.60*+	4.33	4.85*+	3.79*+	4.50	5.00*+
	Tot.	4.34	4.31	4.20	4.09	4.30	4.18	4.15
D13 Visit friends last week	Reg.	2.41	2.75	2.61	2.54	2.73	2.47	2.26*
	Tot.	2.57	2.52	2.54	2.54	2.51	2.56	2.58
D16 Public meetings attended	Reg.	1.52	1.71	1.80	1.61	1.75	1.58	1.44
	Tot.	1.66	1.62	1.61	1.64	1.61	1.64	1.65
D25 Years resided here	Reg.	3.38	3.62	3.80*+	3.15*+	3.76*+	3.46	2.88*+
	Tot.	3.48	3.44	3.39	3.53	3.41	3.46	3.52

[a] The t-test for the significance of difference between means is used here. Differences ≥ 2.06 are significant at ≤ .04 and are designated with * for separate variance and + for pooled variance.

from Schedules A and B (7A, 8B) of the AOSIS sample. We desired information that would facilitate reliability tests of information provided by the same informant to different interviewers in 1987 and 1988 (the QI's and the KI's were not the same).

Protocol variables are prefixed with the letter K; AOSIS items with A or D in the following tests. The results of the equivalent tests were all positive, high, and significant. They addressed four topics: traditional eating habits, proportion of harvested proteins in diet (K3), and percent of meat and fish eaten last year (A33); household annual income (K4, D2); the birth place and, for the KI variable, the duration of residence in that birth place (K37, residence pattern of the informant); where was the respondent born (D24); and, household size (K17, AO).

Table 6-12 provides the γ, X^2 and p values for the diet, income, and residence variables for the entire pretest KIP sample (N = 168). Respondents were drawn at random from the samples in every study village. Each PRE value is very high, attesting to the reliability of the items: the same informants provided the same answers to different interviewers.

Table 6-13 is restricted to the Schedule B sample and adds the household-size variable--a variable that is missing from the entire sample for the reason given above. These coefficients, too, are very high, the lowest being γ .737, which means if we know the distribution of one variable, we can reduce the errors of our guesses about the distribution of the other by 74 percent. The equivalent test reliability for the protocol and the instrument was very high for the combined 1987 and 1988 samples, and for the 1988 samples alone. Interobserver reliability was confirmed. Test-retest reliability,

Table 6-12

EQUIVALENT TEST RELIABILITY--IDENTICAL SCHEDULE A AND B RESPONDENTS (N= 168) TO THREE SETS OF EQUIVALENT AOSIS QUESTIONNAIRE AND KI PROTOCOL ITEMS, 1987-1988

κ3 Proportion of harvested protein in diet	K4 Household annual income	K37 Residence pattern of the informant (birth)
A33 Percent of meat and fish eaten last year	D2 Household annual income	D24 Where was respondent born
γ .643	γ .864	γ .891
x' 68	X^2 332	X^2 187
p <.000	p <.000	p <.000

Table 6-13

EQUIVALENT TEST RELIABILITY--IDENTICAL SCHEDULE B RESPONDENTS (N=55) TO FOUR SETS OF EQUIVALENT AOSIS QUESTIONNAIRE AND KI PROTOCOL ITEMS, 1988

κ3 Proportion of harvested protein in diet	K4 Household annua [income	K37 Residence pattern of the informant (birth)
A33 Percent of meat and fish eaten last year	D2 Household annua 1 income	D24 Where was respondent born
γ .737	7 .769	γ .925
X^2 41	X^2 179	X ² 67
p <.000	p <.000	p <. 000
	K17 Household size	
	AO Household size	
	7 .995	
	X^2 133	
	p <.000	

however, had to await a second wave of research among the KIP samples in 1989.

VI. CONCLUDING HYPOTHESES ABOUT VALIDITY AT THE END OF THE 1988 RESEARCH WAVE

Before we entered the field in 1988, we were reasonably convinced the sampling design was producing results as we predicted it would--all things being equal. The first administration of the AOSIS instrument in 1987 proved to be a much dicier task than had been originally suggested by Braund, Kruse, and Andrews (1985), the team that put the instrument together. Seventy-two of the original items failed one or more of our validity, sensitivity, reliability, and construct validity (language ambiguity, vagueness, *non sequitur,* and false conjunction) tests. The validity of the sampling design could not be assessed until the instrument was corrected. The 1987 research wave, then, served as a field test of an untested instrument; an analysis of the items that proved reliable and valid; and a careful reworking of some items for further testing in Schedule B.

We put off implementation of posttest interviews in Schedule A (to control for testing effect) in 1988 because the AOSIS instrument proved so flawed in 1987. We wanted to administer the revised version of the instruemt to the pretest Schedule B sample and to the second wave (reinterviews) of the A Panel before we spent 1 cent on posttest interviews in Schedule A (a new sample, drawn without replacement from the pretest sample in Schedule A). Our reinterview wave (8A2) correlated very highly and positively with the initial responses given by identical respondents in 1987 (7A). Moreover, comparisons of the (8A2) sample with the initial interviews among the Schedule B sample (8B) for 1988 yielded no suggestion of testing effect in the

reinterviews.

The tests for stability (stationariness) caused the rejection of 21 AOSIS variables, 18 of which were attitudinal--of which almost all "measured affect. Sixteen of these variables appeared in Section E which purported to measure personal attitudes about well-being. Most of these variables were carried into the Schedule B instrument (which was the same instrument used for the reinterviews of A Panel respondents) because they failed only one or two tests in our analysis in 1987. Their lack of stability in 1988, however, caused us to drop them from the instrument.

Statistical power increases with the elimination of threats to validity, both internal and external. The 1989 and 1990 waves of the A and B Panels, and the posttest interviewing in both schedules, we predicted, would provide greater power in our ability to detect significant differences.

VII. A CONCORDANCE OF **AOSIS** ITEMS RETAINED, REVISED, OR REJECTED IN 1988

Research conducted in 1988 allowed for the correlation of answers given to AOSIS questions in 1987 to answers given in 1988 by Panel A respondents, and also allowed for the tests of significance of differences between Schedule B responses and the second wave responses of Panel A. Twenty-one variables were highly unstable, and another 20 required revision for the 1989 research wave. Among all questions in the AOSIS instrument, Section E variables behaved the worst. Sixteen Section E variables were excised, and 11 were revised. In 1988 we modified the Section E questions by reducing the choices from five to four (completely satisfied, mostly satisfied, somewhat

satisfied, not satisfied). Because the Section E questions were deemed important in the original request for proposal, we revised 11 of the surviving Section E questions from four choices to three (completely satisfied, somewhat satisfied, not satisfied). And although the household expense variables behaved erratically (D 1A-D1F), we decided to retain them for the 1989 wave on the assumption that better training of KI's and QI's would rectify the problems encountered with these variables. Table 6-14 lists AOSIS items retained, revised, or rejected in 1988.

Table 6-14

AOSIS ITEMS RETAINED, REVISED, OR REJECTED IN 1988

Retained			Revised	Rejected
A28	D2	D29	D1A	A37
A30	D3	E50	D1B	C13
A32	D3A	E51	D1C	D14
A33	D4	E52	D1D	D15
A34	D5		DIE	D18
A37	D6		DIF	EI
A38	D8		E10	E3
BI	D9		E12	E4
B2	D10		E17	E8
B4	DII		E23	E9
B5	D12		E29	EII
B6	D13		E30	E21
B7	D16		E31	E22
B8	D19		E34	E24
B9	D20		E35	E28
BIO	D21		E41	E33
B11	D22		E45	E36
cI	D23			E37
C2	D24			E38
C3	D25			E40
C4	D26			E49
C5	D27			
C12	D28			

PART FOUR: ANALYSES OF THREATS TO VALIDITY "OVER-TIME," 1987-1990 (RELIABILITY, STATIONARINESS, TEST ARTIFACTS, AND THEORETICAL CONTRASTS)

CHAPTER 7
NONRESPONSE

I. INTRODUCTION

Nonresponse, or "differential subject loss,"[1] posed problems throughout the 4 years of field inquiry. Our analysis of responses to AOSIS questions among the pretest sample (.7A and .8B) allowed us to change some ambiguous questions and to eliminate questions that had poor construct validity, violated respondent sensibilities, violated cultural conventions, or violated linguistic conventions. Because in 1988 and 1989 we altered some questions and replaced others with questions we presumed would have greater construct validity than those we replaced, it was necessary to monitor nonresponse to every AOSIS item throughout every wave of the inquiry.

Table 7-1 presents the nonresponse rates (in percentages) for all AOSIS items that survived the reliability and validity analyses conducted through 1988. Reading from left to right in the table, rates are provided for the three waves of the A Panel (.7AP, .8A2, .9A3), the three waves of the B Panel (.8BP, .9B2, .0B3), the combined pretest sample for Schedules A and B (N = 548) (.78X), the combined posttest sample for Schedules A and B (N = 312) (.90X), and the combined pretest and posttest samples for Schedules A and B (N = 860) (.70X).

It is evident the majority of AOSIS items that survived the tests applied to them during the first 2 years of the research had high-response rates during the last 2 years, and that iterns modified or introduced during 1989 also had high-response rates.

[1] See the discussions of nonresponse as a threat to validity in Chaps. 1.LA., 2.III.A, and 3 .IV.

Table 7-1

NONRESPONSE RATES FOR QUESTIONNAIRE INSTRUMENT ITEMS: A PANELS, B PANELS, PRETEST, POSTTEST, AND COMBINED PRETEST AND POSTTEST SAMPLES, WITH CONTROLS FOR RESPONDENT CHARACTERISTICS

NOMINAL VARIABLES	NONRESPONSE RATE (PERCENT)								
	.7AP	.8A2	.9A3	.8BP	.9B2	.0B3	.78X"	.90*	.70X"
A28 Subsistence food yesterday	0.0	0.0	0.0	3.4	2.3	1.1	1.1	1.9	1.4
A30 Subsistence food day before	0.0	0,0	0,0	3.4	0,0	1.1	1.3	2.2	1.6
A34 Made arts/crafts last year	1.2	0.0	6,1	3.4	1.1	2.3	2.7	7.4	4.4
B9 Incapacitated past two weeks	1.2	0.0	0,0	5.7	0.0	2.3	3.1	1.9	2.7
C6N Employed laat year	0.0	missing data	0,0	4.s	0.0	1.1	0.9	1.3	1.0
Cl 2 Work out of village last year	0.0	4.9	4,9	11.4	2.3	6.8	4.4	4.s	4.4
D3 Commercial fish/own busns	1.2	1.2	2.4	11.4	2.3	1.1	6.2	6.1	6.2
D19 Vote city council election	0.0	6.1	1.2	3.4	0.0	2.3	0.9	1.9	1.3
D20 Vote statewide electlon	0.0	0.0	1.2	2.3	1.1	1.1	0.5	4.2	1.9
D22 Vote village corp election	11.8	8.7	0.0	3.2	0,0	4.7	7.s	6.9	7.3
023 Vote region corp electlon	0.0	1.4	0,0	11.0	2.9	3.1	7.0	3.4	5.8
024 Where were you barn	0.0	0.0	0.0	2.3	0.0	3.4	0.5	1.9	1.0
D28 Race of respondent	0.0	2.4	1.2	10.2	3.4	5.7	3.6	3.2	3.5
D29 Currently married	0.0	0,0	0.0	0.0	0.0	1.1	1.1	2.2	1.5
D29A Race of spouse	5.5	3.7	1,9	8.5	14.5	3.5	7.7	1.6	5.6
E50 Will oll search create jobs	25.6	15.9	11.0	21,6	11.4	8.0	25.0	7.4	18.6
RSEX Sex of respondent	0.0	0.0	0.0	3.4	0.0	1.1	0.4	1.3	0.7

" .78X Is the combined sample of "pretest" Interviews (initial, not panel reinterviews) In Schedule A and B communities.

• .90X Is the combined sample of "posttest" Interviews (initial, not reinterviews) conducted during 1969 and 1990 In Schedule A and B communities.

" .7oX designates the combined "pretest" and "posttest" samples, .78X and .90X.

Table 7-1
(Continued)

ORDINAL VARIABLES	NONRESPONSE RATE (PERCENT)								
	.7AP	.8A2	.9A3	.8BP	.9B2	.0B3	.78X	.90X	,70X
A26A Game last five years	missing data	6.1	7.3	19.3	6.8	3.4	16.9	17.3	17.1
A26B Fish last five years	missing data	14.6	8.5	22,7	6.8	4.5	15.9	11.9	13.5
A31 Who harvested food	missing data	23.2	0.0	33.0	37.5	23.9	76.5	29.8	59.6
A32 Eat with rels/other HHs	1.2	2.4	1.2	3.4	1.1	1.1	3.8	4.6	4.2
A33 Percent meat/fish in diet	0.0	1.2	0.0	3.4	1.1	1.1	0.9	2.2	1.4
A35 Heard elder tell story	missing data	8.7	0.0	14.1	7.1	10.9	14.1	8.9	12.1
A36 Asked elder for advice	19.1	14.5	0.0	9.4	12.9	12.5	19.5	17.2	18.7
A38 Use Native language home	1.5	1.4	0.0	1.6	0.0	3.1	2.9	2.5	2.7
B1 Describe your health	0.0	0.0	0.0	3.4	0.0	1.1	0.4	1.0	0.6
B3 Suffer from illness/disability	3.7	3.7	0.0	4.s	0.0	3.4	4.0	3.8	3.9
B8Bite and chew hard food	0.0	0.0	0.0	3 . 4	0.0	2.3	1.1	2.2	1.5
C1 Years education	1.2	1.2	0.0	3.4	2.3	1.1.	2.2	1.6	2,0
C5 Solve division problems	0.0	2.4	1.2	4.5	1.1	4.5	6.2	3.5	5.2
D6Is household better off now	4.9	1.2	3.7	2.3	1.1	1.1	3.6	3.5	3.6
09 Access to drinking water	0.0	1.2	1.2	2.3	0.0	1.1	0.5	2.2	1.2
010 Waste water removal	1.2	1.2	0.0	3.4	2.3	2.3	1.5	1.3	1.4
D12Difficulty in heating house	0.0	1.2	0.0	3.4	0.0	1.1	1.3	1.3	1.3
D24 Community in which born	0.0	0.0	0.0	2.3	0.0	3.4	0.5	1.9	1.0
D26 Previous residence	0.0	23.2	26.5	14.1	15.7	17.2	4.6	15.3	8.1
E1O Ability in Native language	4.4	4.3	1.5	4.7	4.3	4.7	6.0	3,0	5.0
E12 Social ties other comm	1.2	9.8	0.0	10.2	5.7	2.3	9.1	3.5	7.1
E29 Feelings current income	1.2	0.0	0.0	4.5	0.0	3.4	3.5	2.9	3.3
E30 Feelings standard of living	0.0	0.0	0.0	3.4	0.0	1.1	1.5	1.9	1.6
E41 Local influence hind/water	4.9	7.3	0.0	12.5	8.0	3.4	6.9	5.6	6.5
E45 Can children mature...	1.2	3.7	2.4	17.0	2.3	1.1	2.9	2.9	2.9
E46 Can children learn subsist	2.4	4,9	2.4	4.5	2.3	3.4	5.3	6.1	5.6

Table 7-1
(Continued)

INTERVALVARIABLES	NONRESPONSE RATE (PERCENT)								
	.7AP	.8A2	.9A3	.8BP	.9B2	.0B3	. 7 a x	.90X	.70X
C6M Total months empl last year	56.5	missing data	0.0	42.0	0.0	1.1	49.9	1.3	32.3
C12M Time empl outside village	0.0	missing data	0 . 0	3.4	0.0	1.1	1.6	1.3	1.5
DIA Annual heating expense	1.2	9.8	9.8	12,5	9.1	9.1	7.7	14.7	10.2
D1B Annual electricity expense	1.2	6.1	8.5	5.7	1.1	2.3	6.2	9.6	7.4
D1C Annual housing expense	1.2	35.4	31.7	39.8	29.5	33.0	16.0	32.1	21.8
DID Annual telephone expense	2.4	24.4	16.3	13.6	15.9	13.6	8.9	20.2	13.0
DIE Annual utility expense	2.4	46.3	35.4	30.7	25.0	30.7	17.3	33,7	23.2
D1F Annual repair expense	22.0	56.1	43.9	44.3	36.4	31.6	33.7	37.8	35.2
D2 Annual household Income	2.4	2.4	4.9	12.5	9.1	5.7	6.0	5.8	7.2
D3A Amt invst in comm fish/bus	missing data	0.0	0.0	9.7	6.5	5.9	8.1	4.3	6.8
D4 Smallest Income needed	11.0	3,7	3.7	9.1	2.3	2.3	13.1	3.5	9.6
D8 Rooms In house	0.0	0.0	2.4	2.3	3.4	1.1	1.1	1.9	1.4
D13 Days visiting frnd/rel	1.2	0,0	0.0	.5.7	0.0	2.3	5.1	1.6	3.8
D16 No. pub meets last month	1.2	4.9	1.2	5.7	3.4	1.1	6.9	1.9	5.1
D25 Years resided In village	1.2	1.2	0.0	2.3	26.1	1.1	0.7	4.5	2.1
D27 Visit In other community	1.2	3.7	1.2	3.4	0,0	1.1	2.0	2.6	2.2
RAGE Respondent's age	1.2	0.0	0.0	17.0	1.1	3.4	4.6	2,6	3.6
HSIZE Household size	0.0	0.0	0.0	15.9	0.0	1.1	6.0	2.3	4.6

Prior to the first administration of the AOSIS questionnaire in 1987, we decided that a nonresponse rate of 10 percent or greater on any item was a threat to the validity of the item. We also recognized that if two iterns each had nonresponse rates greater than 10 percent, correlations between the two could represent differential subject loss greater than 20 percent. When correlating a large matrix of variables in which nonresponse on several variables is high, say 10 to 50 percent, pairwise solutions can accommodate the differential subject loss for each pair of variables, whereas listwise solutions can assure that only those respondents (subjects) for whom there are responses on all variables will be tallied in the correlation matrix. Each method creates a potential source of bias. Pairwise solutions may yield no two correlations based on identical subjects, whereas listwise solutions may be based on so few respondents that the correlations do not represent the sample.

Some variables in Table 7-1 apply exclusively to Natives, so the proper response to those questions by non-Native respondents is NA (not applicable, or does not apply). In calculating response/nonresponse rates for these variables, we exercised controls for non-Natives so that they would be excluded from the rates (D28, which classifies the race/ethnicity of the respondent, and D29A, which classifies the race/ethnicity of the respondent's spouse, were used for controls). Non-Natives cannot vote in village corporation elections (D22), or regional corporation elections. Non-Natives do not hear elders tell stories (A35), ask elders for advice (A36), use the Native language at home (A38), or are satisfied with their ability to use the Native language (E1O).

Place of residence before moving here (D26), i.e., the place in which the respondent lived immediately before moving to the village in which R was interviewed, generated high nonresponse rates across the samples, in part because Natives frequently had resided their entire lives in the villages where they were interviewed. During initial interviews, some were puzzled by the question, so did not answer (see the posttest responses to .90X). The nonresponse rates on this question increased during each of the three waves for the panel respondents. In large part the decrease in responses is a function of interviewers failing to ask the question of respondents whom they had asked the question of during the initial interview and who had not relocated following that initial interview. Non-Natives responded to this question at higher rates than Natives.

The amount invested in commercial business (D3A) has been controlled by knowledge of whether a person is a commercial fisherman or owns a business (D3). Persons who did not respond to, or who gave negative responses on D3, were dropped from the assessment of nonresponse on D3A. Similarly, responses on D29A (race of spouse) were dropped unless the respondents were currently married (D29). And A26A and A26B, which measure game and fish harvested in the past 5 years, have been dropped from the 1987 sample and all samples in which the 1987 data are merged because those questions falsely conjoined fish and game in the original questionnaire.

The average nonresponse rate for $N=860$ initial interviews (.70X) for all but one nominal variable in Table 7-1 is 3.1 percent. The sole question among the *nominal* variables for which more than 10 percent of the total respondents failed to answer is E50 (18.6% nonresponse in the .70X sample). Question E50 asks "If the federal government

lets oil companies search for oil in the offshore area near your village, do you think that the search for oil will create more jobs for residents of your region?" We learned during debriefings in 1987 that many respondents preferred not to answer the question. It caused Natives to forecast the consequences of an industry they do not control and in which few have been employed. Many chose not to respond. Non-Native responses were more forthcoming and, for the most part, positive. We retained E50 even though response rates were relatively low in 1987 and 1988 because we anticipated the question might be valuable in future research waves.

We can be criticized for observing a double standard here, retaining some questions but not all questions for which response rates are low. We guessed, however, that a surge in oil-related activities, beneficial or deleterious, would affect response rates. We think that is precisely what happened during the spring of 1989 and the winter of 1990. Not all QI and KI interviewers had completed their interviewing in 1989 when the Exxon Valdez foundered. The nonresponse rates on E50 decreased dramatically in 1989 for the A Panel (down from 26% in 1987 to 16% in 1988 to 11% in 1989) and for the B Panel (down from 22% in 1988 to ll% in 1989 to 8% in 1990). Only 7 percent of the posttest sample respondents in 1989 and 1990 (.90X) failed to respond to the question. We suspect if we had commenced all 1989 interviewing after the spill, both panel (.9A3, .9B2) and posttest (.9AD) respondents in that research wave would have answered the question at an even higher rate.

If we are correct, E50 maybe a useful indicator of public responses to large-scale events related to the oil industry, albeit a puzzling one: respondents, apparently for a

variety of reasons, do not respond to the question, except following a major oil-related event.

Among the *ordinal* variables, 21 had response rates greater than 90 percent (average nonresponse rate 3.3%). Three variables specifically created to measure traditional behaviors had high-nonresponse rates among panel and pretest-posttest respondents. The question that asked who harvested the food eaten by the respondent in either of the last 2 days (A31) generated fewer than 50-percent responses in the .70X sample. Nineteen percent of the respondents did not answer the question that asked whether R had asked an elder for advice during the past year (A36). This variable was retained from 1987, although we have been skeptical about whether it was an accurate measure of Native practices. For the most part, Alaska Natives teach and learn by precept: it is bad form to criticize, and criticism appears to be inherent in giving advice verbally. The high-nonresponse rates ofA31 and A36 recommend they be jettisoned from the study.

Question A35, which asks whether R has heard an elder tell a story in the recent past, overall has a high-nonresponse rate (12% for .70X), but the response rates increased to over 90 percent for 1989 and 1990 in the panels as well as for the posttest sample (.90X). We will retain this variable.

The variables measuring cognitive attitudes about the availability of game (A26A) and fish (A26B) over the past 5 years have increasingly higher response rates in the panels. Question A26B (fish) responses appear to have increased in 1989 and 1990 (.90X), perhaps as a response to the Exxon Valdez spill. We will retain these variables.

The interval variables, excluding the four with overall (.70X) response rates greater than 13 percent (C6M is a special case), average 4.8 nonresponses. The four questions used to measure household expenses (housing, telephone, utilities, and repairs, D1C-D1F) had high-nonresponse rates. They will be jettisoned for this reason alone, but there are several other reasons for dropping them from the study, including low stationariness (high instability) over time. In 1988, we modified the question that asked for the total months employed during the past year (C6M). That question is well reported for 1989 and 1990 (panels and .90X) and will be retained.

LA. Nonresponse Problem Variables by Theoretical Contrasts

Whereas most AOSIS variables that survived the reliability and validity tests during the first two research waves produced high-response rates in 1989 and 1990, a few could not be changed so as to yield higher responses. In Table 7-2, the questions whose response rates were the lowest in the total pretest-posttest sample (.70X, N= 860) and which, regardless of modifications, did not behave better during successive administrations, are listed. One exception is A26A, measuring whether respondents thought game availability had increased or decreased over the past 5 years. Panel respondents answered at higher rates than initial respondents, apparently because of familiarity with the question. There is no evidence that the higher responses for A26A among panel members is a test artifact.

Questions A36 and D1C-D1F yielded high nonresponse rates in general and within contrasts. There is little to suggest that the context in which respondents reside (boroughs, villages with well-developed infrastructures, villages with high proportions of

Table 7-2

NONRESPONSE RATES GREATER THAN 10 PERCENT FOR QUESTIONNAIRE INSTRUMENT ITEMS NOT CORRECTED BY 1989: PRETEST-POSITEST SAMPLE (.70X) PARTITIONED BY THEORETICAL CONTRASTS (BOROUGH: NON-BOROUGH, HUB: PERIPHERY, TEST:CONTROL, NATIVE: MIXED ETHNICITY, AND COMMERCIAL FISHERYNOT COMMERCIAL FISHERY)[a]

PROBLEM VARIABLES	NONRESPONSE RATE (PERCENT) BY CONTRAST									
	Borough	Non-Borough	Hub	Periphery	Test	Control	Native	Mixed	Comm. Fishery	Not Comm. Fishery
A26A Game last five years	19.3	15.3	19.9	12.5	23.1	10.1	11.0	21.4	16.0	18.2
A31 Whoharvestedfood	62.2	57.4	60.1	58.8	59.9	58.7	56.1	62.2	52.1	64.2
A36 Asked elder for advice	23.0	15.2	16.1	21,3	17.9	20.8	18.9	16,6	19.8	18.3
D1C Annual houelng expense	18.5	24.6	22.8	20.5	21.5	23.0	24.3	19.9	25.0	19.9
Dill Annual telephone expense	14.0	12.2	12.6	13.6	14.2	9.4	16.8	10.1	12.2	13.5
DIE Annual utility expense	24.9	21.8	24.4	21.6	23.6	22.1	23.0	23.4	34,5	16.3
D1F Annual repair expense	42.1	29.3	31.8	40.1	36.1	32.4	40.9	30.8	32.0	37.1

[a] The items tabulated here are those with nonresponse rates exceeding 10 percent in the combined .70X sample that never achieved response rates as great as 90 percent. The controls exercised for race/ethnicity, marital status, and discussed in relation to Table 7-1 are exercised here as well or in several of the Schedule A or B panels. Respondent characteristics are interesting in regard to A31. Natives who have recently eaten subsistence foods tend not to answer questions seeking the source of household protein. Fifty-six percent of Native respondents did not answerA31 in the large pretest-posttest sample (.70X). This supports our suggestion that Natives decline to answer certain questions. Hence, nonresponse is not necessarily nor exclusively an artifact of administration or respondentconfusion or ambivalence.

non-Natives, and the like) unduly influences response rates. In partialling for ethnicity and whether subsistence foods contribute to the diet (yesterday and/or the day before yesterday) within the theoretical contrasts, we learned that Natives are, indeed, reluctant to answer A31, "who harvested the food you ate . . . ?" It is evident that Natives who have recently eaten subsistence foods tend not to answer questions seeking the source of household protein (56.4% of nonrespondents to A31 were Natives, and 47.6% had eaten subsistence foods 1 and/or 2 days prior to being interviewed). We are not sure why the response rate was low among Natives on this question. It could be bad form to ask such a question, or bad form to answer. It is possible that Natives anticipated some change to hunting regulations from the question. Whatever the reason(s) may be, Natives declined to answer certain questions because of cultural and linguistic conventions, as we explain above, because questions are ambiguous, or because they are indiscreet. There is no suggestion here that Natives refused to answer because of any confusion or ambivalence, nor do we have evidence that they refused to answer because of an artifact of the way in which the question was administered. The response rate on A31 is a puzzle.

IV.B. Redundant Variables and Other Problems When Response Rates Are High

Several variables generated high responses, but either because of redundancy or ambiguous construct validity, their usefulness in an indicator system is dubious. Table 7-3 lists those variables. It is evident that every variable in the table passes the response rate criterion for retention in the study, but for various reasons these variables are either threats to validity (B1O-11, and the E series), or they are redundant.

-Table 7-3

NONRESPONSE RATES FOR REDUNDANT OR FLAWED VARIABLES

NOMINAL VARIABLES	NONRESPONSE RATE (PERCENT)								
	.7AP	.8A2	.9A3	.8BP	.9B2	.0B3	,78X	.90X	.70X
B10 Struck Intentionally?	1.2	0.0	0.0	12.5	0.0	3.4	6.6	4.5	5.8
B11 Smoke cigarettes	missing data	0.0	0.0	5.7	0.0	1.1	3.1	1.9	2.7
C2 Enrolled In school	1.2	0.0	2.4	3.4	0.0	1.1	1.0	1,6	1.7
ORDINAL VARIABLES									
04 Respondent can see . . .	0.0	0.0	1.2	2.3	0.0	3.4	0,7	2.2	1.3
B5 Respondent can hear . . .	0.0	0.0	1.2	2.3	0.0	4.5	0.5	1.6	0.9
B6 Can run 100 yards	1.2	4.9	0.0	8.0	0.0	2.3	3.8	2.8	3,4
B7 Can carry 25 pounds	2.4	4.9	2.4	3.4	1.1	1.1	2.7	1.6	2.3
C3 Ability to read	3,7	1.2	0.0	4.5	1.1	4.5	4.6	3.2	4.1
C4 Ability to add numbers	4.9	2.4	1.2	4.5	0.0	4.s	5.1	2.6	4.2
E17 Satlsfled-accomplishment	2.4	1.2	1.2	6.0	1.1	2.3	3.5	2.2	3.0
E23 Usefulness of education	3.7	3.7	1.2	4.5	3.4	2.3	4.9	6.4	5,5
E31 Housing opportunities	1.2	4.9	3.7	11.4	2.3	1.1	5.8	3.8	5.1
E34 Safety of community	2.4	0.0	0.0	3.4	1.1	1.1	1.5	1,9	1,6
E35 Goods, services available	1.2	0.0	0.0	2.3	1.1	1.1	1.3	1.9	1.5
INTERVAL VARIABLES									
05 Desired Income per month	11.0	4.9	2.4	9.1	3.4	2.3	13.1	5.1	10.2

Redundancy requires some explanation. Four variables measuring self-reported aspects of the respondent's health are redundant in the sense that knowing the distribution on any of the four reduces prediction error by about 70 percent on any of the other three (B4, B5, B6, B7).[2] These and other answers to self-reported health " questions correlate highly and positively with Bl, in which R provides a self-report of his/her general health. Question Bl, whose response rate is 99.4 percent, is sufficient to represent this highly intercorrelated set.

Redundancy in C3 and C4 is similar to redundancy among the health variables. Respondents who do not read easily (C3), do not solve addition problems with ease (C4), and do not solve division problems with ease (C5); or, if they do read *Newsweek* easily, they also solve addition problems with ease, and so forth. In short, knowledge of the distribution of any one of these variables reduces prediction error for any of the others by over 85 percent. There is no good reason to retain all three of these variables in an indicator system. We will drop C3 and C4 from further analysis.

Redundancy of a different sort occurs among the Section E variables (E23-E35). Internal correlations within the set are rather high, but not so high as among the health and education variables. Peculiarly, the high correlations between Section E variables occur within the topical set but not in systematic fashion across topics (e.g., with education, occupation, or traditional activities variables). We will address the threats to validity posed by the E variables below.

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[2] Questions B4 and B5 ask whether R can see and hear (1) very poor to (5) very good; B6 and B7 ask whether R can run 100 yards and carry 25 pounds (1) not at all to (3) very easily.

II. AOSIS ITEMS REJECTED BECAUSE OF HIGH NONRESPONSE RATES

Six variables will be dropped from further consideration in an indicator system because of high rates of nonresponse. We will have occasion to discuss these variables in chapters to follow, but high-nonresponse rates, alone, are sufficient to expel them from the study.

Reject:

A31
A36
DIC
DID
DIE
DIF

CHAPTER 8
ITEM RELIABILITY WITH THEORETICAL CONTRASTS

L INTRODUCTION

Following the field research session in 1987, we employed two methods to assess the reliability of AOSIS items in addition to the analysis of nonresponse to questions: (1) multiple regression analysis on the relations between respondent characteristics (sex, age, marital status, education, residence, and income) within each set of original variables in the five AOSIS sections; and (2) confirmatory factor analysis within each section without exercising controls for respondent characteristics. Following the field research sessions in 1988 and 1989, we analyzed AOSIS intratopic relations using two algorithms in the Guttman-Lingoes similarity structure analysis series: (1) MINISSA and (2) nonmetric factor analysis.[3] Throughout this section, we refer to intratopic relations variously as "intratopic," "within sections," or "internal correlations." All variables pertaining to a topic, or belonging to a topic, such as Traditional Activities, are classified within the same Section in the questionnaire. All questions, hence variables, measuring Traditional Activities belong to Section A.[4]

The analysis of item reliability will focus on two samples: (1) the pretest sample, or all initial respondents to the AOSIS questionnaire in the random samples drawn in 1987 and 1988 (.78X); and (2) the posttest sample of initial respondents to the AOSIS

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[3] Discussions of similarity structure analysis, also known as smallest space analysis, appear in earlier reports in this series (Jorgensen and McCleary 1988: 47-51, 130-132; Jorgensen and McNabb 1989: 7-14). A comprehensive assessment of the several types of similarity structure analyses appear in Borg and Lingoes (1987). Nonmetric factor analysis is labeled SSA-3 and MINISSA is labeled SSA-I in the Guttman-Lingoes Nonmetric Program Series.

[4] The topics: A Traditional Activities, B Health, C Education and Employment, D Income, Goods& Services, and E Perceived Well-being.

questionnaire in the random samples drawn without replacement in 1989 and 1990 (.90X). Except as noted in Chapter 2, the pretest and posttest samples were drawn from the same villages in the same regions.

A major feature of our research design is testing for differences in theoretical contrasts.[5] The strongest contrasts have proven to be *Hub:Village, Mixed:Native,* and *Fish:Not Fish. The* pretest and posttest samples were divided along each of these contrasts, and also along the *Borough:Not Borough* and *Test:Control* contrasts. Within each contrast, the variables were organized by topic (sections), and internal correlation matrices were obtained. The ordinal PRE statistic, Goodman and Kruskal's γ, was used for all sections except a subset of D. The latter comprised interval variables, so Pearson's *r* was used to generate the internal correlation matrices for those subsets. Because of the space required by the internal correlation matrices (43 pages), those tables appear in Appendix A.[6]

We anticipated that differences in village infrastructure, services, public and private sector economies, and racial/ethnic composition would influence responses to many questionnaire items. In addition, we anticipated that differences between villages would be demonstrated by different responses between those villages on many AOSIS items. Unless we tested for those differences by way of theoretical contrasts, we ran the risk of pushing PRE coefficients toward zero by mixing samples of respondents that

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[5] The theoretical contrasts we employ here divide villages into Hub:Periphery, Mixed:Native, Test:Control, Borough:Not Borough, Fish:Not Fish. Although other contrasts were employed from 1987 through 1989, ordy the five listed here have been retained. The strongeat contrasts throughout the course of this inquiry have pitted Hub:Periphery, Mixed:Native, and Fish:Not Fish

[6] Table Al "Matrices of Coefficients by Theoretical Contrasts, AOSIS Questionnaire Variables, 548 Pretest Respondents (.78X), Schedules A and B (Combined), 1987-89, " and Table A2 "Matrices of Coefficients by Theoretical Contrasta, AOSIS Questionnaire Variables, 312 Posttest Respondents (.90X), Schedules A and B (Combined), 1989-90. "

should not be mixed because of underlying differences in the strata to which they belong. Those strata are our theoretical contrasts. In the simplest example, if the entire pretest sample is merged without regard to theoretical contrasts, high-income respondents in *Native* villages will be tallied with high-income respondents in *Mixed* villages in bivariate measures of visiting friends, eating meals in which subsistence foods constitute a large part, and so forth. We have learned that high earners in Native villages tend to visit more frequently and have more subsistence foods in their diets than do high earners in *Mixed* villages. In the aggregated sample of all earners in all villages, the PRE coefficients between income and, say, visiting friends and relatives will be pushed toward zero. In so doing, some interesting and important information will be lost. Testing for differences by theoretical contrasts obviates the problems inherent in mixing.

For some AOSIS items, regardless of theoretical contrasts, there are only modest differences in the direction and size (strength) of the PRE coefficients that are obtained. For other items, however, positive coefficients are obtained in one part of the contrast and negative coefficients in the other, or coefficients that are high in one part of the contrast are pushed to zero in the other part. And some variables that obtain several PRE coefficients $\geq .50$ within their section in one part of the contrast, obtain fewer high PRE coefficients in the other part of the contrast. The differences provided by the contrasts assist us in evaluating the reliability of our variables, as well as our theories, undoubtedly allowing us to retain some questions whose reliability, hence validity, would be suspect if theoretical contrasts were not made.

Our tests of item reliability within the five AOSIS Sections A through E are administered on those questions that survived the tests conducted during the first 3 years of field research (see Tables A1-A2 in Appendix A). We continue with an assessment of item reliability by theoretical contrasts because of our goal to develop an indicators system whose vulnerability to threats of invalid variables is minimal. If variables are unreliable, those variables pose threats to validity. We commence our analysis of PRE coefficients between all pairs of variables within AOSIS topics on the assumption that iterns within topics, logically and empirically, should yield high positive correlations because of the similarity of the underlying theme on which all variables in the topic are based.

At the outset of the Social Indicators project, we decided to drop any variable from the AOSIS instrument that did not correlate strongly with two or more items in its section. We established PRE coefficient values $\geq .50$ as "strong." Table 8-1 summarizes the average PRE coefficients obtained by AOSIS variables by sections and by theoretical contrasts for the pretest (.78X) and posttest (.90X) samples. Item "D (INT)" in Table 8-1 refers to interval scale variables, measured by Pearson's *r*. Variables in all other sections are ordinal and measured by Goodman and Kruskal's γ. In the pretest, both halves of the contrasts of ordinal variables in Sections B through E average 2.3 PRE coefficients per item. The meaning of this average can be understood by referring to Table 8-1. For example, in the pretest portion of that table (.78X), we see that every ordinal item in the B subsection of the *Hub* subsample has 2.3 PRE

Table 8-1

AVERAGE NUMBER OF PRE COEFFICIENTS ≥ .50 FOR VARIABLES WITHIN EACH SECTION, EXCLUDING VARIABLES THAT HAD NO PRE COEFFICIENTS ≥ .50 WITH OTHER MEMBERS OF THE SAME SECTION

SECTION	N	HUB	PERIPHERY	MIXED	NATIVE	FISH	NOT FISH
		(.78X)		(.78X)		(.78X)	
A	11	1.6	1.5	2.1	2.6	1.8	2.4
B	9	2.3	2.6	2.6	2.3	3.1	2.6
C	9	2.4	2.7	3.3	2.7	3.3	2.0
D	16	3.8	3.1	3.7	3.0	4.6	2.8
D (INT)[a]	6	0.0	2.0	1.0	2.0	1.3	1.0
E	12	3.8	2.4	3.8	3.4	2.7	2.5
		(.90)()		(.90X)		(.90X)	
A	11	2.0	2.3	2.3	2.0	2.0	2.5
B	9	3.7	3.3	2.3	2.5	2.0	3.7
C	13	5.8	5.0	4.5	6.0	4.0	6.7
D	16	5.4	4.5	7.9	3.7	5.9	4.0
D (INT)[a]	6	1.5	1.5	1.7	1.3	2.0	1.0
E	12	1.5	2.1	1.1	2.5	2.2	1.2

'Refers to interval scale variables.

coefficients ≥ .50 with the other items in Section B, and those same items have 2.6 PRE coefficients ≥ .50 with other B items in the *Periphery* subsample. The Traditional Activities (Section A) items do not yield so consistently high averages as the other sets in the pretest sample.

The table demonstrates that within every contrast, one part yields a higher average of strong PRE coefficients than the other. Among the 30 contrasts of ordinal variables (A through E with the exception of D [INT]), the large villages with well-developed infrastructures, public sectors, and private sectors (*Hub/Mixed/Fish*) yield the higher averages 18 times, and the small villages with less developed infrastructures, private sectors, and public sectors (*Periphery/Native/Not Fish*) yield higher averages 12 times. In the majority of contrasts, the large villages produce the highest averages on variables pertaining to education and employment, and to income, goods, and services (Sections C-and D). The smaller villages yield the higher averages on traditional activities (Section A). Because each theoretical contrast aligns villages and respondents somewhat differently, no two contrasts, such as *Hub:Periphery* and *Mixed:Native* yield identical averages within a sample (pretest-posttest), over all sections (A through E), or even within a section.

The interval variables in Section D yield low average PRE coefficients throughout both samples and all contrasts. Measures of household income (D2), investment in personal businesses (D3, D3A), and income required (D4) survive these tests, but only D2 performs well consistently. In revising A26B, D3, and D3A, we eliminate the

ambiguity that had hindered these items, thereby increasing the responses to them in the last two research waves.

Table 8-2 lists all variables for both samples that had fewer than two PRE coefficients ≥ .50 in both halves of each contrast. There are more poor-performing items in the pretest sample than the posttest, the latter benefiting from a few corrections to the way in which questions were revised (particularly A26B, D3, D3A).

Items that obtained fewer than two PRE coefficients ≥ .50 on both halves of all contrasts have low intratopic reliability and will be dropped from the sample and from consideration in the AOSIS indicator system. These are A35, A36, B5, B11, D1C-D1F, D5, D6, D9, E1O, and E35. We will retain E50 for the reasons offered in the preceding chapter.

Upon determining variables that did not have PRE coefficients equal to or greater than 50 percent with two members of its section, we next sought to specify variables that have two or more PRE coefficients equal to or greater than 50 percent in one-half of a theoretical contrast, but not the other. Table 8-3 provides results for the pretest sample (.78X). Some differences are obtained that suggest similarities in the *Hub/Mixed/Fish* contrasts, and distinguish them from the *Periphery/Native/Not Fish* contrasts. Coefficients equal to or greater than 50 percent for the self-reported health variables (ability to run and ability to chew hard foods), education variables (school enrollment), employment variables (months employed and months employed away from the home village), and participation in Native corporation election variables are more

Table 8-2

AOSIS VARIABLES WITH FEWER THAN TWO PRE'S ≥ .50 ON BOTH HALVES OF A THEORETICAL CONTRAST, HUB: PERIPHERY, MIXED: NATIVE, FISH: NOT FISH, PRETEST (.78X) AND POSTTEST (.90X) SAMPLES

HUB: PERIPHERY	MIXED:NATIVE	FISH:NOT FISH	LESS THAN TWO PRE'S ≥.50 ON BOTH HALVES OF ALL CONTRASTS
(.78X)	(.78X)	(.78X)	(.78X)
A26B		A26B	
A32		A32	
A33			
A34		A34	
A35	A35	A35	A35
A38			
B5	B5	B5	B5
B10		B1o	
B11	B11	B11	B11
D1A-D1F	DIA-DIF	D1A-D1F	D1A-D1F
		D2	
		D3	
D3A	D3A	D3A	
		D5	
D6	D6	D6	D6
D9	D9	D9	D9
D12	D12		
E10	E10	Elo	E10
		E29	
E50	E50	E50	E50
(.90X)	(.90X)	(.90X)	(.90X)
A31	A31		
A35	A35		
A36	A36	A36	A36
	B1		
	B5		
	B10	B10	
B11	B11	Bi 1	B11
D1A-D1F	D1B-D1F	D1C-D1F	D1C-D1F
		D2	
D5	D5	D5	D5
	E12	El 2	
E17			
	E29		
	E30		
E31			
E35	E35	E35	E35
		E46	
		E50	

Table 8-3

COMPARISONS WITHIN THEORETICAL CONTRASTS IN WHICH ONE PART OF THE CONTRAST HAS TWO OR MORE PREYS ≥ .50 THAN DOES THE OTHER PART OF THE CONTRAST, TOTAL AOSIS VARIABLES, PRETEST SAMPLE (.78X), 1987-8

HUB	PERIPHERY	MIXED	NATIVE	FISH	NOT FISH
[.78X)		(.78X)		(.78X)	
		A31	A26A		A26A
		A34	A32		A28
B1	*B8		A38		A38
B6	B9	B6	B9	B8	B7
	*C2	B10			
	*C12	C2	C12M	C2	c l
		C6N		C3	
		C12		C6M	
				C6N	
				C12	
D11	D3			C12M	
D22	D10	D11	D3	D l l	
D23	D19	D22	D20	D12	
D24	D20	D23	D28	D19	
D26	D28	D24 ,	D29	D20	
	D2	D26	D29A	D21	
	D4		D5	D22	
	D5			D29	
E12	E23			D4	
E17		E12	E23	E12	E30
E29		E29	E41	*E23	
E30			E46		
E34					
E35					

items common to Hub/Mixed/Fish: B6, B8, C2, C8N, C12, D11, D22, D23, D26, E12, E29 (2 or more PREs ≥.50).

Items common to Periphery/Native/Not Fish: A26A, A38, B9, D3, D5, D20, D28, E23 (2 or more PREs ≥.50).

items common to Mixed/Fish that appear in Periphery B8, C2, C12.

Items common to Periphery/Native that appear in Fish: E23.

numerous for respondents in the larger villages with greater infrastructure than the smaller villages. Coefficients equal to or greater than 50 percent are more numerous for *Periphery/Native/Not Fish* contrasts for traditional activities variables (amount of game available for harvest and speaking Native language at home), a negative self-reported health variable (days not able to work because of sickness or injury), and the ethnicity variable (Native or non-Native). It is apparent, however, that the three sets of theoretical contrasts do not align the respondents in identical fashions because a few variables that yield the greatest number of PRE coefficients, $\geq$ .50 in the larger and more complexly organized parts of the two of the contrasts, yield a greater number of high PRE coefficients in the smaller and less complex part of the third theoretical contrast.

Table 8-4 tallies the differences between the contrasts for the posttest sample (.90X). Some variables were added and others were revised following the 1987 and 1988 research waves, as we have noted above. Thus, the pretest and posttest sampling traits are not identical. In the posttest sample, only the variables measuring months employed and participating in Native corporation elections (C6N, D22, D23) are similar to the pretest sample in producing the greatest number of PRE coefficients equal to or greater than 50 percent among the *Hub/Mixed/Fish* contrasts, and only E23 (feelings about the education children receive) does likewise for the *Periphery/Native/Not Fish* contrasts. Nevertheless, the posttest sample demonstrates similarities with the pretest sample in some related measures. For example, the *Hub/Mixed/Fish* contrasts yield the greatest number of high PRE coefficients with several household expense, household comfort,

Table 8-4

COMPARISONS WITHIN THEORETICAL CONTRASTS IN WHICH ONE PART OF THE CONTRAST HAS TWO OR MORE PRE'S ≥ .50 THAN DOES THE OTHER PART OF THE CONTRAST, TOTAL AOSIS VARIABLES, POSTTEST SAMPLE (.90)(), 1989-90

HUB	PERIPHERY	MIXED	NATIVE	FISH	NOT FISH
(.90X)		(.90X)		(.90X)	
A32	A28	A33	A34	A31	A28
	A34		B3	A32	A33
B5	B1o		B9		B1
					B3
					B6
					B7
					B8
					B9
C3	C2	c l	C2		c l
C5		C4	C12M		C2
C6		C6M			C3
C6M		C6N			C4
C6N		C12C			C5
					C6
					*C6M
					*C6N
					C12C
					C12M
D9	D3	D3		D3	D9
D1O	D24	D6		D6	*D19
D12	D26	D12		D11	*D20
D19	D29A	D19		D22	
D20		D20		D23	
D21		D21		D29	
D22		D22		DIA-B	
D23		D23		D4	
D2		D24			
		D26			
		D28			
		D29			
		D29A			
		DIA			
		D4			
	E23	E31	E10	E10	E41
	E30		E23	E17	
	E41		E34		
	E46		E41		
	E50		E46		
			E50		

items common to Hub/Mixed/Fish: A32, C6M, C6N, DIA, D3, D6, D12, D19, D20, D21, D22, D23, D29 (2 or more PREs ≥.50).

Items common to Periphery/Native/Not Fish: A28, A34, C2, C12M, E23, E41, E46, E50 (2 or more PREs ≥ .50).

Items common to Hub/Mixed that also occur in Not Fish: C6M, C6N, D19, D20.

economic, and voting measures, while the Periphery/Native/Not *Fish* contrasts produce the greatest number of high PRE scores with variables measuring traditional activities.

Questions D5, which asks how much income the respondent thinks is "about right" for his/her family, and D6, which asks whether the respondent thinks his/her family is "better off" than it was 5 years earlier, are erratic, hence puzzling. Question D5 passed the "intratopic contrast" test in the pretest sample, but not the posttest. It is the reverse for D6. Therefore, we reaffirm our decision to jettison them from the sample.

Inspection of the intratopic correlation matrices' uncovered several differences between pairs in the three most discriminating theoretical contrasts. First we focused on the number of high PRE coefficients obtained in one part of the contrast but not the other. It became evident that *Hub/Mixed/Fish* contrasts were similar on many kinds of variables, and that *Periphery/Native/Not Fish* contrasts were similar on many kinds of variables. The differences between the combined sets (large, complex villages versus small and simpler villages) prompted us to test for significance of differences within contrasts.

We did not include the *Borough:Not Borough* and *Test:Control* contrasts in Tables 8-1 through 8-4. Several villages that were not organized into boroughs when we commenced the study became so organized in 1989 or 1990, In so doing, the contrast failed to reproduce differences in recent years that appeared in earlier research waves. The *Test:Control* contrast lumps some small and less complex villages with larger ones, thereby reducing differences. We have reintroduced the *Borough* and *Test* contrasts

'See Tables Al and A2 in Appendix A.

below in our tests of the significance of differences of variables that appeared problematic because they did not behave systematically across the various theoretical contrasts. In order to more accurately discriminate between Native and non-Native respondents, we have replaced the *Mixed:Native* contrast with a contrast of *Native* and *non-Native* respondents. The Native:non-Native contrasts are located in the column designated *Race.*

Table 8-5 demonstrates the differences for several variables between pairs within theoretical contrasts. The variables tested here were selected because PRE coefficients for those variables were positive in one-half of a contrast, but negative in the other half. The tests suggest whether the sizes of the differences between the pairs of coefficients are significant. Among the questions measuring traditional activities (Section A), fewer of the differences within contrasts are significant than are not significant (11 to 8). In the *Native:Non-Native* and *Fish:Not Fish* contrasts, the *Native* and *Not Fish* (respondents from villages in which commercial fishing is absent or provides less than 40% of total commercial income in the village) respondents correlated positively with the subsistence variables but negatively with the variables that measure some customs, such as the recency in which advice was sought from an elder. It was the reverse for *Non-Native* respondents and respondents in *Commercial Fishing* villages. Among those variables, only **A32** (number of meals eaten with relatives outside one's own home during the past **2** days) and **A38** (frequency with which Native language is spoken at home) demonstrate

Table 8-5

. TESTS OF SIGNIFICANCE OF DIFFERENCES, SCHEDULES A AND B PRETEST (.78X) BY TOPIC CATEGORY AND THEORETICAL CONTRAST, AOSIS QUESTIONNAIRE INSTRUMENT[a]

Topic and Variables	Borough	Hub	Race	Test	Fish
A: Traditional Activities					
A26A Game available last five years	missing	missing	missing	missing	missing
A26B Fish available last five years	missing	missing	missing	missing	missing
A32 Meals with relatives from other households	NS	NS	.01	NS	, 0 6
A34 Made arts& crafts last year	NS	NS	NS	.06	NS
A35 Last time heard elder tell story	missing	missing	missing	missing	missing
A36 Last time asked elder for advice	.06	NS	NS	NS	NS
A38 Speak Native language athome	.06	.02	.00	.05	.00
B: Health					
B5 Respondent can hear . . .	NS	.01	.00	.01	NS
610 Struck intentionally?	NS	NS	NS	NS	NS
611 Smoke cigarettes?	NS	.09	.01	N S	NS
C: Education and Employment					
C2 Enrolled in school	NS	NS	.05	.02	NS
C6M Months employed last year	.05	NS	NS	NS	NS
C6N Employed last year	NS	NS	.01	NS	.01
Cl 2 Worked away from village last year	.01	.00	.00	.02	NS
C12M Time spent working outside village	.00	NS	NS	NS	.00

" These tests evaluate variables that were determined to be problematic on the basis of correlations within topic categories and across theoretical contrasts. Matrices of Goodman and Kruskal Gammas (γ) and Pearson's r'a (depending on variable scale assumptions) were compared so as to detect discrepancies across theoretical contrasts. For Instance, a matrix correlating variables for hub communities was compared to a matrix correlating variables for periphery communities. and variables showing chancres of direction (differences of sign) in their correlations across contrasts were selected 'or tests. Hence," variable wfth a positive correlation in one matrix in-da negative correlation In the companion-matrix-Is a candidate for the tests shown here. These comparisons were undertaken for all theoretical contrasts for each topic category (A, B, C, D, and E). The teat for significance of difference between proportions Is employed for nominal data: Kolmogorov-Smirnov test for two Independent samples Is used for ordinal data; and the t-test Is used for Interval variables. The variable scales are as follows. Nominal: A34, B1O, B11, C2, C6N, C12, D3, D1O, D11, D26, D28, D29, E50. Ordinal: A26A, A26B, A32, A34, A35, A36, A38, B5, D6, D9, D12, D26, E1O, E12, E23, E29, E31, E41. Interval: C6M, C12M, DIA. D1C, D1D, D1F, D3A. D26 Is evaluated as both a nominal and an ordinal variable. Variables that are missing fOr a data set are Identified. Borough represents the Borough: Non Borough contrast; Hub signifies the Hub: Periphery contrast; Race designates the Native: Non-NaOve contrast; Teet represents the Test:Control contrast; and Fish signifies the Commercial Fishery:Noncommercial Fishery contrast, probability (P) values less than 10 In 100 are expressed.

Table 8-5
(Continued)

Topic and Variables	Borough	Hub	Race	Test	Fish
D: income. Goods, end Services					
DIA Annual heating expense	NS	.00	.00	NS	.06
D1C Annual housing expense	NS	.00	.00	.00	.00
DID Annual telephone expense	NS	NS	NS	NS	.00
D1F Annual repair expense	NS	NS	NS	NS	.00
D3 Commercial fisherman or own business	.01	NS	NS	.04	.00
D3A Annual business investment	NS	NS	NS	NS	.00
D6 Is household better off . . .	NS	.00	. 0 0	NS	NS
D9 Ability to get good drinking water	NS	.05	NS	NS	NS
D1O What happens to waste water	.00	.00	.00	NS	.00
D11 Toilet facilities	.00	.00	.00	NS	.00
D12 Difficulty In heating house	NS	NS	.00	NS	NS
D26 Where did you live before moving here	.07, NS	.00, .00	.00, .00	.08, NS	.00, .00
D28 Race of respondent	.09	.00	.00	.01	.00
D29 Currently married	NS	NS	NS	NS	.06
E: Perceived Well-being					
E1O (Ability to speak Native language)	NS	NS	NS	NS	.00
E12 (Social ties to other communities)	NS	NS	NS	NS	NS
E23 (Usefulness of child's education)	NS	NS	NS	NS	NS
E29 (Feelings about current income)	NS	NS	.00	NS	NS
E31 (Opportunities for good housing)	NS	NS	NS	NS	NS
E41 (Condition of land and water in community)	NS	N S	N S	NS	N S
E50 (Will oil search create more jobs)	.00	NS	NS	NS	NS

significant differences. Responses on A38 are so marked throughout the sample that significant differences are obtained for the pairs in every contrast.

The importance of racial/ethnic differences is obvious among health variables (Section B); education and employment (Section C); and income, goods, and services (Section D). The greater the representation of non-Natives in the contrast, the greater the number of significant differences between the pairs within the contrast. Among the 36 variables, 16 significant differences obtain within the *Native:Non-Native* contrast, 16 within the *Fish:Not Fish* contrast, 12 within the *Hub:Periphery* contrast, 11 within the *Borough:Not Borough* contrast, and 8 within the *Test: Control* contrast. Race/ethnicity is important, reflecting education; occupation; control over resources, including capital; and, almost surely, access to power (decision-making authority).

Hub, Test, Non-Natives, and *Fish* report greater school enrollments *(Commercial Fish* villages excepted), more months of employment, and employment for greater lengths of time outside the village than do their opposites. In addition, *Non-Natives* and persons residing in *Hubs* and *Fish* villages also report significantly higher heating expenses and financial improvements to their households (over the past 5 years) than do their opposites. These last differences are not detected in the *Test:Control* and *Borough:Not Borough* contrasts because of the manner in which small and large villages are classified in these divisions--the two are commingled, although not in identical fashions.

The differences discovered by theoretical contrasts of the pretest sample data support our underlying assumptions, to wit: that populations in regional centers would

have greater employment, more education, greater access to capital, and greater proportion of non-Natives than would smaller, outlying hamlets, and that those differences would be reflected over a wide ariety of measures. We also anticipated differences between villages affected by OCS activities and those that are not, villages with strong commercial bases in the private sector, particularly fishing, and those that do not have these bases. Although the villages classified as *Borough* have grown considerably, the recent incorporation of many small Native villages into boroughs has reduced, but not wiped out, all significant differences with respondents in villages not organized into boroughs: public works (good water, sewage systems), private-sector investment, and employment remained significantly higher in *Boroughs* than *Not Boroughs,* even after we reclassified the pretest sample to accommodate post-1988 changes.

Table 8-6 lists the differences between theoretical contrasts over the same 36 variables assessed in the pretest sample (Table 8-5). The number of significant differences between *Natives:Non-Natives* increases to 25 (from 16 previously), between *Fish:Not Fish* to 20 (from 16), between *Hub:Periphery* to 16 (from 12), and hold with little or no change between *Borough:Not Borough,* and *Test: Control* contrasts. The differences--focusing as they do on traditional activities; employment; and income, goods, and services--accentuate the differences most likely triggered by the economic downturn in Alaskan villages. The downturn was occasioned by falling oil prices, falling State revenues, and dwindling commercial-fish harvests. The *Native:Non-Native* differences are pronounced regardless of the village strata that are measured.

TABLE 8-6

TESTS OF SIGNIFICANCE OF DIFFERENCES, SCHEDULES A AND B, POSTTEST (.90X) BY TOPIC CATEGORY AND THEORETICAL CONTRAST, AOSIS QUESTIONNAIRE INSTRUMENT[a]

Topic and Variables	Borough	H u b	Race	Test	Fish
A: Traditional Activities					
A26A Game available last five years	NS	NS	NS	NS	NS
A26B Fish available last five years	NS	NS	.00	NS	.00
A32 Meals with relatives from other households	NS	.03	.00	NS	.00
A34 Made arts& crafts last year	NS	NS	.07	NS	.09
A35 Last time heard elder tell story	.00	NS	NS	NS	NS
A36 Last time asked elder for advice	NS	NS	.01	NS	NS
A38 Speak Native language at home	NS	.00	.00	.04	.00
B: Health					
B5 Respondent can hear . . .	NS	NS	NS	NS	NS
B1O Struck intentionally?	NS	NS	NS	NS	NS
611 Smoke cigarettes?	NS	NS	.01	NS	.08
C: Education and Employment					
C2 Enrolled in school	.05	NS	.05	NS	NS
C6M Months employed last year	NS	.00	.00	.02	.01
C6N Employed last year	.09	NS	.03	NS	.01
C12 Worked away from village last year	NS	.06	.03	NS	.01
C12M Time spent working outside village	NS	NS	NS	NS	.02

. These tests evaluate variables that were determined to be problematic on the basis of correlations within topic categories and across theoretical contrasts. Matrices of Goodman and Kruskal Gammas γ and Pearson's r's depending on variable scale assumptions were compared so as to detect discrepancies across theoretical contrasts. For Instance, a matrix correlating variables for hub communities was compared to a matrix correlating variables for periphery communities, and variables showing changes of direction differences of sign In thek correlations across contrasts were selected for tests. Hence, a variable with a positive correlation In one matrix and a negative correlation In the companion matrix Is a candidate for the tests shown here. These comparisons were undertaken for all theoretical contrasts for each topic category A, B, C, D, and E. The teet for significance of difference between proportions Is employed for nominal data; Kolmogorov-Smirnov test for two Independent samples Is used for ordinal data; and the t-test Is used for Interval variables. The variable scales areas follows. Nominal: A34, B1O, fill, C2, C6N, C12, D3, D1O, D11, D26, D28, D29, E50. Ordinal: A26A, A26B, A32, A34, A35, A36, A36, 65.06. D9, D12, D26, E1O, E12, E23, E29, E31, E41. Interval: C6M, C12M, DIA, D1C, DID, D1F, D3A. Question D26 Is evaluated as bOth a nominal and an ordinal variable. Variables that are missing for a data set are Identified. Borough represents the Borough: Non-Borough contrast; Hub signifies the Hub:Periphery contrast; Race designates the Native:Non-Native contrast; Test represents the Test:Control contrast; and Fish signifies the Commercial FIsheryNon-Commercial Fishery contrast. Probability (P) values less than 10 In 100 are expressed.

Table 8-6
(Continued)

Topic and Variables	Borough	Hub	Race	Test	Fish
D: Income, Goods, and Services					
DIA Annual heating expense	.00	.00	.00	NS	.00
DIC Annual housing expense	NS	.00	.00	.00	NS
DID Annual telephone expense	.07	.01	.04	NS	.05
DIF Annual repair expense	NS	.01	.01	NS	NS
D3 Commercial fisherman or own business	.08	NS	.04	.06	.00
D3A Annual business investment	.02	NS	.00	.06	.00
D6 Is household better off...	NS	NS	NS	NS	NS
D9 Ability to get good drinking water	NS	NS	NS	NS	NS
D1O What happens to waste water	.00	.00	.00	NS	.00
DII Toilet facilities	.00	.00	.00	NS	.00
D12 Difficulty in heating house	NS	.04	.00	NS	.00
D26 Where did you live before moving here	.00	.00	.00	NS, NS	.00, .00
D28 Race of respondent	NS	.00	.00	.00	.00
D29 Currently married	NS	NS	.01	NS	.07
E: Perceived Well-being					
El O Ability to speak Native language	NS	.00	.00	.01	.05
E12 Social ties to other communities	NS	NS	NS	NS	NS
E23 Usefulness of child's education	NS	.01	.07	.09	NS
E29 Feelings about current income	NS	NS	NS	NS	NS
E31 Opportunities for good housing	NS	NS	NS	NS	NS
E41 Condition of land and water in community	NS	.00	.00	.01	NS
E50 Will oil search create more jobs	.05	NS	NS	NS	NS

These results suggest that the pretest results are reliable and not sampling artifacts.

II. CURSORY ASSESSMENT OF INTRATOPIC RELATIONS

Throughout the theoretical contrasts, the majority of variables within each section of each contrast reduced error by 50 percent or more in their predictions of the member variables of the section to which they belonged. In earlier assessments of intratopic reliability, we employed Guttman-Lingoes similarity structure analyses[8] to provide solutions for the relations among the variables. Because 50 solutions would be required to demonstrate the intratopic relations for each section (example, Section A Traditional Activities) on each of 10 contrasts, we forego employing those solutions here. The relations within topics are consistent throughout the contrasts although in some instances PRE coefficients are lower on some variables in one-half of the contrast than in the other, or signs are reversed on several variables between the two halves of a contrast. They tend, nevertheless, to produce similarity structures with only modest differences.

Analysis of the intratopic relations for our purposes can be accomplished by inspection of the several matrices. Questions A28, A30, A32, A33, and A38 have greater intratopic reliability than do the other variables in Section A for the pretest, posttest, and total (combined) samples. If we know that subsistence food was a large (or not a large) part of a meal that R's (respondents) ate yesterday (A28), we can reduce prediction error by about 80 percent in guessing whether subsistence foods constituted large parts of the meals they ate the day before yesterday (A30), by about 75 percent in

[8]Discussions of similarity structure analysis, also known as smallest space analysis, appear in earlier reports in this series (Jorgensen and McCleary 1988 :47-51, 130-132; Jorgensen and McNabb 1989:7-14). A comprehensive assessment of the several types of similarity structure analyses appear in Borg and Lingoes (1987). Nonmetric factor analysis is labeled SSA-3 and MINISSA is labeled SSA-I in the Guttman-Lingoes Nonmetric Program Series.

guessing whether subsistence foods constituted a large percentage of R's diets in the previous year (A33), by about 60 percent in guessing whether R's speak Native languages at home a majority of the time, and by about 50 percent in guessing whether they have eaten frequent meals with relatives who reside in households other than R's (A32).

Health, Section B of the AOSIS questionnaire, assesses personal reports of respondent health, including how a person evaluates his/her health in general, whether he/she suffers from illness or injury, arid whether that person can engage in several basic physical skills.[9] Six of the eight variables are highly reliable. Two items, B5 (hearing) and B1O (intentionally injured by other), have low reliability and are candidates for deletion.

The structure of the relations among health variables is obvious from the matrices. Knowledge of R's ability to carry 25 pounds (B7) reduces error by about 80 percent in predicting R's ability to run 100 yards (B6), by about 65 percent in predicting R's ability to bite and chew hard foods (B8), by about 60 percent in predicting whether R has sustained a long-standing illness or injury (B3), and also by about 60 percent in predicting how R evaluates his/her health in general (B1). It also allows us to reduce error by about 60 percent in predicting whether R has suffered a debilitating injury or illness in the previous 2 weeks (B9). Indeed, R's who recently have sustained injuries or suffered illnesses report negative relations with all health variables except B1O (the

[9] *Variable definition codes:* **B1 In general, how would you describe your health 1. very poor, 2. poor, 3. fair, 4. good, 5. very good? B3 How much do you suffer from long standing illness, the effects of an injury, or a disability 1. a lot, 2. some, 3. not at all? B5 How clearly can you normally hear a conversation 1. not at all, 2. somewhat, 3. very? B6 How easily can you run at least 100 yards 1. not at all, 2. some difficulty, 3. no difficulty? B7 How easily can you carry 2S pounds 30 feet 1. not at all, 2. some difficulty, 3. very easily? B8 How easily can you chew and bite hard foods 1. not at aU, etc., B9 Within the past two weeks were there times when you could not do some of your everyday activities due to an illness or injury O. no, 1. yea? B1O During the past twelve months, has anyone intentionally struck you or physically hurt you in some way O. no, 1. yes?**

measure of intentional infliction of injury). Question B1O, however, has a poor response rate throughout all waves of our inquiry. The question is, undoubtedly, sensitive--a question respondents do not want to answer. Question B11, which asks whether R's smoke cigarettes, produces so few PRE coefficients above .20 that it appears to be useless as a potential indicator. As for B5, its PRE scores with other variables in Section B are low. It is a well-known fact of auditory physiology that hearing acuity diminishes with age, but in these data, correlation of age and self-reported ability to hear yields a near zero coefficient. Question B5 and B1O will be excluded.

Education and Employment are measured in Section C through variables addressing education completed, ability to perform basic reading and arithmetic skills, months employed in R's home village as well as in more distant locales, employment skills, and preferred occupation.[10] With the exception of C6M and C12M (incompletely reported for .78X), every variable in the set obtains PRE scores of .50 or higher with at least three variables. This is a highly reliable set as measured by the intratopic test.

If we know R's ability to solve division problems (C5), we can reduce our prediction error by about 80 percent in guessing R's ability to solve addition problems (C4), by about 75 percent in guessing R's ability to read *Newsweek* (C3), by about 60 percent in guessing whether R is enrolled in school (C2), by about 55 percent in guessing the years of school R has completed (Cl), and by about 50 percent in guessing whether

[10] *Variable definition* codes: c 1 How many years of education do you have 1. none, 2. 1-8, 3. 9-12, 4. college, 5. higher? C2 Are You currently enrolled in school O. no, 1. yes? C3 How easily can you read a magazine like *Newsweek* or *Reader's Digest* 1. great difficulty, 2. some difficulty, 3. easily? C4 How easily can you add a list of fifteen prices 1. great difficulty. ..? C5 How easily could you figure *out the answer* to a problem like 583 divided by 17, using a pencil and paper 1. great difficulty. ..? C6 Last year, during which months did you work for pay for two weeks or more 1. Jan... 12. December? C12 Did you work away from the community last year O. no, 1. yes? C 12M How many months did you work 2 weeka or more away from home last year 1. Jan... 12. Dec.?

R worked away from the community last year (C12). In the posttest sample, knowledge of R's education and ability to solve addition and division problems are reasonably good predictors (55-75% range) of amount of employment and amount of employment away from the village (C6 series and C12).

As for the problems of reducing error in predicting employment, in 1989 to 1990 the amount of education and ability to read, add, and divide predicted total months in which R worked for pay in the larger and more complex villages (C6M), but not the smaller, simpler ones. Yet those same variables accounted for less than 50 percent of error among the same contrasts for C12M (total months R worked away from his/her home village for pay for 2 weeks or more).

We have learned that months of employment in village Alaska is a function of the highly seasonal nature of some aspects of the economy, particularly the fishing industry. The 1989 to 1990 correlations with C12M suggest that the Exxon Valdez oil spill created employment opportunities for persons, regardless of education, reading, and math skills.

The Income, Goods, and Services variables of Section D are divided into two subsets on the basis of each variable's scale assumption (nominal/ordinal, interval). The distribution of scores in the D interval matrices suggest neither normal distributions or rectilinear relations, so we do not assume normality for interval variables.

The ordinal variables in the income, goods, and services sector demonstrate very high intratopic reliability by contrasts, yet considerable differences in strength and direction of PRE coefficients between pairs in those contrasts. The structure of the most reliable ordinal variables is simple and intuitive. If you know R's type toilet

(D11), prediction error can be reduced by about 80 percent in guessing the form of household water disposal (DIO). Although the following does not hold for every contrast for the pretest and posttest samples, if you also know whether R is a commercial fisherman or owns his/her own business (D3), you will be more often right than wrong in predicting R's ethnicity (D28), region of birth (D24), prior region of residence (D26), infrastructure in the community in which R resides (D9-11), and participation in several kinds of elections (D23-24). One way to understand these relations is that R's who reside in villages with flush or chemical toilets reside in villages in which culinary water is piped away (a water/sewer system). Those R's tended to be born outside the local community and region and have migrated to the community from some place outside the region. If honey buckets are in use, culinary water empties on the ground, and R was born nearby and has resided in the community or nearby for a large portion of his/her life.

If we have knowledge of R's race/ethnicity (D28), we can reduce our prediction error by much more than half in guessing the race of R's spouse (D29A), whether R voted in the most recent Native corporation election (D23), whether R voted in the most recent village corporation election (D22), and whether R voted in the most recent tribal council election (D21). If we know whether R voted in the most recent city election (D19), we can reduce our prediction error by about half in guessing whether R voted in the most recent Statewide election (D20), and in the most recent tribal council election (D21). If persons own businesses or are commercial fisherman, they are apt not to be Natives, or to vote in elections of any kind. The voting measures appear to introduce

redundancy: if respondents vote, they tend to vote in all forms of elections for which they are franchised. There is no good evidence to eliminate any of these variables, except that several may be redundant (or predicted from other variables in the same set).

Interval level variables in Section D section comprise questions about expenses in maintaining a house, income (actual, necessary for maintenance, desired), business expenses, size of house, attendance at public meetings, years resident in the community, and travel away from the community.[11] Annual housing cost (D1C), telephone (DID), utility (DIE), and house repair costs (D IF) account for so little variance that there is no good reason to retain them in the study. The costs series (D1A-D1G) are very much affected by regional policies and income levels (of households). Only the annual heating (D IA) and electricity (D1B) costs appear to provide reasonably consistent measures across most contrasts although neither one accounts for much variance in other variables in Section D.

Income (D2) is the key variable among the interval-level variables in Section D. If income increases, the smallest amount of income R thinks R's household requires

[11]Variable definition codes: D1A Annual heating cost 1. <$250, 2. <$750, 3. <$1500, 4. <$2250, 5. <$3000, 6.> $3000? D1B Annual electricity cost 1. <$100,2. <$500,3. <$750,4. <$1000,5. <$1500,6. >$1500? DIC Annual housing cost 1. <$1800,2. <$4800,3. <$10800,4. <$10800,5. >$10800? DID Annual telephone cost 1. <$480,2.<$1080,3. <$1800, 4. >$1800? D1E Annual utility cost 1. <$240,2. <$480,3.<$720,4.<$1080,5. >$1080? D1F Annual repair cost 1.<$360,2. <$840,3. <$1800, 4. >$1800? D2 Annual household income 1.<$5000,2. <$10000,3. <$20000, 4. <$30000,5. <$40000,6. <$50000,7. >$50000? D3A How much of your total household income last year went toward commercial fishing or business expenses 1. none, 2. <$2000,3. <$5000,4. >$5000? D5 How much income per month do you think would be right for your family 1. <$500,2. <$1000, 3. <$1500, 4. <$2000,5. <$2500, 6. 2$2500? D8 How many rooms do you have in your house #? D16 During the last month, how many times did you attend a public meeting 1. none, 2. 1-2 times, 3. 3+ times? D25 How *many years* have you lived in the community 1. year or less, 2. 2-5 yews, 3.6-10 yeare? D27 During the last year, how many times have you left your community and visited relatives or friends 1. none, 2. 1-2 times, 3. >2 times?

increases (D4). The income variable accounts for more variation outside Section D than within it.

Section E variables seek to measure Perceived Well-being through affective attitudes. Each poses a question about how the respondent feels on a certain issue, and offers three choices for the answer: whether the respondent is 1. not satisfied, 2. somewhat satisfied, or 3. completely satisfied. In the original AOSIS questionnaire, there were 55 questions in Section E. Twelve of those 55 survived the reliability, sensitivity, and validity tests to which they were subjected following the first and second field sessions. Those twelve have been revised, however, reducing the choices among answers from five states of non-satisfaction/satisfaction to three.[12]

Among the twelve affective variables (E50 is cognitive), only E1O (ability to speak R's Native language), and E35 (feelings about goods and services available in the community) fail to reduce error by 50 percent in two or more variables in both halves of all contrasts. The internal relations in E have presented problems throughout every wave of our research. Intratopic reliability is high during the pretest waves (.78X), but much lower in the posttest (.90X) (see Table 8-l). Table 8-2 presents three sets of theoretical contrasts (*Hub:Periphery, Mixed:Native, Fish:Not Fish*) and divides each into

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[12] *Variable definition codes:* **E1O How do you feel about your ability to speak (Native language) 1. not satisfied, 2. somewhat satisfied, 3. completely satisfied? E12 How do you feel about the social ties you have to people in other communities l...? E17 How do you feel about what you are accomplishing in life l...? E23 And how do you feel about the usefulness of the education children in this community are getting these days l...? E29 How do you feel about the income you (and your family) have l...? E30 How do you feel about your standard of fiing-the things you have like housing, snow machines, furniture, television, and the like l...? E31 How do you feel about the opportunity you have to live in good housing that you can afford l...? E34 How safe do you feel in this community l...? E35 How do you feel about the goods and services you get in your community-like food, appliances, and clothing l...? E41 How do you feel about the amount of local influence over the condition of the land and water near your community l...? E45 How do you feel about the opportunities children have to grow up to be adults that you can be proud of l...? E46 How do you feel about the opportunities children have to *learn* subsistence skills l...? E50 If the federal government lets oil companies search for oif in the [basin, sound, bay, etc.], do you think that the search for oil will create more jobs for residents of the region O. no, 1. yes?**

pretest (.78X) and posttest (.90X) samples, producing six sets of theoretical contrasts. Inspection of Table 8-2 demonstrates that seven[13] of the twelve Section E variables do not yield PRE scores $\geq .50$ on both halves of one theoretical contrast, two of the seven do not do so on two sets of theoretical contrasts, another two do not do so on three sets of theoretical contrasts, and one does not do so on four sets of theoretical contrasts.

Given the erratic performance of the Section E variables in the theoretical contrasts and on the basis of our tests for stability of Section E items following the second wave of research, we suspect that most of the E variables will prove to be unreliable and unstable over time.

[13] **"Questions E1O, E12, E29, E31, E35, E46, E50.**

III. AOSIS ITEMS REJECTED BECAUSE OF LOW INTRATOPIC RELIABILITY

Twelve variables will be dropped from further consideration in developing an AOSIS indicator system because of low intratopic reliability.

Reject:

A35
A36
B5
B11
DIC
DID
DIE
DIF
D5
D6
E1O
E35

CHAPTER 9
STABILITY AND CHANGE OVER-TIME

I. INTRODUCTION

Panels nested within our Schedules A and B pretest-posttest design increase the statistical power of this study in incremental fashion over-time. Three waves of interviews were administered to Panel A respondents (1987, 1988, 1989) and Panel B respondents (1988, 1989, 1990). We demonstrate in Chapter 6 that threats to reliability and internal validity decreased from 1987 to 1988 and from 1988 through 1990. 'he benefits from panel analysis are demonstrated in the results from the second wave of research conducted in 1988 (Chapter 6).

"Stability," or the "stationariness" of an item, is a measure of the relationship of a variable to itself "over time." The relationship of a variable to itself over time is measured in three temporal periods (or temporal states): t_1 initial, t_2 transitional, t_3 change. An item must correlate $\geq$ +.50 at t_1-t_2 (r_{12}), at t_2-t_3 (r_{23}), and at t_1-t_3 (r_{13}) to satisfy the requirements for stationariness and for potential incorporation into the AOSIS indicator system. It is necessary to compare measures at three points in time to validly attribute change in an indicator system to some specific factor. Our research design is built upon this requirement.

Stability of items is necessary to overcome threats to AOSIS's internal validity posed by history, testing artifacts (or test effects), and regression. History and regression are threats to validity only if an indicator is unstable, or "nonstationary." We will refer to stability and stationariness as synonymous.

History is defined in the introductory chapter as an observed effect among interdependent respondents in a set of villages or one village. That is to say, respondents may report similar practices, or ideas, or objects because they share a common linguistic and cultural history. We sought to control for history through measures of the Native language areas in which respondents reside. This control was fraught with problems. We also sought to control for history through tests of kinship relations among sample respondents.[14]

We add to the definition of history here. History over time is also a threat when an event occurs between the pretest and posttest and when that event is not a feature of the research interest (Cook and Campbell 1979:5 1). Thus, in addition to long-term relations which can cause persons to be similar (interdependence), events peculiar to a place, or a group of related places, can exercise influences that are not felt elsewhere in the sample.

Testing Effect is a threat when an effect is a consequence of prior knowledge of and response to questions. So responses to item 1 at t_1 may influence responses to the same item by the same respondent at t_2.

Regression (statistical regression) is a threat, say, when respondents respond to high ranks on ordinal questions in one wave of research (t,) and lower ranks on the same questions in a subsequent wave of research (t_2). Contrariwise, persons who respond to lower ranks during the first wave respond to higher ranks in a subsequent wave.

[14] Genealogies were collected from each KIP respondent to determine whether that respondent was related to any other respondent selected for our samples. We tested responses over a set of items of persons known to be related, against responses on the same items by respondents unrelated to those respondents related by kinship or to one enother. If the related respondenta resided in several communities, they were compared with respondents to whom they were not related in those same communities. Otherwise, releted (kinship network) and unrelated respondents were from the same community.

Regression of this type, a statistical phenomenon, is not easily attributed to any known factor, but regression is always to the population mean of a group (Cook and Campbell 1979:53).[15]

To measure stability over time we have correlated the initial responses of the Schedule A panel in 1987 (.7AP) with the responses of those same panel members to the same questions in 1988 (.8A2) and also with the responses of those same panel members in 1989 (.9A3). The responses of the panel members in 1988 (.8A2) are also correlated with the responses of the same panel members in 1989 (.9A3). Thus, responses in each wave are correlated with every other wave. This design provides measures of stationariness between successive years and over 2 years (the first and third wave [.7AP/.9A3] in which the middle wave [.8A2] is skipped).

Inasmuch as the B panel was created in 1988, the three waves for that panel are 1988 (.8BP), 1989 (.9B2), and 1990 (.0B3). I refer to measures of longitudinal correlation, reliability, and stability over the 3-year period for each panel as over-time measures.

Staggering the startup dates for the panels provided the opportunity to control for interpanel stability (.8A2 * .8BP; .9A3 * .9B2). This test allows us to determine if there are historical differences between the schedules (A and B). Controls are also exercised by comparing the entire pretest Schedule A sample (.7A) against the third wave of the A panel (.9A3), and the entire pretest Schedule B sample (.8B) against the third wave of

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[15] See the discussion of statistical regression as a threat to validity in Chapter 6 .I.D., note 4, above.

* = Correlation coefficients obtained between the same respondents over the same items at two points in tire% it also referra to tests of significance of differences between the same panels and difference panels at the same points in time.

the B panel (.0B3). These controls for stability suggest whether the panel has been influenced by testing and whether test artifacts have appeared. Testing Effect, however, is analyzed with different tests and more fully in the following chapter.

Figure 2-1, the sampling design, is reintroduced for quick comprehension of the relations among parts of the design for tests of stability (and below, for testing effect). Our pretest-posttest nested panel design provides a temporal measure of the stability of AOSIS items (see Sullivan and Feldman 1979:56-66). With little or no random measurement error, repeated applications of a measurement should produce identical or nearly identical results. Across the identical group of respondents measured in two or three waves, each 1 year apart, the correlation for each should be high and positive (e.g., .7AP * .8A2; .8A2 * .9A3; .8BP * .9B2; .9B2 * .0B3). The correlations between waves administered 2 years apart should also be positive and high (e.g., .7AP * .9A3; .8BP * .0B3), but not necessarily as high as the correlations obtained between measures taken annually (l-year separation only). Random error will reduce over-time correspondence for each individual item in the panel. Whereas the absence of high correlation is taken as an indication of unreliability (a distinct threat to internal validity), some change can be expected. As a goal, we seek to develop a parsimonious set of indicators that are sensitive to OCS and non-OCS factors in causing change.

Braund et al. (1985) created AOSIS variables for MMS which they thought would be sensitive to change. Thus, if any substantive change takes place, the correlation between that variable, as measured by the response to the first, second, and third waves,

	A SCHEDULE			B SCHEDULE		
YEAR	QI	QI	KI	QI	QI	KI
1990 w				0B3 (93) ↑	OBD (144) [*POST*]	
1989 W	9A3 (92) t	9AD (168) [*POST*]	KIA2 (62) t	9B2 (101) t		KIB2 (46) t
1988 W	8A2 (114) t		t ↑ ↑	8B (206) [*PRE*]		KIB (60)
1987 W	7A (342) [*PRE*]		KIA (112)			
	QI	QI	KI	QI	QI	KI

FIGURE 2-1. SOCIAL INDICATORS PROJECT SOLOMON FOUR GROUP SAMPLING DESIGN.

Legend: QI = questionnaire investigator AOSIS interviews, KI = key investigator protocol interviews, A = Schedule A sample (North Slope, NANA, Calista, and Aleutian-Pribilof Islands), and B = Schedule B sample (Bering Straits, Bristol Bay, and Kodiak) .

Initial Interviews and the Year Administered (Questionnaire) 7A, 8B[PRETESTS]; 9AD, OBD [POSTTESTS]: The number before the letter represents the year the initial interview was administered (e.g., 7 represents 1987); D following the number and A or B represent second seta of initial interviews we refer to as poattesta (new samples in each schedule drawn without replacement of original interviewees into the sampling universe).

Initial Interviews (Protocol) KIA, KIB: KI representa the key informant protocol (or KIP); A or B represents the schedule.

Panels: P = panel. Random samples drawn from initial QI [PRE 7A, 8B] samples in each schedule are reinterviewed. The first waves, selected from the initial interview samples, are designated 7AP and 8BP but are not distinguished from the pretest sample in the figure. There are two waves of reinterviews for the QI panels for A and B. There also is one wave of reinterviews for the entire KI samples for A and B. A subset of the KI panels for Schedules A end B (see KIAB above) is reinterviewed in one wave, and a smaller panel of Kodiak villages alone ia reinterviewed a second time (KIAB2) (see the analysis of Schedule C in a separate report). The numbers 2, 3 following the panel's year (#) and schedule (alpha) represent the wave of the reinterview (e.g., 8A2 = 1988, Schedule A questionnaire panel, second wave).

will underestimate the true reliability of the measure.[16] And contrariwise, if true stability is sought, the responses to the variable at each wave must be perfectly reliable. If we were restricted to a pretest-posttest measure at two points in time, the reliability coefficient R_{12}[17] is confounded. That problem is rectified with the introduction of a third wave for the B as well as the A panel. Reliability for each panel (three waves) is measured from three correlations r_{12}, r_{23}, r_{13} by way of $r_{13} = a' \cdot r_{12}/a^2 \cdot r_{23}/a^2 = r_{12}r_{23}/a^2$. Since the reliability coefficient is the square of *a*, reliability is measured by $r_{x'x'} = r_{12}r_{23}/r_{13}$. From this equation, which provides an estimate of reliabilities across measurements, we can obtain estimates of true stability of each variable over time, since in the presence of unreliability the observed correlation is an underestimate of stability. Over-time stability is obtained by dividing the square of the over-time correlation for 1987/89 (and 1988/90) by the product of the longitudinal correlations for 1987/88 and 1988/89 (and 1988/89 and 1989/90): $s_{13} = r^2_{13}/r_{12}r_{23}$.

"True" stability requires that we make several assumptions, a crucial one being that reliabilities are equal across measurements. A comparison of the third wave of Schedule B (data collected during the winter of 1990) allows us to assess similarities and differences between the two panels over time. The comparison of the two panels does not obviate a comprehensive analysis of unequal reliabilities, which requires separate error estimates for each variable, each wave (see Wiley and Wiley [1971]). Other

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[16] Substantive change necessarily alters a variable. That is, if persons earn less at t_1 than at t_2, the PRE coefficient for income for those two periods will not be unity. The closer the PRE score is to zero, the less reliable the measure. Yet, if change has occurred, we expect the reliability coefficient to be less than unity for measures of the same item and the same respondent at two points in time. *Thus, a coefficient less then unity,* assuming no random error, is valid in this example; hence, reliability is underestimated. In addition, of course, reliability coefficients are influenced by random error.

[17] The reliability coefficient is usually symbolized with a^2, but I have chosen to use $R_{x'x'}$ here.

assumptions are that the sample is random, the respondents are identical for each wave of the panel, and that testing effect is not significant. The panels were selected at random from the samples drawn for the initial interviews, but because of problems in locating some Panel A respondents in either the second or third waves, or because some villages were not or could not be visited in either the second or third waves, 37 respondents were dropped from the calculation of between-year coefficients as well as the over-time reliability and stability coefficients (R_{13}, S_{13}), reducing the panel to N=82. Similarly, 16 respondents were dropped from between-year and the over-time reliability and stability coefficients for the B panel, reducing that panel to N= 85.

We were concerned about attrition in the panels, so as to assess differences between the original panels for A and B and the panels employed here to estimate reliability and stability of AOSIS items, several items were correlated for the largest samples of identical respondents that could be drawn for each pair of waves (1987/88, 1988/89, 1987/89, 1989/90, 1988/90). Differences in the pairs of longitudinal correlations were minimal: for nominal variables, the average differences among ϕ coefficients was .01 (comparisons of 30 correlations [10 variables] for 1987/88, 1988/89, 1989/90, 1987/89, 1988/90). Average differences among 39 pairs of I' coefficients for 13 variables over the 3 years was .015. Average differences among 24 pairs of r coefficients for 8 variables over the 3 years was .0015. Here, then, with appropriate caveats, we employ Heise's (1971) test for true stability in which the assumption of equal reliabilities is made. In order to assess the reliability and stability of the ordinal variables, r's (in addition to I's) were calculated for the over-time correlations.

Controls for stability are exercised for the longitudinal correlations for Panel A (1987/89) and Panel B (1988/90) (r_{ts}) in three measures: (1) tests of the significance of difference between responses of the entire Pretest Schedule A sample for 1987 (.7A) and the responses of the third wave of the Schedule A panel for 1989 (.9A3); (2) similar tests between responses of the entire Pretest Schedule B sample for 1988 (.8B) and the responses of the third wave of the Schedule B panel for 1990 (.0B3); and (3) tests of the significance of differences between the third wave of Panel A (.9A3) and the second wave of Panel B (.9B2). The tests of the A and B panels for 1989 are of reinterview respondents. The rationale for including this set of measures as a control is that several AOSIS questions that survived the tests for reliability, validity, sensitivity, and ambiguity in 1987 were revised prior to the 1988 research wave. Several more were revised following the 1988 wave. Inspection of the tests of differences between the panels for 1989 (both comprise reinterview respondents) allows us to assess whether the differences we see between the A and B panels for 1989, after completing revisions to the questions and administering identical questions to all panel respondents, produces between-year(s) and over-time similarities (or differences) between the panels that are fortuitous or are the consequences of specifiable factors.

Table 9-1 assesses the over-time reliability and stability of 78 AOSIS variables. The table is divided into four parts assessing (A) nominal, (B) ordinal, (C) interval, and (D) redundant or flawed variables. A problem frequently encountered among the items

Table 9-l(A)

LONGITUDINAL CORRELATIONS. RELIABILITY AND STABILITY COEFFICIENTS WITH CONTROLS FOR TESTING ARTIFACTS, PANELS FOR SCHEDULES A AND B, PRETEST AND POSTTEST SAMPLES FOR SCHEDULES A AND B, QUESTIONNAIRE INSTRUMENT, 1987-1990'

NOMINAL VARIABLES (ϕ)	STABILITY TESTS: A PANEL 87/88 .7AP*.8A2	A PANEL 88/89 .8A2*.9A3	A PANEL 87/89 .7AP*.9A3	A PANEL REL R_{tt}	A PANEL STA S_{tt}	B PANEL 88/89 .8BP*.9B2	B PANEL 89/90 .9B2*.0B3	B PANEL 88/90 .8BP*.0B3	B PANEL REL R_{tt}	B PANEL STA S_{tt}	CONTROLS FOR STABILITY: A IN/PAN 87/89 .7A*.9A3	A&B PANS 1989 .9A3*.9B2	B IN/PAN 88/90 .8B*.0B3
A28 Subsistence food yesterday	.26	.58	.28	(.55)	[.52]	.36	.30	.47	(.23)	[2.04]	NS	NS	NS
A30 Subsistence food day before	.55	.56	.43	(.72)	[.60]	.31	.30	.31	(3.5)	[.81]	NS	NS	NS
A34 Made arts/crafts last year	.64	.62	.46	(.86)	[.53]	.61	.52	.44	(.72)	[.59]	.02	.03	NS
89 I.capacitated past two weeks	.27	.21	.08	(.71]	[.11)	.11	.21	.18	(.13)	[1.47]	.07	NS	NS
C6N Employedlast year	missing data	missing data	.53	NA	NA	.53	.65	.43	(.81)	[.53]	NS	NS	NS
C12 Work out of village last year	.40	.62	.49	(.51)	[.97]	.3s	.41	.42	(.31)	[1.51]	NS	NS	.097
03 commercial fish/ownbusns	.60	.78	.71	(.66)	[1.07]	.61	.73	.60	(.74)	[.80]	NS	.03	NS
019 Vote city council election	.58	.53	.63	(.49)	[1.29]	1.00	1.00	1.s0	(1.00)	[1.00]	NS	Ns	NS
D20 Vote statewide election	.70	.58	.48	(.83)	[.57]	.74	.62	.s3	(.72)	[.88]	NS	.01	NS
022 Vote village corpelection	.42	.31	.33	[.39)	[.84]	.30	.45	.30	(.35)	[1.09]	NS	.0s	NS
023 Vote region corp election	.42	.66	.4s	[.52)	[.84]	.36	.53	33	(.57)	[.57]	NS	NS	.07
D28 Pace of respondent	.91	.95	.99	[.94)	[1.13]	.71	.77	.85	(.64)	[1.32]	NS	NS	NS
D29 Currently married	.92	.84	.136	(.90)	[.96]	07	.79	.87	(.79)	[1.09]	NS	NS	NS
029A Race of spouse	.95	.87	.94	(.08)	[1.06]	.93	1.00	.95	(.99)	[1.29]	NS	.04	NS
E50 Will oilsearchcreate jobs	.70	.62	.59	(.74)	[.80]	.31	.36	.33	(.34)	[.95]	NS	NS	NS
RSEX Sex of respondent	.98	.96	.93	(.95)	[.99]	1.00	.62	.81	(1.00]	[.80]	NS	NS	NS
HTYPE Household type	missing data	missing data	missing data	NA		.56	.71	.49	(.64)	[.24]	.00	NS	NS

" Longitudinal correlations represent three within Panel A and two within Panel B. .7AP •.8A2 represents the correlation r_{tt} (first and second year), .8A2 * .9A3 = r_{tt} (second and third year), and .7AP •.9A3 = r_{tt} (first and third year). The reliability for each variable over 3 years is expressed as $R_{tt} = r_{1,2}r_{2,3}/r_{1,3}$. Stability coefficients are expressed as $S_{tt} = r'_{1,2}/r_{1,2}r_{2,3}$. Reliability and stability for nominal variables are derived from Pearson's Phi (ϕ) [Cramer's V for D24, D26]. All ϕ values in the longitudinal correlations are significant at <,301. Controls for stability are tested with the significance of difference of proportions. NS = Not Significant. Probability (P) values less than 10 in 100 are expressed.

Table 9-l(B)

LONGITUDINAL CORRELATIONS, RELIABILITY AND STABILITY COEFFICIENTS WITH CONTROLS FOR TESTING ARTIFACTS (CONTINUED)[b]

ORDINAL VARIABLES (Γ)	STABILITY TESTS: A PANEL 87/88 .7AP*.8A2	A PANEL 88/89 .8A2*.9A3	A PANEL 87/89 .7AP*.9A3	A PANEL REL R_{rr}	A PANEL STA S_{rr}	B PANEL 88/89 .8BP*.9B2	B PANEL 89/90 .9s2'.003	B PANEL 88/90 .8BP*.0B3	B PANEL REL R_{rr}	B PANEL STA S_{rr}	CONTROLS FOR STABILITY: A IN/PAN 87/89 .7A*.9A3	A&B PANS 1989 .9A3*.9B2	B IN/PAN 88/90 .8B*.0B3
A26A Game last fin. years	missing data	.11	missing dots	NA	NA	.17	.54	.10	(1.02)	[.03]	missing data	.00	NS
A26B Fish last five years	missing data	.42	missing data	NA	NA	.23	,26	.54	(.01)	[5.75]	missing data	.07	NS
A31 Who harvested food	missing data	.39	missing data	NA	NA	.25	.3D	.49	(.18)	[1.93]	missing data	NS	NS
A32 Eat with rels/other HHs	.69	.50	.56	(.62)	[.73]	.42	.42	.25	(.60)	[.26]	Ns	NS	NS
A33 Percent meat/fish in diet	.76	.65	.s3	(.89)	[.53]	.64	.60	.6D	(s9)	[.66]	NS	NS	NS
A35 Heard elder tell story	missing data	.48	missing data	NA	NA	.60	,43	.32	(.s1)	[.53]	missing data	NS	NS
A36 Asked elder for advice	.00	.18	,05	(.03)	[2.13]	.49	.53	.62	(.36)	[1.19]	.08	NS	.00
A38 Use native language home	.93	.53	.39	(.80)	[.91]	.80	.08	.91	. (.71)	[1.13]	NS	.0D3	Ns
B1 Describe your health	.74	.45	.37	(.90)	[.22]	.74	,55	.72	(.72)	[.21]	NS	NS	NS
03 Suffer from illness/disability	.78	.65	.59	(.90)	[.71]	.55	.01	.47	(.86]	[.47]	NS	NS	NS
66 Bite and chew hard food	.65	.91	.87	(.68)	[1.53]	.87	.89	.84	(.77)	[.67]	NS	NS	NS
C1 Years education	.97	.99	.97	(.93)	[.94]	.99	.95	.94	(.96]	[.50]	NS	NS	NS
C5 Solve division problems	.63	.38	.70	(.34)	[3.60]	.78	.89	.88	(.65)	[1.02]	NS	NS	NS
D6 Is household better off now	.60	.28	.36	(.47)	[.97]	.55	.52	.41	(.55)	[.53]	Ns	NS	NS
D9 Access to drinking water	.77	.55	.20	(.48)	[.40]	.s0	.70	.6s	(.65)	[.s1]	Ns	NS	NS
D10 Waste water removal	.6S	.67	.55	(.47)	[.48]	.84	.83	.39	(1,39)	[.22]	.01	.02	.029
D12 Difficulty in heating house	.76	.82	.57	(.57)	[.66)	,s6	.75	.69	(.51)	[1.03]	.00	NS	NS
024 Community in which born	.96	.83	.82	(.89)	[.85]	.s0	.79	.86	(.74)	[1.05]	.001	NS	NS
026 Previous residence	.59	.62	.s3	(.69)	[.77]	.79	.79	,79	(.65)	[1.01]	.02	NS	NS
E10 Ability in native language	.91	.86	.90	(.87)	[.94]	.85	.90	.71	(.95)	[.57]	NS	NS	.01
E12 Social ties other comm	.88	.33	.52	(.56)	[.90]	,45	.58	,22	(s4)	[.37]	.00	NS	.00
E29 Feelings current income	.67	.71	.56	(.50)	[.69]	.62	.59	,57	(.49)	[.60]	.03	NS	.04
E30 Feelings standard of living	.05	.68	.0$3	(.85)	[.90]	.22	.30	.31	(.10)	[1.96]	.00	.07	.00
E41 Local influence land/water	.87	.64	.39	(.85)	[.25]	.10	.36	.18	(.22)	[.40]	,03	NS	.02
E45 Can children mature...	.71	.56	.70	(.57)	[1.64]	-.27	.35	.05	(1,79)	[.004]	,03	NS	.01
E46 Can children learn subsist	,69	.45	,65	(.40)	[1.58]	.45	.44	.05	(.97]	[.07]	.07	NS	.00

*Stability and reliability coefficients for the ordinal variables are derived from Pearson's r. Longitudinal PRE coefficients for ordinal variables are Goodman and Kruskal Gammas (Γ). All Γ values are significant at <.001 (using significance determined from Kendall's r.). Controls for stability are tested with the Kolmogorov-Smirnov Two Sample Test (significance of maximum extreme difference between two independent samples). NS = Not Significant Probability (P) values leas than 10 in 100 are expressed.

Table 9-l(C)

LONGITUDINAL CORRELATIONS, RELIABILITY AND STABILITY COEFFICIENTS WITH CONTROLS FOR TESTING ARTIFACTS (CONTINUED}

INTERVAL VARIABLES (r)	STABILITY TESTS: A PANEL 87/88 .7 AP*.8A2	A PANEL 88/89 .8A2*.9A3	A PANEL 87/89 .7AP*.9A3	A PANEL REL R_{tt}	A PANEL STA S_{tt}	B PANEL 88/89 .8BP*.9B2	B PANEL 89/90 .9B2*.0B3	B PANEL 88/90 .8 BP*.0B3	B PANEL REL R_{tt}	B PANEL STA S_{tt}	CONTROLS FOR STABILITY: A IN/PAN 87/89 .7A*.9A3	A&B PANS 1989 .9A3*.9B2	B IN/PAN 88/90 .8B*.0B3
C6M Total months empl last year	missing data	missing data	.40	NA	NA	.30	.66	.24	(.23)	[2.04]	.00	NS	.00
C12M Time empl outside village	mk.sing data	.66	.00	NA	NA	.17	.46	.06	(1.33)	[.04]	.00	NS	.00
DIA Annual heating expense	.42	.49	.s4	(.38)	[1.39]	.36	.36	.40	(.36)	[1.11]	NS	NS	.09
D1B Annual electricity expense	.41	.45	,42	(.44]	[.98]	.64	.69	.49	(.92]	[.51]	.002	NS	NS
D1C Annual ho.slug expense	.69	.61	.54	(. 70]	[.69]	,60	.76	,64	(.95)	[.67]	,03	NS	NS
DID Annual telephone expense	.39	.45	.57	(.31 I	[1.85]	,30	.59	.s2	(..s2)	[1.23]	NS	.00	NS
D1E Annual utility expense	,70	.63	.65	(67 I	(.%]	.29	-.01	19	(.03)	(6.25]	NS	NS	NS
D1F Annual repair expense	.24	.60	,52	(.28)	[1.87]	.43	.08	.31	(.11)	[2.93]	.01	NS	NS
D2 Annual household income	,77	.75	.69	(.04]	[.83]	.72	,76	.60	[.69)	[1.15]	NS	NS	NS
D3A And invst in comm fish/bus	missing data	-.20	missing data	NA	NA	.60	.72	.42	[1.01)	[.42]	missing data	NS	NS
734 Smallest income needed	.56	.35	.33	(.59)	[.54]	.70	.56	.51	(.77)	[. 62]	NS	NS	NS
D O Rooms in house	.7.4	.68	.50	(67)	[.67]	.58	.66	.6 I	[.72]	[.81]	.00	NS	.01
D13 Days visiting frnd/rel	.30	.34	.32	(.40]	[.79]	.25	.46	,41	(.04)	[1.59]	NS	NS	NS
D16 No. pubmeetslast month	.54	.s4	,40	(.60)	[79]	.42	.49	.44	(.44)	[.95]	NS	NS	NS
D25 Years resided in villagn	.73	.43	,51	(.s2]	[.93]	,70	7 s	.50	(1.03)	[,49)	NS	.00	NS
D27 Visit in other community	.72	.6 I	.57	(.77)	[.74]	.34	.50	.30	[.s6)	[.s4)	NS	NS	.04
RAGE Respondent's age	.99	.6S	.85	(.99)	[.66]	.92	,70	.65	(.99)	[.66]	NS	.04	.02
HSIZE Household size	.80	.80	.74	(.86)	[.86]	.78	.61	.67	(.94)	[.71]	.00	NS	NS

" Longitudinal correlations are Pearson's r. All f values are significant at <.001 although several are below .s0. Controls for stability are tested with the t-test for two independent samples, NS - Not Significant. Probability (P) values less then 10 In 100 are expressed. 04er.time reliability and stability coefficients are derived from Pearson's r (see fn on preceding page of this table).

Table 9-1(D)

REDUNDANT OR FLAWED VARIABLES, LONGITUDINAL CORREI.ATIONS, RELIABILITY AND STABILITY COEFFICIENTS WITH CONTROLS FOR TESTING ARTIFACTS, PANELS FOR SCHEDULES A AND B, PRETEST AND POSTTEST SAMPLES FOR SCHEDULES A AND B, QUESTIONNA1RE INSTRUMENT, 1987-1990

		STABILITY TESTS										CONTROLS FOR STABILITY		
		A PANEL					B PANEL					A IN/PAN	A&B PANS	B IN/PAN
NOMINAL VARIABLES (ϕ)		87/88 .7AP*.8A2	88/89 .8A2*.9A3	87/89 .7AP*.9A3	REL R_{rr}	STA S_{rr}	88/89 .8BP*.9B2	89/90 .9B2*.0B3	88/90 .8BP*.0B3	REL R_{rr}	STA S_{rr}	87/89 .7A*.9A3	1989 .9A3*.9B2	88/90 .8 B*.0B3
310	Struck intentionally?	,37	.46	. 3 7	(,46)	[.81]	.05	.62	.10	(.30]	[.33]	NS	NS	NS
911	Smoke cigarettes	missing data	.73	missing data	NA	NA	.74	.84	.65	(1.48)	[.60]	NS	NS	NS
C2	Enrolled in school	.18	.2s	.29	(.16)	[1.s8]	. 1 0	.13	.07	(.19)	[.30]	NS	NS	NS
ORDINAL VARIABLES (r)														
		.62	.83	.84	(.30)	[1.09]	.28	.71	.49	(.13)	[1.48]	NS	NS	NS
B4	Respondent can see . .	.28	.42	.73	(.06)	[8.00]	.79	.97	.78	(.84)	[.49]	NS	Ns	NS
B5	Respondent can hear . . .	.82	.89	.80	(.71)	[.85]	.02	.74	.73	(.6S)	[.83]	NS	NS	NS
B6	Can run 100 yards	.89	.27	.65	(.45)	[1.50]	.87	.79	. 7 1	(.73)	[.61]	NS	NS	34s
07	Can carry 25 pounds	.4s	.90	.07	(91)	[.71]	.93	.96	.94	(.7s)	[.87]	NS	NS	NS
C3	Ability to read	,40	-.01	.33	(.26)	[2.08]	,66	.91,	.83	(.7s)	[.74]	NS	NS	NS
C4	Ability to add numbers	.64	.69	.76	(.27)	[1.60]	.58	.74	.59	(.50)	[.60]	.00	Ns	.30
E17	Satisfied-accomplishment	.77	.63	.6!	(47)	[.60]	.42	.60	.27	(89)	[.21]	Ns	Ns	.s41
E23	Usefulness of education	.89	.64	.50	(.00)	[.37]	.46	.67	.72	(.34)	[1.27]	.00	NS	.00
E31	Housing opportunities	,79	.73	.71	(.s6)	[.60]	.21	.53	.23	(.22)	[.40]	.00	NS	.00
E34	Safety of community	.67	.79	.36	(.36)	[.s7]	.62	,61	,73	(.39)	[1.26]	.02	NS	NS
E3S	Goods, services available													
INTERVAL VARIABLES (r)		.71	.23	.41	(.40)	[1.05]	.69	.49	.42	(.81)	[.53]	" NS	N S	NS
D5	Desired income per month													

in the AOSIS data set is that the longitudinal correlation between the first wave (.7AP) and the third wave (.9A3) (and between .8BP * .0B3) is higher than the correlations between adjacent waves. We scrutinized every response for every respondent in the 1987 Schedule A sample seven times (more for some respondents whose responses in successive waves caused special problems--such as those for whom a sex or race change was reported between waves). We scrutinized the 1988 Schedule B sample in similar fashion. We are convinced that with the exception of the attitudinal questions, higher correlations are obtained for the longer time period (2-year intervals) than for the shorter ones (l-year intervals) because of problems in the original questionnaire, not all of which were solved when we embarked on the second research wave in 1988.

It is important, of course, that 462 of the 468 longitudinal correlations are positive. The over-time reliability and stability coefficients are very sensitive to fluctuations in the strengths of correlations within panels between intervals, 1 year and over time. If $r_{12} \geq r_{23}$, and $r_{23} \geq r_{13}$, reliability and stationariness will be high (between + .50 and + 1.00).[18] Interpretations of reliability measures are obvious: low values repeated longitudinally and over time can yield high reliability coefficients, just as do high values repeated longitudinally and over time. Stability is a more complex measure. The proportional differences in the three sets of correlations affect stability. The possible deviations from the model above in which stationariness will exceed 1.00 (or in some instances plunge toward 0.00) are: (1) strengths of longitudinal and over-time correlations fluctuate between intervals such that r_{12}) r_{23}, and r_{13}) r_{23}, and, in addition, the

[18] For example, A Panel, AOSIS item D24, Where you were born, r_{12} .76, r_{23} .70, r_{13} .70, R_{12} .76, S_{12} .92. Reliability end stability are high.

proportional differences of those correlations are great; (2) strengths of longitudinal and over-time correlations fluctuate so that r_{12} (r_{23}, and r_{23}) r_{13}, and, in addition, the proportional differences of those correlations are great; and (3) r_{12} (r_{23} (r_{13}, and the proportional differences of those correlations are great. If the correlations are high among the three coefficients and the proportional differences are modest, the stability coefficients will be close to unity (below or above 1.0). Items that demonstrate low reliability (R_{13} (.50) and poor stability (S_{13} { .50 or) 1.25) are candidates for rejection from the study, but they are also candidates for comparison with the same item on the opposite panel if the panels yield different refinability and stability coefficients on that item. Discrepancies between the coefficients on some items for the A and B panels, and for the A and B schedules, maybe products of history.

Discrepancies in the coefficients for the same items between the two panels (and schedules) may be an unintended consequence of our research design. We divided the seven Alaska Native regions in our sample into two schedules, as described in Chapter 2, initiating research in Schedule A in 1987 and Schedule B in 1988. Schedule B encompasses two regions in which commercial fishing dominates local industry and in which non-Natives comprise large proportions of the largest villages (Bristol Bay and Kodiak) and one region in which respondents in several villages fish commercially (Bering Straits). In addition, Bristol Bay and Kodiak are located in more southerly and ice-free latitudes than all but the Aleutian-Pribilof Region in Schedule A (which shares with Bristol Bay and Kodiak the features of commercial-fishing dominance in local industry and non-Native majorities in several large villages). The differences between

coefficients on the same items for the A and B samples may be products of these differences of history. That is to say, the differences may reflect ethnic/racial, economic, and environmental factors that distinguish Schedule A respondents from Schedule B respondents on some variables. Our theoretical contrasts will provide a means to evaluate hypotheses about ethnic/racial and/or economic influences if such hypotheses are generated from inspecting Table 9-1.

The majority of longitudinal coefficients (82 of 117) are between .50 and 1.00 (another eight are between .44 and .49), and the large majority of stability coefficients (78 of 115) are between .50 and 1.25. Twenty-four items have low reliability and quixotic stability. Every item does not behave similarly on the two panels.

II. STABILITY AMONG THE NOMINAL VARIABLES

The nominal variables in Table 9-1, for the most part, have adequate reliability and stability. Several pose problems either because of differences in the magnitudes of coefficients or differences in reliability and stability between the A and B panels. Let us address the problem variables. Question A28 asks a respondent whether subsistence food was a large part of any of the meals eaten the day before the questionnaire was administered. We did not have a systematic way to ask the question until 1988, when the interviewers explained that “subsistence food’ meant items “you don’t buy in the store.” The low reliability of the item is in part explained by construct validity problems in 1987 that were rectified after 1988. But in addition, the low reliability for A28 suggests that the amounts of subsistence food eaten increased for many respondents in 1989 and 1990,

reflecting, we think, the downturn in the economy. The differences between Schedules A and B are not significant for A28 or A30.

Question A34 asks whether the respondent engaged in arts or crafts production in the previous year. This measure has high reliability and adequate stability. Whereas we could expect arts and crafts production to increase during economic downturns, sales also decrease during economic downturns, eventually affecting art production. We had greater difficulty locating Panel A respondents for reinterviews in 1988 and 1989 than in locating Panel B respondents in 1989 and 1990. It is apparent that the reinterviewees in both panels either had stable employment or had no opportunities to out-migrate during the worsening conditions in most villages from 1988 through 1990. There is a significant difference between all pretest Schedule A respondents in 1987 (.7A) and the panel respondents in 1989 (.9A3) in arts and crafts production, and between A and B panel respondents in 1989. In the more affluent commercial-fishing villages, even in the presence of the Exxon Valdez spill, the difference in arts and crafts production between pretest and panel respondents in 1988 and 1990 was not significant. We suspect that A34 will work best in some of the models in which theoretical contrasts are made.

Question B9 asks whether the respondent has been incapacitated in the past 2 weeks. Although B9 yields low longitudinal and over-time correlations, and low reliability and stability coefficients, we do not expect high correlations except in the presence of protracted infirmities and protracted good health free from injuries. So, B9 reflects short-term changes. As such, it is interesting in the same way that A34 is interesting: there is a significant difference between the pretest Schedule A sample

(.7A) and the third wave of the A panel (.9A3), suggesting that the A panel reinterviewees comprise persons who did not out-migrate. There is no difference between the A and B panel respondents for 1989, and no difference between the pretest Schedule B sample for 1988 and the third wave of the B panel.

Question C6N asks whether respondents were employed during the previous year. The fluctuation in the B panel reflects the increase in employment during 1989. This is almost certainly a consequence of the Exxon Valdez oil spill and its direct and ripple effects on employment.

Question C12 asks whether respondents worked away from their home villages during the past year. Reliability is very low and the over-time coefficient is unstable for B respondents, but adequate for A respondents. The fluctuation in the B data (there is a significant difference between the pretest sample and the third wave panel responses) is occasioned by the Exxon Valdez spill (again, direct and indirect consequences for employment away from the village).

Question D3 asks whether a respondent fishes commercially, or owns his/her own business. During 1987 and 1988, QI interviewers frequently interpreted the question as "are you a commercial fisherman?" omitting the part about "do you own your own business?" This problem was discovered and rectified, in part because persons who responded "no" to D3 responded positively to D3A, in which they were asked how much of their household income was allocated to their commercial-fishing pursuits or personal businesses during the past year. The reliability and true stability are not accurately measured for D3 although they are adequate for both the A and B schedules. The

significant difference between the A and B panels for 1989 reflects the preponderance of commercial-fishing villages in the Schedule B sample.

Question D19 measures whether the respondent voted in the last city council election. The longitudinal and over-time correlations are positive, and the reliability and stability coefficients are adequate. Some villages held elections between 1988 and 1989, probably affecting the over-time measures for the A panel.

Question D20 asks whether the respondent voted in the last Statewide election. Reliability and stability are adequate for both schedules although the significant differences between the A and B panel respondents for 1989 reflect the greater exercise of franchise by Schedule A respondents. The average A panel member has resided in his/her region and village longer than has the average B panel member. Voting in Statewide elections (D20) can be influenced by a person's perceptions of issues and candidates, but can also be influenced by whether a respondent is a newcomer, where that respondent comes from, and how long that person intends to stay (D24, D25, D26). We hypothesize that permanence of place, in particular, contributes to different rates of participation. Questions D24 and D26, then, should be good predictors of participation in elections if we are correct.

Questions D21 and D22 ask whether the respondent voted in the last village and regional corporation elections. Reliability and stability are adequate but require some discussion. In 1987 and 1988, QI interviewers often recorded "no," rather than "not applicable" for non-Native respondents. By the time we were able to correct the way in which the question was asked, error had been introduced into the data. I do not here

attribute the relatively low reliability (in the .50's) and fluctuating stability (in the B panel) solely to interviewing problems. Stability must also have been affected by economic issues that influenced Native voters.

Question D28, race of respondent, should have perfect reliability and perfect stability inasmuch as a respondent's race doesn't change between research waves. Yet we obtained reliability and stability problems for both panels. The stability problem in the A panel is attributable to a sole error: one QI interviewer recorded a respondent during the second wave as belonging to a different racial/ethnic group (non-Native) than in the prior and subsequent years. In this case, it is possible that husband and wife, together, responded during the interview. The case was not dropped from the panel. Because the source of the error is unknown, we classify it as random. The B panel has at least two such errors. Again, we think that husband and wife in a mixed racial marriage responded to the questionnaire. We have not been able to correct the errors in panel B after two passes through the data.

Question D29A, race of spouse, yields high reliability and stability. Native marriages are relatively volatile, so we do not expect longitudinal and over-time correlations of unity. We think it is likely that D29A is measuring instability in marriage and does not reflect confusion of respondents (construct validity) or of QI interviewers (construct validity or bias). The AOSIS questions that were aimed directly at measuring divorce had high-nonresponse rates. One of those questions was also ambiguous, so it was dropped in later tests. Inspection of D29A responses suggests only that some persons divorced and some of them remarried between 1987 and 1989.

Although E50, which asks whether respondents think that the search for oil on the Outer Continental Shelf will create jobs, accounted for only modest reduction of error in some earlier measures, it is evident that it is reliable and stable for Panel A respondents, and unreliable (yet stable) for Panel B respondents. We do not think the differences are due to sampling error. Rather, we think the low reliability in the B panel reflects the quick and dramatic changes of attitudes among a large proportion of Panel B respondents to the Exxon Valdez spill, which threatened commercial fishing in the Bristol Bay area and temporarily halted commercial fishing in the Kodiak area. As an unexpected consequence, some fishermen from the spill-affected regions reported to our QI interviewers that they fished in the Bristol Bay area in 1989, which was outside the regions where they held access permits. If true, and we are checking on these claims, we would expect the consequences of similar spills to reflect changes in responses from persons directly affected, as well as those indirectly affected. I refer here to persons holding commercial entry permits in regions adjacent to, but not directly affected by, the spill.

Question RSEX should yield perfect reliability and stability, but similar to D28 (race of respondent), it doesn't. One case fouls each panel. Each is likely the consequence of a husband and wife responding to the questionnaire in separate waves.

Question HHTYPE is reliable, but not stationary. It is our hypothesis that HHTYPE is very sensitive to economic circumstance. This is especially true in Native households, but not restricted to Native households. It may not be necessary to use both

HHTYPE and HSIZE in the AOSIS indicator system. We will select the best measure on the basis of the full battery of tests to which we are subjecting these data.

III. STABILITY AMONG THE ORDINAL VARIABLES

Ninety-nine percent of the longitudinal and over-time coefficients among the ordinal scale variables (Table 9-1) are positive, and 73 percent are greater than .50. Although a very high proportion of the coefficients reduce error by more than 50 percent, nearly 40 percent (10 of 26) of the ordinal variables demonstrate nonstationary behavior while also yielding low reliability coefficients. Yet, as among the nominal variables, items that are nonstationary or unreliable in the B panel are not necessarily so in the A panel, and vice versa. Thus, again it appears many of the differences are produced by a fortuity in the research design in which the Schedule A sample, whose respondents are predominantly Natives residing in villages where commercial fishing is of negligible importance contrast with respondents in the Schedule B sample where non-Native representation is greater and commercial fishing is more important ‘than in Schedule A.

Three variables in the traditional set, A26A (amount of game available during last 5 years), A26B (amount of fish available during . . .), and A31 (on either day who was subsistence food harvested by), posed construct validity problems in 1987 and cannot be used for Schedule A tests for over-time stability and reliability. Differences between the A and B panels in 1989 on A26A and A26B are significant, reflecting differences of opinion about the availability of game and of fish. Respondents in Panel A, who are less often commercial fishermen and less dependent on fish for subsistence than Panel B

respondents, more frequently reported that fish availability stayed the same or increased over the past 5 years than did Panel B respondents. Panel B respondents, who are less dependent on harvests of birds, land mammals, and sea mammals than Panel A respondents, more frequently reported that the availability of game stayed the same or increased over than past 5 years than did Panel A respondents. Respondents in the two panels, then, were of the opinion that the availability of the resources on which they were most reliant had decreased. This is surely the case for fish among Kodiak respondents (Schedule B) in 1989 (as measured from 1990) because the Exxon Valdez spill limited the access. It may also be true for Bristol Bay respondents if, as reported, Kodiak, Cook Inlet, and Alaska Peninsula commercial fishermen were allowed to fish in the Bering Sea in 1989.

Indeed, although there was an increase in the availability of anadromous fish in areas north of the Alaska Peninsula for several years after 1977 when the U.S. widened its territorial boundaries to claim a 200-mile limit from its coast, returning spawners have declined dramatically since the mid-1980's. Fish have been intercepted with new, efficient technologies beyond (and within) the 200-mile territorial waters, thereby influencing local spawning runs.

Questions A26A and A26B appear to be sensitive to exogenous factors, but the correlations between empirical reality and opinions about resource availability are not - established. Over-time reliability and stability coefficients for A31 suggest responsiveness to change. In 1989, in both panels A and B, and in 1990 (Panel B only) more respondents reported receiving food from persons in other households than was the case

in 1988. This empirical measure lends some support to the opinion that some locally occurring resources (game or fish depending on the panel) were less available "now" than "during the past five years."

Question A31, in turn, becomes more credible as a sensitive indicator of change in comparison with A32, which asks how many meals in the past 2 days a respondent ate with a relative who lives in another household. The measure is reliable and stable for Panel A, and reliable but unstable for Panel B. The B panel respondents ate more meals with relatives in other households in the winter of 1990, 8 months after the Exxon Valdez spill, than in the winter of 1988.

Therefore, the traditional measures A26A, A26B, A31, and A32 present puzzles, but all appear to be sensitive to exogenous factors. Even the questions that have the least empirical support (A26A, game availability in Schedule B, A26B fish availability in Schedule A) appear to measure respondent perceptions. It is likely that those perceptions are not be based on empirical reality (or information, or knowledge).

Question A33, which asks about the percentage of subsistence foods in the respondent's diet, is reliable and stable.

Two variables measuring traditional activities are unreliable and lack stability, **A35** and **A36.** For different reasons, each should be dropped. Question A35, a revised question which is not available in over-time measures for the A panel, is reliable and stable for the B panel. It is reliable because few respondents heard elders tell stories in the years 1988 through 1990. The longitudinal correlation for A panel respondents (.8A2 * .9A3) is marginal, and there is no difference between the A and B panels for 1989. So,

A35is nonsensitive. Question A36, which asks whether respondents have asked elders for advice (past week, etc.), has very low longitudinal coefficients, reliability, and stability for Panel A respondents, and low reliability for Panel B respondents. Natives tend to learn by precept: it is bad form for elders to offer unsolicited advice in a didactic fashion, and it is with care that juniors seek advice from elders by question and answer methods. As has been made explicit above, this is not to suggest that juniors do not receive education and counsel from elders. Much of the education is by precept; and much is by hearing real-life stories of problems and situations from elders' experiences recounted by elders that are analogous to their own problems. Some, too, is by direct elicitation from junior to elder, such as "can we repair this stainless steel propeller?" Question A36 did not provide the scope required to elicit valid information about the times and situations in which a junior has received or sought advice from an elder. Non-Natives, to the contrary, seek advice from adults with explicit skills; being elderly is not a precondition for possession of those skills.

Question A38 asks the frequency with which Native languages are spoken at home. It is stable and reliable, although yielding a significant difference between the panels. The B panel members are less apt to speak Native languages, whereas A panel members are more apt to speak Native languages.

The variables measuring personal assessments of health are, for the most part, stable and reliable. In fact, knowing whether a respondent suffers from an illness or disability allows for 80- to 90-percent reduction of error in predicting whether the respondent can see well (B4), hear well (B5), run 100 yards (B6), and carry 25 pounds

(B7). These questions are redundant (see Table 9-l). In Table 9-1, we list Bl, the respondent's overall assessment of his/her health; B3, the assessment of long-term illness or disability; and B8, whether the respondent can bite and chew hard foods.

The three variables have high reliability, but the stability measures show fluctuation. We interpret these iterns as reflecting change. There are no significant differences in scale locations between panels or within schedules.

Question Cl, years of education, is reliable and stable. We expect some change in education because persons can always gain more education.

Question C5, ability to solve long-division problems, is puzzling, at least in the A panel. Some respondents who claimed they could solve long-division problems rather easily in 1987 claimed that it was not so easy in 1988, only to claim that the task was accomplished easily in 1989 (and, of course, some who had difficulty solving division problems in 1987 and 1989 solved them with greater ease in 1988). Panel B responses are reliable and stable. The difference between responses of the A and B panels for 1989 are not significantly different. So it is possible that problems in the AOSIS instrument in 1987, or its administration, are the sources of C5'S low reliability and marked instability in the A panel. Question C3, ability to read *Newsweek,* and **C4,** ability to solve addition problems, are likewise unstable in the A panel but not in the B panel (see Table 9-l). It appears that reliability and stability for C3-C5 are functions of several unspecified factors, including problems in administering and interpreting questions among respondents in Schedule A villages, in general. These items should be eliminated from further consideration as potential indicators.

Question D6 is an attitudinal question assessing whether a respondent thinks his/her household is better off now than 5 years ago. In previous reports, it has been noted that Natives, in particular, do not like to retrodict or predict. In this instance, respondents in both panels have been asked three times to compare the present with the past. The present (1989 for A and 1990 for B) and the past (ostensibly 1982, 1983, 1984) mark the downturn in oil prices and its consequences for village Alaskans. Question D6 is more stable for the A panel than for the B panel, which more directly suffered from the Exxon Valdez spill. The comparison of .9A3 and .9B2 yields no significant difference. But D6's reliability is marginal (47 and 55$%), reflecting downturns in reports of financial well-being over the 3 years for both samples. Stability for Panel B, in particular, is marginal. We suspect D6 is a valid measure of changing attitudes about household conditions in both panels.

The measures of access to drinking water (D9) and waste water removal (D10) yield marginal reliability and stability. Both, of course, can reflect change as water and waste water systems are improved or deteriorate. These questions do not appear to be especially sensitive indicators of change. AU possible within-schedule and between-panel differences for D1O are significant, providing additional reason to drop D1O from consideration as a potential item in a final indicator system. Question D9 might be retained. As might D26, which measures the difficulty in heating the respondent's house.

Questions D24 and D26, which ask where respondents were born and where they resided before moving to the village where they were interviewed, have good reliability and stability. As with several measures above, however, it is apparent that the

reinterviewees in the A panel differ significantly from the pretest schedule from which they were drawn (.7A * .9A3). The A panel selected for the most permanent residents in 1988 and 1989. The scale differences between A and B panel respondents in 1989 reflect the longer residence of A respondents and the shorter residence of B respondents in the villages where they were interviewed.

The affective attitudinal questions E1O, E12, E29, E30, E41, E45, and E46 are puzzling. Most yield high positive longitudinal and over-time coefficients for the A panel, but low positive ones for the B panel, and high reliability and adequate stability for the A panel, but the reverse for the B panel. All but E46 pass the reliability test for A although E41, E45, and E46 founder on the stability test. In the B panel, only E1O passes the reliability and stability tests; E12 and E46 pass the reliability tests, and E29 passes the stability test. These questions, with the exceptions of E1O, satisfaction with R's ability to speak his/her Native language; E12, feelings about ties with persons in other communities; and E29, feelings of satisfaction about R's current income, should be jettisoned.

IV. STABILITY AMONG THE INTERVAL VARIABLES

Table 9-l(C) demonstrates that only 60 percent of the longitudinal and over-time coefficients among interval variables account for 50 percent or more variation. The six variables (D 1A-D1C) measuring household expenses for repairs, utilities, and the like, behave especially badly.

Questions D1A and D1B passed, but D1C-D1F failed the tests of intratopic reliability. Question D1C, annual housing expenses, is the sole item in the D1A-D1F set

that passes the reliability and stability tests. Because we have already eliminated DIC from further consideration, there is no reason to discuss its retention here, nor is there sufficient reason to retain DIA or DIB for use in the indicator system. Question DIA yields low longitudinal coefficients and low reliability for both panels; DIB behaves similarly in the A panel. Although, in theory, all six of these variables should provide important measures in an indicator system, they don't work.

Question D2, annual household income, is a reliable and stable measure. Question D3A suffered in 1987 and 1988 from the way in which the question was posed in the questionnaire and the manner in which it was administered. The discussions in the preceding chapters address D3A and the manner in which we have corrected the data collection problem.

The measures of the smallest income respondent's require (D4) and the rooms in their houses (D8) are reliable and stationary.

Question D13, days spent visiting friends, has adequate stability in the A panel although it is obvious that panel members fluctuate from year to year in the amount of visiting in which they engage. The visiting engaged in by members of the B panel fluctuated more in 1989 than in 1988 or 1990, suggesting some change. But differences in scale location are not significant within schedules or between panels, suggesting that changes, overall, are slight. Question D13 may be a poor variable that has little value for an indicator system. There is no good reason to drop it at this point. Nor is there good reason to drop D16, which measures the number of public meetings attended in the

past month. The correlations are marginal in the A panel and below .50 in the B panel, but stability is adequate.

Question D25 asks how many years the respondent has resided in the village. Reliability is high although the stability measures between the panels are different. The scale location between the panels is significantly different. (Panel A respondents had resided in their villages significantly longer than had Panel B respondents.) This item is retained.

Question D27 is reliable and stationary for both panels, although the longitudinal and over-time correlations for Panel B are low, reflecting, almost surely, changes in the amount of visiting in 1989 and 1990.

Questions RAGE (respondent's age) and HSIZE (household size) are highly reliable and stationary.

V. FLAWED OR REDUNDANT VARIABLES

Table 9-l(D) lists variables that are redundant with other items (the self-reported health items [B4-B7] and the education skills items [C3-C4] fit this definition) and need not be included in a final indicator system; that have either low or highly fluctuating longitudinal coefficients (B1O, Bll, C2, D5) so are not appropriate for a final indicator system; that behave very erratically in one panel but not the other (B4-B7, C3-C4) so have little utility as indicators; or that behave erratically, in general (E17, E23, E31, E34, E35). We recommend that all of these items be dropped from further consideration.

VI. CHANGE AS INFERRED FROM DIFFERENCES WITHIN PANELS AND BETWEEN PRETEST AND POSTTEST SAMPLES

Table 9-2 lists significance of differences between combined pretest and combined posttest samples, and between combined first wave and combined third wave of the A and B panels. The two sets of tests provide one means of assessing change: the panels quite probably reflect the least transient persons in the study villages during the pretest inquiry (1987 and 1988) because they are composed of persons drawn at random from the pretest samples who could be located at each of two subsequent waves of research. The posttest sample (.9AD & .0BD) quite likely draws from recent in-migrants to the study villages, as well as persons who were not selected for the pretest sample.

In comparisons of pretest-posttest and first wave-third wave responses to 65 AOSIS items, there are 19 items in which significant differences occur in one of the comparisons, say pretest-posttest samples, but not the other. Differences are significant between pretest and posttest samples on 15 items that are not significant between the waves of the panels, whereas differences are significant between waves of the panels on 4 items that are not significant between the pretest and posttest samples. Whether this is prima facie evidence for less change in the panels and greater change in the posttest samples, or whether this is evidence for testing artifacts (reactivity), awaits our next series of tests.

Suffice it to point out here that pretest-posttest differences appear to reflect population changes on several crucial measures: voting in city and State elections (newcomers vote less often than long-term residents) (D19, D20); race of respondent and

Table 9-2

MEASURES OF SIGNIFICANCE OF DIFFERENCES, SCHEDULES A AND B PRETEST/POS'ITEST SAMPLES (PRETEST 19S7 AND 1988 INITIAL INTERVIEWS; POSTTEST: 1989 AND 1990 INITIAL INTERVIEWS); AND SCHEDULES A AND B FIRST/THIRD WAVE PANELS, QUESTIONNAIRE INSTRUMENT'

NOMINAL VARIABLES		CHANGE AS MEASURED BY PRETEST AND POSTTEST, AND FIRST AND THIRD WAVES OF PANELS	
		.7A&.8B * .9AD&.0BD	.7AP&.8BP * .9A3&.0B3
A34	Made arts & crafts last year	NS	NS
C12	Work away from village last year	NS	NS
D3	Commercial fisherman or own business	NS	NS
D19	Vote in last city council election	.00	NS
D20	Vote in last statewide election	.00	NS
D28	Race of respondent	.00	NS
D29A	Race of spouse	.01	NS
E50	Will oil search create more jobs	NS	NS
RSEX	Sex of respondent	NS	NS
EMPLR	Employer	.00	missing data
HTYPE	Household type	.00	NS
A28	Subsistence food yesterday	NS	NS
A30	Subsistence food day before yesterday	NS	NS
B9	Illness /injury prevent some activities	NS	.08
C6N	Employed last year	NS	NS
D1O	What happena to waste water	.00	NS
D11	Toilet facilities	NS	NS
D22	Vote in last village corporation election	NS	.00
D23	Vote in last regional corporation election	.00	.00
D29	Currently married	NS	NS

[a] The test for significance of difference between proportions is employed on the nominal data; the Kolmogorov-Smirnov test for two independent samples is used for the ordinal data. The t-testis used to test the significance of difference between samples on interval scale data. NS = Not Significant. Probability (P) values less than 10 in 100 are expressed.

Table 9-2
(Continued)

ORDINALVARIABLES		CHANGERS MEASURED BY PRETEST AND POSTTEST, AND FIRST AND THIRD WAVES OF PANELS	
		.7A&.8B * .9AD&.0BD	.7AP&.8BP * .9A3&.0B3
A26A	Game available last five years	NS	NS
A26B	Fish available last five years	NS	NS
A32	Meals with relatives from other households	NS	NS
A33	Percent meat/fish (Native food) in diet	NS	NS
B3	Suffer from long illness/disability	.02	NS
B8	Bite and chew hard food	NS	NS
c l	Years education	NS	NS
C5	Ability to solve division problems	NS	NS
D6	Is household better off now . . .	NS	NS
El O	Ability to speak Native language	NS	.00
El 2	Social ties to other communities	.00	.00
E29	Feelings about current income	.00	.00
E30	Feelings about standard of living	.00	.00
E45	Opportunities for children to mature...	.00	.01
E46	Opportunities for children in subsistence...	.00	.00
A31	Either day was food harvested by another	NS	NS
A35	Last time heard elder tell story	NS	NS
A36	Last time asked elder for advice	.00	.00
A38	Speak Native language at home	NS	NS
B1	My health is...	NS	NS
D9	Ability to get good drinking water	NS	NS
012	Difficulty in heating house	.00	.00
D24	Where were you born	.00	NS
D26	Where did you live before moving here	.00	NS
E41	Condition of land and water in community	.00	.01
HSIZE	Household size	NS	NS

INTERVAL VARIABLES		CHANGE AS MEASURED BY PRETEST AND POSTTEST, AND FIRST AND THIRD WAVES OF PANELS	
		.7A&.8B * .9AD&.0BD	.7AP&.8BP * .9A3&.0B3
RAGE	Age of respondent	NS	NS
C6M	Months worked (employed) last year	.00	.00
C12M	Time spent working outside village	.00	NS
D1D	Annual telephone expense	NS	NS
DIE	Annual utility expense	.01	NS
D1F	Annual repair expense	. 0 0	.05
D2	Annual household income	.01	NS
D13	Days visiting friends /relatives	NS	NS
D16	Attend public meetings last month	NS	NS
025	Years resided in village	.00	.01
D27	Number of visits outside village last year	NS	NS
D8	Number of rooms in house	.01	.00
DIA	Annual heating expense	NS	.00
DIB	Annual electricity expense	.00	.00
D1C	Annual housing expense	.00	.02
D3A	Annual business investment	.02	NS
D4	Minimum income needed per year	.07	NS

spouse (in-migrants or out-migrants--Native or non-Native--can influence differences between pretest and posttest samples) (D28, D29A); place of birth and residence before moving to the village (differences between pretest and posttest suggests either out-migration, in-migration, or both) (D24, D26); and type of household (composite households increase with economic downturns; nuclear households increase with non-Natives and economic upturns) (HTYPE). Four economic variables strongly suggest changes within the villages between the pretest and posttest samples: time spent working outside the village (C12M), annual household income (D2), annual business investment (D3A), and minimum income needed per year (D4). I have disregarded the D1A-D1F questions, although they appear in Table 9-1.

VII. COMMENTS ON STABILITY AND RELIABILITY

The Social Indicator system is multivariate, so the items whose reliability and stability we are assessing here have not been developed as single items sensitive to change. It should be possible, however, to determine whether exogenous factors impact the variables that prove to be reliable and stationary over time--the impact must be measurable and the response in the indicator variable, too, must be measurable. Because of the complexity of multivariate, multitrait, panel, pretest-posttest models, we will seek to measure the relations in sets of five or six variables over time, while controlling for exogenous factors that may be affecting the panels.

Several of the variables in the AOSIS instrument have passed the three wave reliability and stability tests and suggest, on the basis of these tests, that they will be sensitive measures. Whether persons have made arts and crafts (A34) or worked away

from the village in the past year (C12) may well be influenced by economic factors (increased unemployment in villages), and those factors might be influenced by economic factors that originate outside Alaska (downturn in oil prices) or by normal accidents affecting the Alaskan environment and economy, such as the infamous Exxon Valdez oil spill. If representatives of one ethnic/racial group increases in *Test, Mixed,* or Commercial *Fishing* villages, this may not be an epiphenomenon, but caused by multiple economic and other factors, including education (Cl), race (D26), income (D2), and obligations to kinspersons and friends (A32, D27, E12).

The many variables that have demonstrated stability and reliability over three waves in the A and B panels must be tested for testing effect. Then the differences between the two must be assessed to determine whether some correlations are historical and restricted to persons from villages sharing common histories, traditions, and the like. The middle column in the controls section of Table 9-1 tests the 1989 waves of the A and B panels[19] for differences in responses to a group of AOSIS questions. Twelve of 61 differences were significant at .07 or less. The differences are interesting; many of them suggest obvious and important underlying factors, but some do not, as discussed above. For example, it is not surprising to learn that B respondents invest more in commercial fishing or personal businesses (D3A) than A respondents, inasmuch as two of the three regions in Schedule B are dominated by commercial fishing, whereas only one of four in A is so dominated.

[19]The third wave for panel A (.9A3) and the second wave of panel B (.9B2) are tested for the goodness of fit between two samples (significance of differences of proportions) (nominal), for extreme differences of ordinal variables, and for significance of differences of means for interval variables.

High participation in voting in elections of all kinds (see D20) is characteristic of A respondents (in all initial samples and panel waves) but not of B. Perhaps this is a function, at least in part, of a more transient population in the commercial-fishing areas dominated by seasonal employment. The causes are surely more complex and will not be ventured here. In this vein, B respondents are more apt to have resided outside Alaska before moving to the village in which they were interviewed (D26) and are apt to have resided in those villages for much shorter periods than is true for A respondents (D25). And continuing in this vein, spouses of respondents are more frequently non-Native among B respondents than A respondents (D29A).

The influence of environment is not trivial. Schedule A respondents thought less game was available in 1989 (A26A) while B respondents thought less fish was available in 1989 (A26B). Schedule B respondents in the Kodiak region were queried immediately prior to the Exxon Valdez spill. Some Bristol Bay interviews (Panel B) were administered after the spill and could have influenced the response on this question; they almost certainly were influenced by the spill when reinterviewed in 1990.

According to these tests, A respondents pay more for telephone service than do B respondents. The household expense variables are so muddled, however, that we could not salvage them for use in a concise indicator system.

VIII. AOSIS ITEMS TO BE REJECTED BECAUSE OF INSTABILITY OR LOW RELIABILITY

Twenty-two items will be dropped because of nonstationary behavior, low reliability over-time, redundancy, or erratic longitudinal coefficients within and between panels.

Reject:

A35
A36
B4
B5 .
B6
B7
B1O
B 1 1
C2
C3
C4
D1A
DIB
E17
E23
E30
E31
E34
E35
E41
E45
E46

CHAPTER 10
TESTING ARTIFACTS AS A THREAT TO VALIDITY

1. INTRODUCTION

The Social Indicators research design seeks to control for reactions among respondents that can bias posttests. If a pretest (initial interviews in Schedules A and B) generates a reaction that, in turn, creates bias, the assumptions of the statistics that we employ to measure change have been violated. In the preceding section, γ, ϕ, and r (including several measures derived from r) are employed to measure stationariness and change. Each assumes independent responses from respondents selected at random. The stability tests for over-time correlations seek not only to account for change in a variable, but they do so while eliminating the threat to validity known as the ecological fallacy (a specification error in which results from group 1 are attributed to group 2).[1] To avoid specification error in our research design, group 1 comprises panels (.7AP, .8BP) drawn from our pretest samples for Schedules A (.7A) and B (.8B). Results of reinterviews of the panels are used to generalize about the panels and also to the larger pretest sample from which they were drawn.

The threat to validity in this operation is, in statistical terms, reactivity, i.e., responses at t_1 are influenced by the interviewing process and the responses given at t_0,

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'An example of ecological fallacy, or specification error, follows. Assume ortr research design comprises a pretest and posttest sample. The pretest sample is drawn at random from our target universe and is interviewed. A year later, we return to the same villages and draw another random sample. It does not matter whether, prior to selecting the sample, we replace the originat respondents in the target universe or do not replace them. Either way, if we interview the posttest respondents with the same instrument administered to the pretest respondents and then attribute the results from the posttest (change or no change) to the pretest respondents, we have committed the ecological fallacy. If some pretest respondents are selected for the posttest sample (ii a design that replaces pretest respondents to the target universe), their responses can be renctive, representing one threat to validity, whereas the responses of persons in the same sample who were not interviewed in the pretest cannot be valid representatives of the pretest sample (and vice versa). So attributing to either the results from the other is specification error. If the posttest sample is selected without replacement, it does not suffer from reactivity, but specification error is the threat to valid conclusions drawn from the poettest sample in relation to the similarities with or differences from the pretest sample. Also see references to ecological fallacy in Chapter 2, Sections 2.1., 2. III.A., and 2.IV.B.

and responses at t_2 are influenced by the interviewing process and the responses given at t_0 and t_1. Reactivity biases the statistics and hence violates the assumptions on which the statistics are based. The results are dependent on prior responses to the same question and consequently cannot be used to describe the panel or to make inferences about the larger sample from which the panel was drawn. If reactivity is present, we refer to it as a testing artifact.

The full sampling design including discussion of the precise way in which controls for reactivity and specification error are exercised is explicated in Chapter 2. It is important to note that beginning the second year (1988) in each year of the research design, either a pretest or a posttest sample was drawn without replacement, and one or more panels was reinterviewed. Thus, fresh responses could be tested against reinterview responses during the second, third, and fourth field research years.

Beginning with the second field research year (1988), we were able to exercise controls for testing artifacts, although we were restricted to tests of the A panel (.8A2) and the B pretest sample (.8B). During the third field research year (1989), we reinterviewed both panels (.9A3 and .9B2), testing them against each other as well as against the Schedule A posttest sample (.9AD, also referred to as the Schedule A discretionary sample).[2] The third field session enabled us to exercise more controls for testing artifacts than in any other year of the research design, including 1990 (Schedule A villages were not interviewed in 1990). The design for 1989 worked as follows: the third-wave reinterviews of Panel A (.9A3) were tested against the posttest sample (.9AD)

[2] "Discretionary" was used so that "D" could be used in our notational system for samples (.9AD, .0BD). Pretest had no alphabetic signifier (.7A, .8 B); P already had been claimed for the panels (first wave) (.7AP, .8BP).

drawn from among persons in Schedule A villages who previously had not been interviewed. Because the posttest sample respondents, then, could not have participated in the Social Indicators research previously, their responses could not be reactive. Instead, their responses should have been representative of the sampling universe because the posttest sample was drawn at random from persons who had not been replaced into the sampling universe from a previous wave. If Panel A responses varied significantly from those of the posttest sample, the likely cause of the difference would be testing effect. The panel responses were reactive. If differences were not significant between the two samples (panel and posttest), we could generalize to the Schedule A sampling universe (and, of course, to changes that occurred over-time).

The design also allowed us to test (1) Panel B reinterviews for 1989 (.9B2) against the 1989 posttest sample for Schedule A (.9AD) and (2) the third wave of Panel B reinterviews for 1990 (.0B3) against the posttest sample for Schedule B (.0BD).

We performed several tests to determine whether the effects of reinterviewing caused testing artifacts, and we also exercised several controls to assist us in evaluating those tests. Table 10-1 is divided into four parts, one each for nominal, ordinal, and

Table 10-1(A)

MEASURES **FOR** TESTING **ARTIFACTS,** PANELS **FOR** SCHEDULES **A AND B (THIRD WAVES OF REINTERVIEWS 1989-90), TESTED AGAINST SCHEDULE A AND B POSTTEST SAMPLES (INITIAL INTERVIEWS, 1989, 1990). CONTROLS EXERCISED THROUGH TESTS WITH SCHEDULE A AND B PRETEST SAMPLES (INITIAL INTERVIEWS, 1987, 1988), QUESTIONNAIRE INSTRUMENT[a]**

NOMINAL VARIABLES		TESTS FOR TESTING ARTIFACTS			CONTROLS FOR TESTING ARTIFACTS		
		1989 A PANEL (R)/ A POSTTEST (1) .9A3 • .9AD	1989 B PANEL (R)/ A POSTTEST (1) .9B2 * .9AD	1990 B PANEL (R)/ B POSTTEST (1) .003 * .0BD	1987-1989 A PRETEST (1)/ A POSTTEST (1) .7A * .9AD	1988-1990 , B PRETEST (1)/ B POSTTEST (1) .8B * .0BD	1989 A&B PANELS (R)/ A POSTTEST (1) .9A3&.9B2 * .9AD
A34	Made arts and crafts last year	NS	NS	NS	NS	NS	NS
C12	Work away from village last year	NS	NS	.01	Ns	Ns	NS
03	Commercial fisherman or own business	NS	.09	NS	NS	NS	NS
019	Vote in last city council election	NS	Ns	. 0 1	.01	.08	.00
D20	Vote In last Statewide election	.02	,09	NS	.00	NS	.00
028	Race of respondent	NS	NS	.00	NS	.00	Ns
D29A	Race of spouse	NS	.01	.00	NS	.00	.07
E50	Will oil search create more jobs	NS	NS	NS	NS	NS	NS
RSEX	Sex of respondent	NS	NS	NS	Ns	NS	NS
EMPLR	Employer	NS	.00	NS	/ .00	.00	.00
HTYPE	Household type	NS	NS	NS	.02	NS	Ns
A28	Subsistence food yesterday	NS	NS	NS	NS	NS	NS
A30	Subsistence food day before yesterday	Ns	Ns	NS	NS	NS	Ns
89	Illness/injury prevent some activities	Ns	Ns	Ns	Ns	NS	NS
C8N	Employed last year	.098	NS	NS	NS	Ns	NS
c9A	Job classification			NS			
c1oA	Private employment: specific classification			NS			
C1OB	Number of different jobs during yeer			NS			
cl 1	Desired occupation			NS			
C12X	Occupation away from home			NS			
C12Y	Employment away: spill? private/public?			NS			
C12Z	Location of employment away			NS			
Cls	If work was Exxon related, leave village?			NS			
D10	What happens to wastewater	NS	NS	NS	NS	,00	NS
011	Toilet facilities	NS	NS	NS	NS	NS	NS
022	Vote In last village corporation election	NS	NS	.00	NS	.01	NS
023	Vote In fast regional corporation election	NS	NS	.00	NS	.02	Ns
029	Currently married	NS	NS	NS	NS	NS	NS
E58	Who Is responsible for Exxon Valdez oil spill?			NS			

'The lest for significance of difference between proportions Is employed on the nominal data; Kolmogorov-Smirnov teat for two independent samples Is used for the ordinal data. The t-test Is used to test the significance of difference between samples on Interval scale data. NS = Not Significant. Probability (P) values less than 10 In 100 are expressed.

Table 10-1(B)

MEASURES FOR TESTING ARTIFACTS, AOSIS ORDINAL VAR1ABLES,'1987-90

ORDINAL VARIABLES		TESTS FOR TESTING ARTIFACTS			CONTROLS FOR TESTING ARTIFACTS		
		1989 A PANEL (R)/ . A POSTTEST (1) .9A3 • .9AD	1989 B PANEL (R)/ A POSTTEST (1) .9B2 • .9AD	1990 B PANEL (R)/ B POSTTEST (i) .003 * OBD	1987-1989 A PRETEST (1)/ A POSTTEST (1) .7A•.9AD	1988-1990 B PRETEST (1)/ B POSTTEST (1) .8B • .0BD	1989 A&B PANELS (R)/ A POSTTEST (1) .9A3&.9B2 * .9AD
A26A	Game available last five years	NS	.01	NS		NS	Ns
A26B	Fish available last five years	NS	NS	.06		NS	NS
A32	Meals with relatives from other households	NS	NS	,01	NS	.02	NS
A33	Percent mcot/fish (Native food) in diet	NS	NS	NS	NS	NS	NS
B3	Suffer from long illness/disability	Ns	Ns	NS	Ns	NS	NS
B8	Bite and chew hard food	NS	NS	NS	NS	Ns	NS
cl	Years education	Ns	NS	.02	.09	NS	Ns
C5	Ability to solve division problems	NS	Ns	NS	NS	Ns	NS
D6	Is household belter off now. . .	Ns	NS	NS	NS	NS	NS
E10	Ability 10 speak Native language	Ns	NS	.02	NS	NS	NS
E12	Social tles to other communities	Ns	Ns	NS	.00	.00	Ns
E29	Feelings about current Income	NS	NS	NS	.00	.098	NS
E30	Feelings about standard of living	. Ns	Ns	NS	.00	.00	Ns
E45	Opportunities for children to mature . . .	NS	NS	NS	Ns	,00	NS
E46	Opportunities for children in subsistence. . .	NS	Ns	NS	.00	.00	NS
A2SA	Game available since Exxon Valdez spill			NS			
A26A	Fish available since Exxon Wddez spill			NS			
A31	Either day was food harvested by another	NS	NS	NS	missing data	NS	Ns
A326	Percent subsistence food since Exxon Valdez			NS			
A35	Last time heard elder tell story	NS	NS	NS	missing data	NS	Ns
A36	Last lime asked elder for advice	Ns	Ns	.05	.00	.03	NS
A38	Speak "Native language at home	Ns	.09	NS	Ns	.0s	NS
61	My health Is . . .	Ns	.07	NS	NS	NS	Ns
C13	Employment due to Exxon Valdez			NS			
C16	Lose employment due to Exxon Valdez			NS			
C18	Relocate due to Exxon Valdez			NS			
C19	Lost property due to Exxon Valdez			NS			
C20	II financial loss, dld Exxon compensate			NS			
09	Ability to get good drinking water	Ns	NS	NS	.07	NS	.05
012	Difficulty In heating house	NS	NS	NS	.00	NS	NS
024	Where were you born	NS	NS	.00	.00	.02	Ns
026	Where dld you live before moving here	NS	NS	NS	.00	.01	NS
E41	Condition of land and water in community	NS	.0s	NS	.00	.01	.05
E51	How will oil search affect game						
E52	Is 011 search good or bad Idea						
HSIZE	Household size	NS	Ns	NS	Ns	Ns	Ns

Table 10-I(C)

MEASURES FOR TESTING ARTIFACTS, AOSIS INTERVAL VARIABLES, 1987-90

INTERVAL VARIABLES		TESTS FOR TESTING ARTIFACTS			CONTROLS FOR TESTING ARTIFACTS		
		1989 A PANEL (R)/ A POSTTEST (1) .9A3 * .9AD	1989 B PANEL (R)/ A POSTTEST (1) .9B2 * .9AD	1990 B PANEL (R)/ B POSTTEST (1) .083 * .0BD	1987-1989 A PRETEST (1)/ A POSTTEST (1) .7A • .9AD	1988-1990 B PRETEST (1)/ B POSTTEST (1) .8B * .0BD	1989 A&B PANELS (R)/ A POSTTEST (1) .9A3&.9B2 * .9AD
RAGE	Age of respondent	NS	NS	.01	NS	Ns	NS
C6M	Months worked (employed) last year	NS	N'S	NS	.00	.00	NS
C12M	Thne spent working outside village	NS	NS	.02	NS	NS	NS
D1D	Annual telephone expense	NS	,00	NS	.00	NS	.00
DIE	Annual utility expense	NS	.04	NS	.00	Ns	.00
D1F	Annual repah expense	.08	NS	NS	.00	NS	NS
02	Annual household income	NS	NS	NS	.06	.01	NS
D13	Days visiting friends/relatives	NS	.07	Ns	NS	NS	NS
D16	Attend public meetings last month '	NS	NS	Ns	NS	NS	NS
D25	Years resided In village	.04	.00	.04	.00	.00	NS
027	Number of visits outside village laat year	NS	NS	.094	NS	NS	NS
CDAY1	Cumulative days hunting land mammals	NS	.08	NS	.00	NS	NS
CREL1	Cumulative rel/friends on lend mammal hnts	Ns	.00	NS			.05
CDAY2	Cumulative days hunting sea mammals	NS	.05	Ns	.00	NS	.08
CREL2	Cumulative rel/friends on sea mammal hunts	NS	.00	NS			.03
CDAY4	Cumulative days camping for extraction	NS	NS	Ns	.00	.004	NS
CREL4	Cumulative rel/friends with whom camped	Ns	,00	NS			.00
CDAY5	Cumulative days winter/hook/trap fishing	NS	NS	NS	.00	.00	NS
CREL5	Cumulative rel/friends w/h/t fishing	Ns	.00	NS			NS
08	Number of rooms In house	.01	.02	NS	.00	,01	.00
DIA	Annual heating expense	.08	.01	NS	.05	NS	.01
D1B	Annual electricity expense	NS	NS	NS	.00	NS	NS
D1C	Annual housing expense	.02	.02	NS	.00	.02	.01
D3A	Annual business Investment	NS	Ns	NS	missing data	NS	NS
D4	Minimum Income needed per year	NS	NS	NS	NS	.0s	NS
C9B	Number of different jobs			NS			

Table 10-1(D)

MEASURES FOR TESTING ARTIFACTS, REDUNDANT OR FLAWED QUESTIONS, AOSIS NOMINAL, ORDINAL, AND INTERVAL VARIABLES, 1987-90'

	TESTS FOR TESTING ARTIFACTS			CONTROLS FOR TESTING ARTIFACTS		
	1989 A PANEL (R)/ A POSTTEST (I) .9A3 • .9AD	1989 B PANEL (R)/ A POSTTEST (1) .9B2 • .9AD	1990 B PANEL (R)/ B POSTTEST (1) .0B3 • .0BD	1987-1989 A PRETEST (1)/ A POSTTEST (1) ,7A • .9AD	1988-1990 B PRETEST (1)/ B POSTTEST (1) .8B • .0BD	1989 A&B PANELS (R)/ A POSTTEST (1) .9A3&.9B2 • .9AD
NOMINAL VARIABLES						
B1O Struck intentionally?	NS	.03	NS	.00	NS	.04
B1 1 Smoke cigarettes	NS	NS	NS	NS	NS	NS
C2 Enrolled in school	.04	NS	NS	.01	NS	.05
ORDINAL VARIABLES						
B4 Respondent can see . . .	NS	NS	NS	. 0 7	NS	NS
B5 Respondent can hear , , .	NS	NS	NS	NS	NS	NS
B6 Respondent can run 100 yards . . .	NS	NS	NS	NS	NS	NS
97 Respondent can carry 25 pounds ., .	NS	NS	NS	NS	NS	NS
C3 Ability 10 read	NS	NS	NS	NS	NS	NS
C4 Ability to add numbers	NS	NS	NS	NS	NS	NS
E17 Satisfaction with accomplishments	NS	NS	NS	.00	.01	NS
E23 Usefulness of child's education	NS	NS	.09	.00	NS	NS
E31 Opportunities for good housing	NS	NS	NS	.00	.01	NS
E34 Safety of community	NS	NS	NS	.00	.00	NS
E35 Goods and services available	NS	NS	NS	.02	NS	NS
INTERVAL VARIABLES						
D5 Desired Income per month	NS	NS	NS	NS	.02	NS

"The test for significance of difference between proportions Is employed on the nominal data; Kolmogorov-Smirnov test for two independent samples Is used for the ordinal data. The t-test Is used to test the significance of difference between samples on Interval scale data. NS = Not Significant. Probability (P) values less than 10 In 100 are expressed,

interval scale variables and one for redundant and/or flawed variables. The research design, perforce, connects the stability analysis to the analysis for testing artifacts. As a consequence, the logic of the tests that analyze stability and reliability often were integral to the analysis of testing artifacts, and vice versa. The rationale for introducing controls for testing artifacts in Table 10-1 is to determine similarities and differences between the combined panels A & B (.9A3 & .9B2) and the posttest sample for Schedule A (.9AD). Upon establishing these relations, we controlled to see whether differences between pretest and posttest samples (.7A * .9AD) were similar or were different from the A panel/A posttest contrast for 1989 and also whether the differences between pretest and posttest samples (.8B * .0BD) were similar or were different from the B panel/B posttest contrast for 1990.

If the .7A and .9AD samples demonstrate significant differences on some variables, but .9A3 and .9AD do not on those same variables, change rather than testing effect should account for the differences. Likewise, if the .8B and .0BD samples demonstrate differences on some variables, but .0B3 and .0BD do not on those same variables, change rather than testing effect should account for the differences. Finally, if differences or similarities obtain between the combined .9A3&.9B2 sample and .9AD that do not occur when one or the other panel is tested separately against .9AD, those discrepancies should be accounted for by the influence of merging.

II. TESTS FOR TESTING ARTIFACTS

Let us begin by inspecting the “Tests for Testing Artifacts.” The initial tests for testing artifacts were conducted in 1988 between the responses of A-panel members

(.8A2) and Schedule B posttest respondents (.8B). These tests are discussed in Chapter 6. Here, we focus our attention on the 1989 and 1990 research waves, with special attention paid to over-time differences between pretest and posttest samples.

II.A. Panel **A,** Third Wave, 1989

Column 1 in Table 10-1 contrasts the third wave of the A panel (.9A3) and the Schedule A posttest sample (.9AD). The tests for differences demonstrate remarkable similarity, providing strong support for the inference that the similarities are not products of chance and that the over-time correlations are not functions of reactivity. Among the 20 nominal variables, only two significant differences (at $P \leq .10$) occur. More panel respondents than posttest respondents voted in Statewide elections (D20). This suggests, perhaps, that third-wave panel respondents--those persons from the original sample who were reinterviewed in two subsequent years in the villages in which they were initially interviewed--were well-ensconced participants in village and in extra-village affairs, such as Statewide elections, that might impinge on the village. Exercising political franchise might indicate respondent stability in the village. Some support for this conjecture is drawn from the significant differences obtained for employment during the past year (C6N) and the number of years in which respondents resided in the village (D25, an interval variable, see Table 10-1[C]). The panel respondents were more frequently employed and had resided in the villages longer, on average, than the posttest respondents.

Among the 26 ordinal variables (Table 10-1[B]), there are no significant differences between the A panel and the A posttest respondents.

There are 5 significant differences among the 25 interval variables. The average number of rooms in respondents' houses (D8) was significantly larger than in posttest respondents' houses, although income was not significantly greater (D2). This measure, too, suggests that the panel had selected for stable respondents, whether possessing low or high incomes. Income was only one variable that influenced house size in Schedule A villages. Low-income persons can gain access to large houses in those regions in which borough or HUD programs have sponsored large-house building projects, such as the North Slope and NANA. Whatever the case may be, stability of place facilitates access to large houses.

The household-expense measures (D1A-D1F) behaved badly throughout the 4 years in which they were administered. Questions that passed the stationariness test failed either the reliability-response tests or the intratopic reliability tests, and questions that passed the testing artifacts test failed the stability or reliability tests. These problems have been discussed in the preceding chapters. There are no differences between the panel and posttest in 1989 on telephone, utility, and telephone expenses (D1B, DID, and DIE). Annual repair costs were higher in 1989 for posttest respondents (D1F), as were heating and housing expenses (D1F, D1A, and D1C). These differences suggest that panel respondents, through dint of longer residence, either had somewhat better housing--more rooms and better, more efficient insulation--than short-term residents or that they were able to initiate and maintain repairs over a longer period, thereby reducing costs. The erratic performances of all of the D1 series variables, however, suggests caution in interpretation.

The significant generalization to draw from the .9A3/.9AD comparisons is that there is no evidence that responses of the A panel in 1989 were reactive. It was previously determined there was no evidence that A panel responses in 1988 were reactive to the 1987 responses (Jorgensen 1988).

II.B. Panel B, Second Wave, 1989

The tests for differences between the B panel reinterview responses for 1989 (.9B2) and the initial responses of the Schedule A posttest sample (.9AD) produced 21 significant differences among the 71 variables, a rate three times as great as for the A panel. These results pose two problems. The first is similar to the problem encountered in the stability analysis (previous chapter), to wit: are Schedules A and B representative of the same universe? The second is whether B panel responses suffer from reactivity whereas A responses do not.

Among the nominal variables there are four significant differences between B panel responses and A posttest sample responses for 1989 (see Table 10-1[A], D3, D20, D29A, and EMPLR). The differences suggest that B panel respondents are similar to A panel respondents in that they more often voted in the last Statewide election (D20) than did the posttest respondents. In addition, among the interval variables, we see that B panel respondents resided in the villages in which they were reinterviewed for a significantly longer time than the posttest respondents resided in the villages in which they were interviewed (D25).

If panel members were not available for reinterviews because they were away from the village, temporarily or permanently, those who stayed in the villages and were

available for reinterviews influenced upwards the average years of residence in the village and also the proportion of persons who voted in the last Statewide election. The two probably are related: respondents who remained fixed in the village because of employment, age, or other factors also were active in village affairs.

As for whether Schedules A and B represent the same or different universes, some of the differences between the B panel and the posttest sample from Schedule A are neither fortuities nor products of reactivity. The major industry in the majority of Schedule B villages is commercial fishing (fishing and commercial-fishing-related enterprises). The difference between the B panel and the posttest A sample on whether a respondent is a commercial fisherman or owns his/her own business (D3) is a statistically real and determinate difference, as has been explained in previous sections.[3] And there is a significant difference in the nature of B panel and A posttest employment in which commercial-fishing and private-sector jobs dominate in B but not A (EMPLR).

The B panel also differed from .9AD in that B respondents less often were married to Native spouses (D29A).[4] This is not surprising inasmuch as non-Natives comprise the majorities in the large commercial-fishing villages of Kodiak, Dillingham, and Naknek.

Among the 26 ordinal variables, there are four significant differences between the B panel and the A posttest sample. Not one significant difference occurs among these variables between the A panel and the A posttest sample for 1989. The differences are

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[3] **See Table 9-1 for the contrast between .9A3 and .9B2 on D3. The B-panel respondenta were significantly different from A-panel respondenta in their participation in commercial fishing or ownership of private enterprises.**

[4] **See Table 9-1. The B and A panels also were significantly different on this variable, demonstrating that the differences between the B panel and tbe Schedule A postteat sample are not fortuities.**

explained by differences in contexts and populations, not by reactivity. Although birds, some sea mammals, and some land mammals occur in relatively large numbers in the Bristol Bay and Kodiak regions (Kodiak supports a large deer population), fish and marine invertebrates are the principal subsistence resources. Game--land and sea mammals--make much larger contributions to Native diets in three-fourths of the Schedule A regions (North Slope, NANA, and Calista) than they do in two-thirds of the Schedule B regions (Bristol Bay and Kodiak). It is reasonable, therefore, that B panel respondents were significantly different from the A posttest respondents and from the A panel respondents (see Table 9-1) in their assessments of the amount of game available (A26A), which B respondents thought was sufficient (A's did not).' Contrariwise, in the comparison of panel responses in 1989 on the question of the availability of fish (A26B), Schedule B respondents thought that their numbers were less than sufficient, whereas Schedule A respondents thought they were sufficient (see Table 9-l).

Other differences that distinguish the B panel from the A posttest, but which do not distinguish the A panel from the A posttest, are the rates at which Native languages were spoken at home (A38), health (B1, panel respondents reported better health than did posttest respondents), and the condition of land and water in the community (E41, B panel respondents reported greater satisfaction). Self-reporting of better health maybe a simple function of better health being associated with relative economic success, and satisfaction with land and water may be a reflection of the optimism that characterizes rural non-Native opinions about the environments in which they gain their livelihoods

[5] Table 9-1 demonstrates that the A and B panels also are different on their aggregate assessments of the amount of fish available B's thought that fish available were somewhat less than sufficient; A's thought that they were sufficient or more.

(see, for example, Little's [1978] appositive treatment of rural non-Native opinions about energy developments in the western United States). Those opinions can change quickly and dramatically in the presence of "normal accidents," such as an oil spill, but return to their previous state in short order. The preceding speculation will not gain much empirical support from Section E variables (well-being) because so few are reliable or stationary.

The B panel and A posttest respondents yielded significant differences on 13 of 25 interval variables. If we eliminate the six items in D1A-D1F because of their low reliability and quixotic stationary behavior, there remain seven differences among 19 variables--five more than obtain between the A panel and A posttest. Six of these differences reflect population differences: the A posttest sample is composed of fewer non-Natives and fewer commercial fishermen than the B panel. In addition, posttest respondents enjoyed larger numbers of relatives within their villages and regions than did non-Natives; and residents of Schedule A villages, in general, are more dependent on the harvests of naturally occurring resources for subsistence than are residents of Schedule B villages.

Whereas there were no significant differences between A panel and A posttest respondents in the cumulative days spent in extractive pursuits and the number of relatives and friends with whom they were engaged in so doing, the B panel differed significantly from the A posttest on six of the eight measures (CDAY1, CREL1, CDAY2, CREL2, CREL4, and CREL5). There was no difference in the cumulative days spent

camping, and the cumulative days spent jigging for fish, hook-and-line fishing, and trapping fish for subsistence (and sport).

Given the large proportions of non-Natives in the largest Schedule B villages and the commercial importance of fish and marine invertebrates in most Schedule B villages (including Unalakleet and Nome in the Bering Straits region), I conclude that the differences between the schedules and panels are not fortuities or consequences of testing effects.

lLC. Panel B, Third Wave, 1990

The third wave of research among Panel B respondents, which coincided with the interviewing of the posttest sample for Schedule B, was conducted 9 months after the Exxon Valdez spill. Many non-Native residents had relocated from the larger fishing villages, some new residents had moved into the villages looking for spill-related employment, and some persons who had not worked away from their home villages in previous research waves had done so between the second and third waves.

Among the nominal variables, there are six significant differences between panel and posttest. The differences reflect the greater job opportunities outside the villages and also greater participation in local political affairs by panel residents as opposed to posttest residents. Panel respondents more frequently voted in city council (D19), village corporation (D22), and regional corporation (D23) elections than did posttest respondents, whereas posttest respondents more frequently worked away from the village (in which they were interviewed in 1990), were more apt to be non-Natives (D28), and more apt to be married to non-Natives (D29A). The increased proportion of non-

Natives reflects the larger proportion of interviews conducted in the largest Schedule B villages in 1990 as opposed to the pretest in 1988.

Among the ordinal variables, 6 of 36 items were significantly different. Panel respondents ate more meals with relatives in other households than did posttest respondents (A32), were more satisfied with their ability to speak their Native language(s) (E1O), were less apt to have asked the elders for advice recently (A36), and were more apt to have been born nearby. These measures suggest that following the Exxon Valdez spill, Native panel respondents were less apt to have relocated from the villages and more apt to have been reinterviewed than were non-Native panel respondents.

Among the interval scale measures, 4 of 26 items yielded differences between panel and posttest. The differences were almost surely influenced by the oil spill: posttest sample respondents were significantly younger (RAGE), spent more time working outside the village (C12M), resided in the village a shorter time (D25), and made more visits outside the village (D27) than did their panel counterparts in the preceding year.

II.D. Testing Artifacts in the A and B Panels

The tests for significance of differences between posttest samples and the second and third waves of the panels yielded 44 significant differences among 232 tests (19%). Reactivity does not appear to be operating to account for any of the differences between panel waves and posttest responses. Testing artifacts were not discovered if any occurred.

Of the 44 differences, 21 occurred in the tests of the B panel against the A posttest sample (.9B2 * .9AD). Sixteen of the 21 were consequences of the arbitrary way in which the Schedule A and Schedule B strata were defined. Schedule A comprises the North Slope, Northwest Alaska, Ca.lists, and Aleutian regions. Among the financial-industrial sectors of these four regions, only the Aleutians is dominated by commercial fishing, and only in the Aleutians do non-Natives comprise the majorities of any village populations. Schedule B comprises the Bering Straits, Kodiak, and Bristol Bay regions. The economies of the last two are dominated by commercial fishing; and commercial fishing is important, although not dominant, in the economies of Nome and Unalakleet in the Bering Straits region. Moreover, the largest villages in the Bristol Bay and Kodiak regions have large non-Native majorities. We aver that the differences between the schedules in ethnic compositions and economic bases account for 16 of the 21 significant differences. The theoretical contrasts analyzed above support this conclusion.

Seven significant differences occurred between various panels and posttest samples on household expense (D1A-D1F). These items behaved so badly (poor reliability, stability, and reporting) that we eliminated them from consideration for the indicator system.

The 21 significant differences that remained (among the 44) are explained as consequences either of (1) the residential stability of panel members (some persons relocated because of economic exigencies and could not be reinterviewed, whereas other persons stayed in place and were reinterviewed, either because they could not move or because they need not move) or (2) immigration to and outmigration from the posttest

sampling universe because of economic exigencies, including the infamous Exxon Valdez oil spill.

III. CONTROLS AND THE MEASUREMENT OF CHANGE

Table 10-1 (columns 4-6) tests for significance of differences between (1) the pretest sample for Schedule A regions in 1987 (.7A) and the posttest sample for those regions drawn at random and without replacement from the same villages in 1989 (.9AD); (2) the pretest sample for Schedule B regions in 1988 (.8B) and the posttest sample for those regions drawn at random and without replacement in 1990 (.0BD); and (3) the combined A and B panels for 1989 (.9A3 & .9B2) and the Schedule A posttest sample for 1989 (.9AD).

Here, we are concerned whether the similarities and differences between the pretest and posttest samples are similar to or different from the results from the comparisons of .9AD and .9A3, .0BD and .0B3 (same year as represented in columns 1 and 3, Table 10-1), and .7A and .9A3, .8B and .0B3 (2-year interludes between pretest and third waves of panels, see Table 9-1, columns 11 and 13, Controls for Stability).

III.A. Panel A, Pretest A, and Posttest A

Among 62 comparisons between .7A and .9AD, 29 are significant (47%).[6] Among 56 of the same variables, there are 21 significant differences between .7A and .9A3 (38%) (see Table 9-1, column 11). Three of those differences occur in the D1A-D1F set. The six D1* items are not addressed here, thereby reducing the common variables between the posttest-pretest samples and the pretest-panel samples to 50. A large

[6] The "flawed and redundant" variables in Tables 9-1(D) and 10-1(D) are excluded from analysis here.

proportion of significant differences remain, suggesting either considerable changes between 1987 and 1989 or unreliable and invalid measures. The problems encountered in the questionnaire and its administering during 1987 to the Schedule A pretest sample, and the deletions and changes (alterations) that were made in 1988 to increase reliability and validity, have been explicated above. It is our informed judgment that these many significant differences are not attributable to our problems in 1987.

Comparison of the A posttest sample with the third wave of the A panel yields only seven significant differences between them in 1989 (.9A3 * .9AD, Table 10-1, column 1). The question is whether the differences between the 1987 and 1989 measures are statistically real--when time varies do the responses to the 50 identical questions vary?

The 1987 pretest respondents more frequently voted in the most recent city and State elections than did posttest respondents in 1989 (D19 and D20). There are no significant differences, on the other hand, between the 1987 pretest respondents and the third wave of the Schedule A panel. The implication is that the panel represents a replication of the pretest practice of relatively high exercise of the political franchise, a practice we hypothesized might be connected to length of tenure in the village. The posttest sample proved to have a significantly shorter tenure in the village (although the posttest respondents averaged more than 6 years' residence in the village), to have moved to the village from some place beyond near proximity to the village, and to have significantly fewer persons born in the village or the region than did the panel (D24, D25, and D26, Table 9-l). In Table 10-1, we see that the pretest and posttest results on

the respondent's place of birth and the most recent residence prior to locating in the village in which the respondent was interviewed mirror the pretest/panel comparisons.

Another interesting set of differences occurs between the pretest and posttest samples and the pretest sample and the panel in types of households (HTYPE). The pretest sample had larger proportions of single persons, conjugal pairs, and nuclear families than either the posttest sample or the panel. Household types and household sizes are very responsive to economic change. Single persons living alone, conjugal pairs, and nuclear families tend to be more mobile and more dependent on employment to remain in place in times of economic adversity than the variety of stem, denuded nuclear, and mixed households we defined in this analysis. The evidence suggests that sufficiently many single persons, conjugal pairs, and nuclear families relocated from the sample villages between 1987 and 1989, most probably because of economic factors--downturns in public and private employment--to yield differences between the pretest sample and both the posttest sample and the third wave of the panel.

The clear inference is that the composition of A villages between 1987 and 1989 was affected by some as yet undiscovered exogenous factors, most plausibly economic and stemming from the downturn in oil prices, which, in turn, affected revenue transfers of many kinds to villages. These data suggest the panel is over-represented by respondents less apt to relocate. The posttest sample also is affected, but not so dramatically: the posttest sample reflects demographic change. Two economic profiles correlate, in a curvilinear fashion, with this package of birth, relocation, and tenure variables. Persons with full-time employment, stable incomes, and high educational

attainment represent one profile. Persons with low educations, who are unemployed or underemployed and whose low incomes are drawn from several sources--including welfare transfers--represent the other profile. One profile of respondents can relocate, but need not. The other does not possess the skills (or, perhaps, the desire) to relocate.

Item A34 and B9, which measure "arts and crafts production in the past year" and "incapacitating illness or injury in the past two weeks," yield no differences between the pretest and posttest samples (.7A * .9AD). The pretest-panel contrast (.7A * .9A3), to the contrary, demonstrated differences on both items. The pretest sample produced *fewer* arts and crafts and also suffered from more recent illness or injury. Differences between the third wave of the panel and the posttest sample were not significant on these items, so the threat of testing artifacts was reduced and the inference that change had occurred was increased. The panel was healthier and more apt to engage in arts and crafts production than were pretest respondents.

The .7A/.9AD contrasts suggest that relocations between 1987 and 1989 may have affected differences between pretest and posttest respondents much as relocations (outmigration, in particular) affected pretest and third-wave panel responses. The posttest-sample respondents had higher educations than the pretest sample (Cl), but the difference with the third wave of the panel was not significant (.9A3 * .9AD). In addition, posttest respondents were more satisfied about their social ties to people in other communities (E12), their incomes (E29), their standards of living (E30), and the prospects for their children to learn and acquire subsistence skills (E46) than were the pretest respondents. These results also mirrored those obtained in comparisons of the

panel with the pretest sample (.7A * .9A3, Table 9-1).[7] The implication is that higher education and greater satisfaction with contacts and income, and perhaps with prospects for children, correlated with more recent relocates to the villages but also with persons who were favorably and gainfully ensconced in villages (through education, employment, and income).

These are, of course, multivariate claims that require multivariate analysis over three panel waves. The evidence for the hypothesis is, nevertheless, compelling. This is particularly so when we assess months employed during the past year (C6M) and household income (D2), in which posttest respondents differed significantly from the pretest sample (posttest and panel respondents worked much more often and made more money). The posttest sample and the third wave of the panel most surely represent stability of place but also some movement and relatively recent relocations of persons for whom movement is economically feasible, if not also desirable and possible. Contrariwise, the comparisons with the pretest sample suggest selective outmigration for persons in households able to move, especially single persons, conjugal pairs, and nuclear families. These comparisons reflect change, rather than testing artifacts.

III.B. Panel B, Pretest B, and Posttest B

Column 5, Table 10-1, compares the 1988 pretest sample for Schedule B (.8B) with the 1990 posttest sample for Schedule B (. 0BD). Of 67 differences, 25 are significant (37%). Of 61 of the same measures, 17 are significantly different between the

[7] Items E30 and E45 demonstrate erratic stability and poor reliability (several measures), so comparisons based on these variables are vulnerable.

third wave of the B panel (.0B3) and the pretest sample (.8B) (28%) (see Table 9-1, column 13).

In the assessment of testing artifacts above, we hypothesized that differences between the panel and the posttest sample for 1990 were severely affected by the employment dislocations and employment opportunities following the Exxon Valdez oil spill. The evidence presented here supports that hypothesis. We remind the reader that we sampled the villages of Kodiak and Dillingham more heavily in the posttest (.0BD) than in the pretest (.8B). In the pretest, we selectively under-sampled those villages because of their very large populations and very high proportions of non-Natives. We did not want to swamp the results for the rest of the sample on the basis of responses from several large, non-Native fishing villages in the Bristol Bay and Alaska Peninsula areas.

Each sampling in Schedule B villages followed randomizing procedures, but in 1988, 72 percent of the respondents were Natives whereas in 1990, 58 percent were Natives. The 14-percent increase in non-Natives does not account for all of the differences. In-migration in search of employment (and out-migration because of loss of employment) also are important factors. For example, fewer posttest respondents were born in the village or region in which they were interviewed than was the case for pretest respondents (D28), fewer posttest than pretest respondents had lived in the region or even in Alaska immediately prior to locating in the village in which they were interviewed in 1990 (D26), and the average length of residence for posttest respondents (7.5 years) was 5 years less than that of the pretest average (D25). The theoretical

contrasts will better discriminate among racial/ethnic differences, as well as differences in types of villages, than will the A and B schedules, whose differences are functions of the arbitrary way in which the schedules were created.

So, the pretest and posttest differences reflect the larger proportion of non-Natives in the posttest sample, but they also reflect recent transiency in pursuit of employment (seeking cleanup-related work, or leaving because of the closing of commercial-fishing waters). The posttest respondents ate fewer meals with relatives (A32); less frequently sought advice from elders (A36); were less apt to speak a Native language at home (A38); less frequently voted in the last city, village, and regional elections (D19, D22, and D23); less often were married to Native spouses (D29A); and less often were employed in the private sector (fishing-related businesses) (EMPLR). A most interesting outcome is that employment in the private sector dropped from 74 percent to 57 percent between the pretest and posttest. Public-sector jobs increased from 26 percent to 43 percent of all employment.

The employment and earning-related variables show marked changes between 1988 and 1990. Respondents in the posttest sample were employed for more months of the year (seasonal employment was less dominant in 1990 than in 1988), earned greater incomes (D2), claimed to require greater incomes to survive (D4), and resided in houses with more rooms.

Turning our attention to significant differences between the B posttest respondents (.8B) and the third-wave responses of the B panel (.0B3), we uncover evidence of changes similar to those changes discovered in the Schedule A data (see

Table 9-1, column 13). The panel respondents appear to be less transient and, perhaps, more economically stable than either the pretest sample or the posttest sample. In comparison with the pretest sample, panel respondents are older (RAGE), were employed during more months of the previous year (C6M), were less often employed outside the village, and were employed outside for fewer months (C12 and C12M). Panel respondents resided in larger houses (D8), more frequently voted in the most recent regional corporation election (D23), were more satisfied with their ability to speak their Native language (E1O), and were more frequently "completely satisfied' with their social ties to persons in other communities as well as the usefulness of their childrens' educations (E12 and E23).

Differences are not significant in the respondents' race/ethnicity, race/ethnicity of spouse, or years resident in the village. However, there were more Natives and more Native spouses, and respondents in the panel were older than was the case for the pretest sample.

It appears, then, that some attrition occurred to younger persons and non-Natives and that the panel reflected the most stable persons in the Schedule B sample. In the absence of testing artifacts, we discovered some items that may well indicate sensitive responses to exogenous, most likely, economic factors.

The final column of Table 10-1 compares the combined 1989 waves of the A and B panels against the Schedule A posttest sample for 1989. The comparisons between the combined panels and the posttest sample for 1989 confirm the generalization that differences between pretest and posttest samples are products of change and not testing

artifacts or fortuities. The combined panels voted more frequently than .9AD (explained above), and the race of spouse differed between combined panel and posttest (accounted for by the inclusion of the B panel).

CHAPTER 11
RELIABILITY. STABILITY. AND TESTING EFFECTS: RESULTS AND RECOMMENDATIONS

The longitudinal and over-time tests for reliability, stability, and testing effects of the AOSIS questionnaire items uncovered many items that must be dropped from consideration for inclusion in a questionnaire-indicator system. It is likely that some of the recalcitrant variables can be revised and will prove to be valid, but the research and testing procedures required to evaluate the validity of items revised at this point are beyond the scope and timeliness of this research project. Here I list the questions in the original and revised AOSIS instrument that failed the final tests of reliability, stability, and validity and also those variables that proved to be redundant and hence unnecessary for an indicator system. I also list the AOSIS variables that survived the three waves of research through Schedule A and B villages, 1987-1990.

The majority of problems discovered subsequent to the 1989 field research season appear to have been caused by problems in the original design of the AOSIS questionnaire, by the ratings of responses to those questions during the first field year, and/or by problems in locating and interviewing the identical panel respondents (Panel A) during the second wave in 1988. We rectified many of these problems as we progressed through the second and third research waves. The failure of so many variables to pass the intratopic reliability tests and the stability tests was not expected; and the failure to develop reliable and valid measures of household expenses was a disappointment that we sought to correct, but to no avail.

Two large problems remain and must be resolved if affective measures of well-being are to be employed in the questionnaire Social Indicator system. The affective attitudinal variables are puzzling. Those that were modified and survived intratopic reliability tests within a sample for a given year seldom passed the stability tests within the panels and, in most cases, yielded significant differences between pretest and posttest samples. These results may, of course, represent change, but the erratic longitudinal behavior of most of the questions does not instill confidence in their use. They lend themselves to facile interpretations in almost all analyses that include variables that are empirical in addition to affective, but that is a problem rather than a solution. The survey research literature on pretest-posttest affective attitudinal variables suggests that we should not expect questions of this type to be stable. The reasons usually given to rationalize the instability of affective items is that they vary over time by an indefinite number of factors of context and circumstance. This is a rather flimsy rationalization of items whose reliability is low and for whom threats to validity are high. We are uneasy about the behavior of the affective attitudinal items in the AOSIS instrument, even though they have been reduced from five ordinal steps to three, and even though only three of the original 52 remain in the questionnaire: E1O (feel your ability in language), E12 (feel social ties other villages), and E29 (feel income). Those three passed all tests of reliability, sensitivity, validity, stability, and testing effects, with the exception of E10, which did not pass the intratopic reliability test.

As for the household-expense questions (D1A-D1F), responses seem to be influenced by construct validity problems. For example, many respondents may

experience difficulty in remembering or reconstructing or separating the various expenses that they incur in maintaining their houses. Construct validity aside, the erratic behavior of the variables may also be influenced by various public policies (differences in State energy-transfer programs and the like) that differ among regions, villages, or even among income groups. Analyses of the over-time correlations, stability, and reliability for the panels and the pretest and posttest samples do not suggest that we have developed valid measures of household expenses.

Table 11-1 lists the items that were eliminated from consideration for the questionnaire indicator system and the reason(s) for which each was eliminated.

Table 11-2 lists the variables, by section (topics), that have been proven to be reliable and valid. There are some unresolved questions about some of the variables, in particular the affective attitudinal items E1O (feel your ability in language), E12 (feel social ties other villages), and E29 (feel income), and also the items that assess opinions about the consequences of searches for oil: E50 (oil search create jobs), E51 (search for oil reduce fish and game), and E52 (search for oil good or bad).

We restrict the analysis in Social Indicators III to the variables in Table 11-2, from which indicator variables are selected for a questionnaire (AOSIS) Social Indicator system.

Table 11-1

AOSIS VARIABLES THAT FAILED FINAL TESTS (NONRESPONSE, INTRATOPIC RELIABILITY, OVER-TIME RELIABILITY, AND STABILITY) OR WERE REDUNDANT, 1987-1990'

NONRESPONSE RELIABILITY	INTRATOPIC RELIABILITY	OVER-TIME RELIABILITY, STABILITY, AND ERRATIC LONGITUDINAL COEFFICIENTS	REDUNDANT VARIABLES
A31	A35*	A35*	B4
A35 +	A36+	A36+	B5*
DI C*	B5*	B10	66
D1 D*	B1I*	B1I*	B7
D1 E*	DIC*	C2	C3
D1 F*	DID*	DIA	C4
	D1 E*	D1 B	
	D1 F*	El 7	
	D5	E23	
	D6	E30	
	El 0	E31	
	E35*	E34	
		E35	
		E41	
		, E45	
		E46	

*(*) Signifies that a variable failed two tests. (+) Signifies that a variable failed three tests.

Table 11-2

AOSIS VARIABLES THAT PASSED ALL TESTS: CONSTRUCT VALIDITY, RESPONSE, RELIABILITY, STABILITY, TESTING ARTIFACT, 1987-1990

SECTION A	SECTION B	SECTION C	SECTION D	SECTION E
A26A	B1	cl	D2	E10
A26B	B3	C5	D3	E12
A28	B8	C6M	D4	E29
A30	B9	C6N	D6	E50
A31		C9B	D8	E51
A32		C10A	D9	E52
A33		C10B	D10	E58
A34		cl 1	D11	
A38		C12	D12	
CDAY1		C12M	D13	
CREL1		cl 2X	D16	AGE, SEX
CDAY2		cl 2Y	D19	JOB, HOUSE
CREL2		C12Z	D20	
CDAY4		C13	D22	RAGE
CREL4		C15	D23	RSEX
CDAY5		C16	D24	EMPLR
CREL5		C18	D25	HSIZE
A25A EXXON		C19	D26	HTYPE
A26A EXXON		C20	D27	
A32B EXXON			D28	
			D29	
			D29A	

PART FIVE: THE KEY INFORMANT PROTOCOL

CHAPTER 12
RELIABILITY AND STABILITY

L INTRODUCTION

During the 1989 field season, we reinterviewed the original KI respondents in the Schedule A and B samples (N= 169 in 1987 and 1988). Our 1989 reinterview sample was N= 108.[1] Some of the original KI respondents in the A and B panels (initial interviews in 1987 and 1988) had relocated, some villages were not revisited because of weather or logistical problems (although KI informants from some of these villages were interviewed by phone or by meeting in villages other than those in which they resided when initially interviewed), and some could not be located because of shoddy records maintained by some KI investigators. Table 12-1 lists the 108 KI respondents reinterviewed in 1989 by their regions and villages of residence. The tests for stability (stationariness), response rate, and multivariate (intervariable) reliability are based on 64 percent of the respondents in the original sample.

It was our intention when we created our multimethod, multimatrix Solomon Four Group research design that the KI protocol (KIP) would provide depth of understanding that would allow increased understanding of the questionnaire and responses to it. We had not intended to apply reliability and validity tests to KIP data so that a Social

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‘ In the period since their initial interview, some respondents had relocated and some were merely away from their home villages and could not be interviewed (although we interviewed four in their new locales). We anticipated low success for some villages in the Kodiak, Aleutian, and Bristol Bay areas where in- and outmigration is seasonal and high. During the winter field session of 19S9, some of the original KI's could not be interviewed because of scheduling (time) conflicts when our KI interviewers were in the villages. Our KI interviewers could not get to two small villages because of inclement weather that made travel to them impossible during the research period. One KI interviewer was obligated to another contractor and was not able to conduct interviews in two North Slope villages.

Table 12-1

KI PROTOCOL RESPONDENTS BY REGION AND VILLAGE (SCHEDULES A AND B), 1989

Region	value	Frequency	Percent
CALISTA	1	17	15.7
NANA	2	12	11.1
NORTH SLOPE	3	14	13.0
ALEUTIAN/PRIBILOF ISLANDS	4	19	17.6
BERING STRAITS	5	13	12.0
BRISTOL BAY	6	19	17.6
KODIAK	7	14	13.0
TOTAL		108	100.0
Valid Cases 108			

Village	Value	Frequency	Percent
BETHEL	1	5	4.6
NUNAPITCHUK	2	1	0.9
ANIAK	3	3	2.8
ALAKANUK	4	4	3.7
SCAMMON BAY	5	1	0.9
TOKSOOK BAY	6	3	2.8
KIVALINA	7	1	0.9
DEERING	8	2	1.9
BUCKLAND	9	1	0.9
KOTZEBUE	10	8	7.4
BARROW	11	5	4.6
WAINWRIGHT	13	2	1.9
PT HOPE	14	3	2.8
NUIQSUT	15	2	1.9
ST PAUL	16	5	4.6
SAND POINT	17	3	2.8
ATKA	18	3	2.8
UNALASKA	19	5	4.6
NIKOLSKI	20	3	2.8
GAMBELL	21	7	6.5
NOME	22	2	1.9
UNALAKLEET	23	2	1.9
SHISHMAREF	24	2	1.9
DILLINGHAM	25	7	6.5
NAKNEK	26	2	1.9
TOGIAK	27	7	6.5
MANOKOTAK	28	3	2.8
KODIAK	29	12	11.1
OLD HARBOR	30	2	1.9
KAKTOVIK	31	2	1.9
TOTAL		108	100.0
Valid Cases 108			

Indicators monitoring system could be developed from them, perhaps to be integrated with a similar system to be developed from the QI (AOSIS) questionnaire data.

Following the 1987 field session among Schedule A villages, all KIP variables had response rates greater than 95 percent, and almost all obtained PRE scores of $\geq \pm .50$ with three or more variables. Interinstrument reliability, too, proved to be high (see Jorgensen and McCleary 1987). Following the 1988 field session, the KIP samples for Schedules A and B were merged, and 48 KIP variables were again tested for intervariable reliability. The conjunction of the Schedule A and B samples lowered the number of PRE coefficients greater than .50 for 17 variables. But upon testing these same variables in our theoretical contrasts, all 48 yielded three or more PRE coefficients $\geq .50$ in several contrasts.

A difference between the two methods within our research design is that the KIP samples for Schedules A and B were initially planned to be interviewed only once. But as problems emerged with the attitudinal questions in the AOSIS questionnaire, particularly the questions addressing traditional customs and ideas of many kinds, it became advisable to address those questions through the protocol. To determine whether those questions (and the ratings made by the KIP investigators) were reliable, it was necessary to convert those samples into panels. That is, posttests (reinterviews) were required to determine the stability and multivariate reliability of the protocol questions, including the new questions introduced into the protocol in 1988 to rectify problems encountered in the questionnaire instrument.

In 1988, we interviewed respondents in the Schedule B sample for the first time. We used that occasion to introduce a few questions from which we created 100 new variables addressing a wide variety of topics about economic conflicts within villages and regions; about naturally occurring resources, including their availability, management, preferred management, meanings (symbolic, commodity), knowledge of the resources by formal research, and understanding of the resources by use; and attitudes about the probable consequences of oil-related operations for village residents. Upon assessing the responses from the Schedule B **KIP** sample in 1988, we added a few questions to the matrix and generated another 80 variables. This was done in largest part because, according to the **KIP** interviewers, the responses to the questions we introduced in 1988 stimulated questions from the respondents. We added a few questions, then, which in turn generated a large number of variables.

The tests for stability here included the original protocol questions as well as the questions introduced in 1988 but not those introduced in 1989 (inasmuch as we have only a single measure of the items most recently introduced). Both **KIP** panels **(A&B)** were reinterviewed in 1989, but because only the Schedule B respondents answered both the pretest and the posttest questions introduced in 1988, the stability tests for these questions were restricted to the B respondents.

11. **RELIABILITY:** NONRESPONSE AND **INTERVARIABLE** TESTS FOR 1989

IV.A. General

The response rates for the original 48 protocol variables averaged 96 percent. Not one variable among them was dropped because of low response rates. Five of eight

new variables introduced in 1989 to assess economic conflicts within villages and regions, however, had very low response rates (between 40% and 60%) and were dropped from the analysis. Apparently these questions suffered as much from confusion among the KIP interviewers as among the respondents. It is not clear whether the questions were especially sensitive or whether their construct validity was poor. Ninety-eight percent of the respondents were willing to discuss whether economic conflicts occurred within the village (BK33A), 80 percent were willing to discuss whether economic conflicts occurred between Native and non-Native persons (BK33C), and 80 percent were willing to discuss whether economic conflicts occurred between non-Native-owned corporations and Natives (and/or Native corporations) (BK33G).

The five remaining specific forms of economic conflicts covering relations between persons in the village, Native profit and nonprofit corporations, Native corporations and city governments, village and regional organizations, and Native organizations and State or Federal Governments (BK33B, BK33D, BK33E, BK33F, and BK33H) received 40- to 60-percent-response rates. Whether respondents did not know about such conflicts, did not care to answer, or did not understand the questions is unclear. The low response rates did not commend these questions for a protocol monitoring system.

Of the remaining 172 questions introduced either in 1988 or 1989, every one pertaining to knowledge and understanding of resources, consequences from oil-related activities, the time required to gain knowledge of the environment, and the significance of symbols attached to the environment produced over 98-percent-response rates. The specific resource questions, such as the availability and management of arctic hares,

produced over 95-percent-response rates if the questions pertained to resources within the area used by the respondent. Virtually all of the remaining 172 questions introduced in 1988 and 1989, then, passed the response test for reliability.

Because of the massive number of resource-related questions, it is impractical to analyze them in a single matrix of 172 variables. I organized the many species into matrices on the basis of similarities among them, e.g., land mammals were placed together in a set, as were sea mammals, fish, birds, marine invertebrates, and so on; and I added variables pertaining to the specific management of those resources, knowledge and understanding of those resources, symbols attached to those resources, and so forth. This procedure requires the assumption that items that share an underlying similarity should correlate strongly and positively internally (within the set). If they do not, they should be jettisoned; and if they do, it is then possible to select one or two to represent the set when representatives from several sets are correlated.

Almost all species reduced the percentage of error by more than .50 with two or more other species or with specific questions about the management or understanding of resources. The major problem posed by these variables was redundancy. This problem was solved by reducing the matrices for each resource type by retaining only one item from among two, three, or four, if **all** correlated strongly and positively (or negatively) with the same set of items in the matrix. Matrices for land mammals, sea mammals, and the like are presented in a later chapter.

Among the original 48 variables, 3 obtained fewer than three PRE scoresof ± .50: household composition and dynamics (K19), political participation in the household (K24), and identification of political issues (K25). The remaining 45 passed the intervariable test, but because 12 have doubtful stability,[2] only 33 KI variables are entered in the matrix in Table 12-2.

II.B. Stability

Because we were restricted to two waves, no over-time tests of stationariness could be conducted on the KI variables (correlations of the same respondents on the same variables at three points in time).[3]

Of 93 variables--including all of the variables we created to measure cognitive attitudes about naturally occurring resources and their management, and about traditional culture--87 either passed the stability test (test of stationariness) by yielding sufficiently high measures of variation explained or proportional reduction of error or were retained because they appeared to be sensitive to changes occurring between pretest and posttest investigations. Tables 12-3 and 12-4 provide the results of those tests. These variables also passed the test for multivariate validity (PRE or Pearson's ? values ≥ .50 with at least three variables [see Tables 12-3 and 12-4]),

[2]The 12 items (and others) are discussed in Sec. 12.II.B.

'Schedule C interviews conducted in late summer 1989 and to be analyzed *in* Social Indicator Project V will provide tests of over-time stationariness for the KI respondents in tbe Aleutian-Pribilof, Kodiak, and Bristol Bay regiona (the commercial-fishing contrast in our Commercial *Frkh:Non-Commercial Fish theoretical* contrast). This will assist our understanding of the behavior of the protocol variables in that part of the contrast, but not for tbe entire sample.

Table 12-3 provides coefficients obtained between the initial interviews (pretests) and reinterviews (posttest) of 108 IUP respondents for the 47 original variables in the KIP. Of the 47 variables, 41 either passed the stability test by yielding PRE (or r^2 values $\geq \pm .50$ or appeared to be sensitive to recent changes in village economics and required

Table 12-2

MATRIX OF GAMMA COEFFICIENTS, 33 KI VARIABLES AND 108 KI RESPONDENTS, SCHEDULES A AND B REINTERVIEWS, 1989

	D28	BK1	BK2	BK3	BK4
D28	1.000				
BK1	-0.821	1.000			
BK2	-0.876	0.728	1.000		
BK3	-0.689	0.616	0.501	1.000	
BK4	0.694	-0.167	-0.120	-0.153	1.000
BK5	0.388	0.004	0.081	0.048	0.707
BK6	-0.319	0.017	-0.184	0.022	-0.610
BK9	0.876	-0.231	-0.247	-0.267	0.607
BK1O	0.503	-0.034	-0.174	0.129	0.085
BK1	-0.588	0.489	0.579	0.484	0.012
BK1	-0.678	0.464	0.515	0.477	-0.152
BK1	-0.332	0.229	0.452	0.308	0.082
BK1	-0.559	0.398	0.317	0.345	0.041
BK1	-0.572	0.389	0.272	0.306	-0.014
BK1	-0.086	0.136	0.107	0,270	0.217
BK1	-0.439	0.219	0.231	0.192	0.057
BK1	-0.530	0.064	0.105	0.298	-0.057
BK17	-0.730	0.485	0.474	0.308	0.083
BK18	-0.115	0.094	0.024	0.239	-0.152
BK22	-0.104	0.001	0.147	0.205	0.088
BK26	-0.552	0.195	0.242	0.308	-0.157
BK27	-0.141	0.037	0.211	0.119	-0.003
BK28	-0.716	0.390	0.474	0.395	-0.290
BK29	-0.742	0.638	0.555	0.598	-0.304
BK30	-0.569	0.504	0.458	0.451	-0.240
BK31	-0.979	0.626	0.592	0.576	-0.445
BK3	0.227	-0.030	0.044	-0.228	0.306
BK3	0.079	-0.012	0.086	-0.354	0.311 .
BK35	-0.040	-0.158	0S)32	0.095	-0.186
BK37	-1.000	0.468	0.486	0.251	-0.383
BK3	-0.481	-0.114	-0.076	-0.014	-0.414
BK38	0.879	-0.255	-0.290	-0.480	0.643
BK41	0.853	-0.529	-0.315	-0.487	0.351

Table 12-2
(Continued)

	BK5	BK6	B K 9	BKIO	BK11A
BK5	1.000				
BK6	-0.966	1.000			
BK9	0.607	-0.569	1.000		
BK1o	-0.192	0.273	-0.063	1.000	
BK11A	0.240	-0.319	-0.061	-0.220	1.000
BK11B	0.066	-0.195	-0.066	-0.298	0.911
BK13A	0.186	-0.165	0.216	-0.006	0.423
BK14B	0.345	-0.363	0.053	0.040	0.555
BK15A	0.306	-0.259	0.045	0.087	0.588
BK16A	0.195	-0.050	-0.020	0.307	0.172
BK16B	0.104	-0.061	0.110	0.184	0.446
BK17	0.120	-0.094	0.029	0 . 0 1 2	0.274
BK18	0.392	-0.411	-0.037	-0.444	0.423
BK22	-0.552	0.512	-0.208	0.163	0.104
BK26	-0.128	0005	-0.036	0.314	0.517
BK27	-0.120	0.133	-0.134	0.026	0.510
BK28	-0.114	0.127	0.084	0,019	0.420
BK29	-0.229	0.166	-0.309	-0.100	0.524
BK30	-0.268	0.113	-0.329	-0.188	0.610
BK31	-0.145	0.246	-0.233	0.148	0.426
BK33C	-0.439	0.353	-0.484	-0.225	0.677
BK33G	0.230	-0.264	0.474	0.434	-0.146
BK35	0.073	0.003	0.505	0.203	-0.209
BK37	-0.363	0.158	0.239	-0.585	-0.077
BK37B	-0.138	0.0?4	-0.165	-0.491	0.284
BK38	-0.274	0.214	-0.185	-0.097	-0.264
BK41	0.512	-0.473	0.635	-0.013	-0.147
	0.397	-0.362	0.371	0.148	-0.294

	BK11 B	BK13A	BK14A	BK14B	BK15A
BK11 B	1.000				
BK13A	0.358	1.000			
BK14A	0.235	0.320	1,000		
BK14B	0296	0.240	0.997	1.000	
BK15A	-0.018	0.646	0.261	0.216	1.000
BK16A	0.124	0.492	0.703	0.698	0.598
BK16B	0,114	0.377	0.810	0.837	0.287
BK17	0.392	0.482	0.220	0.174	0.110
BK18	0.262	-0.234	-0.101	-0.123	0.151
BK22	0.306	0.344	0.170	0222	0.391
BK26	0.313	0.281	0.294	0.270	0.222
BK27	0.428	0.299	-0.046	-0.072	0.163
BK28	0583	0.295	0.197	0.227	0.307
BK29	0.574	0.273	0.431	0.424	-0.076
BK30	0.443	0.417	0.397	0.455	0.350
BK31	0.725	0.421	0.430	0.453	0.251
BK33C	-0.477	0.090	0.049	0.072	-0.183
BK33G	-0.345	0 . 2 1 1	-0.113	-0.051	-0.185
BK35	0.085	-0.123	-0.080	-0.139	-0.865
BK37	0.281	0.141	0.211	0.236	0.027
BK37B	-0.089	-0.273	0.023	0.060	-0.202
BK38	-0.192	-0.198	0.106	0.028	-0.104
BK41	-0.246	-0.044	-0.403	-0.417	0.059

Table 12-2
(Continued)

	BK16A	BK16B	BK17	BK18	BK22
BK16A	1,000				
BK16B	0.813	1.000			
BK17	0.134	0.130	1.000		
BK18	-0.152	-0.293	-0.066	1.000	
BK22	0.447	0.091	0.187	-0.049	1.000
BK27	0.496	0.340	0.229	0.067	0.559
BK28	0.355	0.059	0.184	0.200	0.492
BK29	0.203	0.141	0.304	0.131	0.211
BK30	o.197	0.111	0.258	0.067	0.245
BK31	0.395	0.273	0.158	0.085	0.354
BK33C	0.337	0.231	0.367	0.266	0.399
BK33G	0.227	0.265	-0.081	-0.412	0.354
BK35	0.169	0.264	-0.215	-0.374	-0.(.)60
BK37	-0.194	0.041	0.041	4.033	0.087
BK37B	0.158	0.172	0.333	0.068	-0.195
BK38	-0.067	0.021	-0.278	0.196	-0.626
BK41	0.034	-0.051	0.017	-0.106	-0.125
	-0.032	-0.078	-0.266	-0.020	-0.026

	BK26	BK27	BK28	BK28	BK30
BK26	1.000				
BK27	0.909	1.000			
BK28	0.370	0.252	1.000		
BK29	0.370	0.080	0.653	1.000	
BK30	0.441	0.207	0.561	0.681	1.000
BK31	0.415	0.122	0.664	0.924	0.747
BK33C	0.222	0.216	-0.342	-0.340	-0.194
BK33G	-0.068	0.092	-0.464	-0.353	-0.224
BK35	-0.036	-0.084	-0.078	0.455	-0.213
BK37	0.065	-0.112	0.365	0.424	0.251
BK37B	-0.214	-0.228	0.040	0.127	-0.040
BK36	-0.239	-0.063	-0.387	-0.319	-0.286
BK41	0.109	0.287	-0.244	-0.769	-0.462

	BK31	BK33C	BK33G	BK35	BK37
BK31	1.000				
BK33C	-0.468	1.000			
BK33G	-0.488	0.992	1.000		
BK35	0.136	-0.209	-0.005	1.000	
BK37	0.580	-0.309	-0.257	0062	1.000
BK37B	0226	-0.503	-0.450	-0.066	0.318
BK38	-0.553	0.406	0.388	-0.110	*-0.347*
BK41	-0.660	0.540	0.478	-0.054	-0.528

	BK37B	BK38	BK41		
BK37B	1000				
BK38	-0.257	1.000			
BK41	-0.169	0.413	1.000		

Table 12-3

STATIONARINESS OF ORIGINAL 47 KI PROTOCOL VARIABLES, COEFFICIENTS BETWEEN INITIAL INTERVIEWS AND REINTERVIEWS, 108 KI RESPONDENTS (SCHEDULES A AND B), 1987-8, 1989

YEAR 1987-8"	YEAR 1989	STATISTICS V	STATISTICS Φ	STATISTICS r	STATISTICS $X^2(P)$	DISPOSITION DROP / KEEP[b]
K1	BK1	.4s			.000	K
K2	BK2	.60			.000	K
K3	BK3	.77		.66	.000	K
K4	BK4	.75		.75	.000	K
K5	BK5	.73		.63	.000	K
K6	BK6	.67		.44	.830	K
K7	BK7	.57		.4S	.000	D
K8	BK8	.58		.50	.000	D[c]
K9	BK9	.48			.190	K
K10	BK10	.72			.000	K
K11A	BK11A	.34			.004	K
K11B	BK11B	.12			.004	K
K12A	BK12A	.04			.244	D
K12B	BK12B	.18			.5S8	D
K13A	BK13A	.47			.640	K
K13B	BK13B	.27			.S30	K
K14A	BK14A	.59			.002	K
K14B	BK14B	.54			.000	K
K15A	BK15A	.35			.173	K
K15B	BK15B	.41			.175	K
K16A	BK16A	.42			.006	K
K16B	BK16B	.44			.029	K
K17	BK17	.84		.76	.000	K
K18	BK18	.92		.72	.000	K
K19	BK19	.49			.003	K
K20	BK20	.16			.764	D
K21	BK21	.34			.000	D
K22	BK22	.s4			.000	K
K23	BK23	.31			.130	D
K24	BK24	.66			.000	K
K25	BK25	.58			.000	K
K26	BK26	.55			.000	K
K27	BK27	.76			.000	K
K28	BK28	.45			.012	K
K29	BK29	.58			.000	K
K30	BK30	.47			.000	K
K31	BK31	.93			.000	K
K32	BK32	.22			.07S	D
K34	BK34	.42			.003	K
K35	BK35	.39			.01 1	K
K36	BK36	.46			.614	K
K37	BK37	.31			.000	K
K37B	BK37B	.67			.000	K
K38	BK38	.93			.000	K
K39	BKB39	.40			.038	K
K40	BK40	.94			.000	K
K41	BK41	.27			.038	K

' Respondents in Schedule A villages initially were interviewed in 1987. Respondents in Schedule B villages initially were interviewed in 1988. Reinterviews of Schedule A and Schedule B respondents were conducted in 1989.

[b] Variables whose PRE coefficients or probabilities are underlined, although yielding either low significance values or low positive PRE scores, in the theoretical contrast are demonstrated to be sensitive to recent changes in village economies. Item K9, for example, appears to be measuring an increased reliance on stable forms of unearned income, whereas K11A and K11B appear to be measuring increased sharing of income within and among households within the village in 1989 over 1987 or 1988.

"Variables K7 and K8, although reliable by our correlations and tests of significance, suffered from construct validity threats. These variables were replaced by PPEMP from the questionnaire.

Table 12-4

STATIONARINESS OF 46 KI PROTOCOL VARIABLES (TRADITIONAL), COEFFICIENTS BETWEEN INITIAL INTERVIEWS AND REINTERVIEWS, 46 SCHEDULE B RESPONDENTS, 1988 AND 1989

YEAR 1988-9[a]	RESOURCE[b]	STATISTICS V	x'(P)	DISPOSITION DROP/KEEP
Q2A1	WALRUS	.64	.008	K
Q2A2	WALRUS	.72	.067	K
Q2B1	BOWHEAD	.45	.190	K
Q2B2	BOWHEAD	.5s	.362	K
Q2C1	OTHER WHALES	.95	.000	K
Q2C2	OTHER WHALES	.73	.001	K
Q2D1	SALMON	.67	.021	K
Q2D2	SALMON	.72	.001	K
Q2E1	HERRING	.70	.003	K
Q2E2	HERRING	.82	.000	K
Q2F1	COD	.81	.000	K
Q2F2	coo	.82	.002	K
Q2G1	HALIBUT	..96	.000	K
Q2G2	HALIBUT	.75	.001	K
Q2I1	KING CRAB	1.00	.000	K
Q2I2	KING CRAB	.67	.002	K
Q2M1	CARIBOU	.66	.049	K
Q2M2	CARIBOU	.81	.029	K
Q2Q1	GEESE	.84	.000	K
Q2Q2	GEESE	.71	.000	K
Q2R1	DUCKS	.82	.000	K
Q2R2	DUCKS	.76	.000	K
Q2V1	ROE-ON-KELP	.82	.002	K
Q2V2	ROE-ON-KELP	.78	.000	K
Q3A	WALRUS	.66	.090	K
Q3B	SEALS	.89	.000	K
Q3C	BOWHEAD	1.00	.140	K
Q3E	CARIBOU	.56	.073	K
Q3F	MOOSE	.64	.145	K
Q3H	SALMON	.91	.000	K
Q31	HERRING	.91	.000	K
Q3J	BOTTOM FISH	.87	.009	K
Q3K	CRABS	.80	.012	K
Q4A	SALMON	.57	.081	K
Q4B	HERRING	.72	.068	K
Q4C	BOTTOM FISH	.68	.064	K
Q4D	MARINE INVERT.	.73	.041	K
Q4F	GEESE	.69	,005	K
Q4G	DUCKS	.82	,001	K
Q4K	CARIBOU	.76	.200	K
Q4L	MOOSE	.76	.270	K
Q4M	FUR BEARERS	.62	.000	K
Q6	TIME	.s0	,020	K
Q7	SYMBOLS	.63	,000	K
09	MEMORIES	.80	.018	K
Q10	ELDERS	.s0	,018	K

[a] The questions pertaining to the variables correlated here were developed in 1988 so were not administered to Schedule A respondents in 1987. The tests for stationariness conducted here pertain only to Schedule B respondents. These questions were asked of Schedule B respondents in 1988 and again in 1989 (with some modifications). Schedule A respondents were asked these questions in 1989.

[b] The following are brief definitions of the variable names in this column; the names in the column identify the resources about which the question pertains Q2*1 = Can tha [resource] be managed (cannot/persons can/institutions can). Q2*2 = Who should manage the [resource]: (State or Federal Govemment/combination of Government and Native institutions/Natives). Q3* = Cognitive attitude about effectiveness of State or Federal management of [resource] in comparison to presumed Native effectiveness if they exercised control. Q4* = Cognitive attitude about whether village residents, through advisory boards or any other means, influence governmental policies on the management of [resource]. Q6 = Cognitive attitude about how long it takes to acquire knowledge about an environment, that is, the space in which persons reside and from which they gain their livelihood. Q7 = Are significant symbols (inviolable, sacred, important) attached to the environment (see definition of environment in Q6). Q9 = Memory of sharing resources, labor, sash (comparison between past and present practices). Q1O = Attitude about treatment of elders (is care insufficient, adequate, greater than necessary),

an over-time test (correlations at three points in time), while controlling for exogenous factors, before making a decision to jettison the questions from the inquiry. In particular, the variables that measured sharing cash within the household and the village and with persons in other villages (KI 1A-K12B) and those that measured sharing goods (equipment, food, clothing, etc.) appeared to be especially sensitive to changes, most likely economic, that occurred between the pretest and posttest. By these measures, sharing increased within households and kinship groups and among wider networks of kinspersons and friends *within* villages between tests.

Two variables passed the pretest-posttest stability analysis but because KI investigators either had difficulty interpreting the questions or conveying them accurately to the respondents, or because respondents had difficulty interpreting and answering the questions (about whether their employment was in the public or private sectors of the economy, K7-K8)--were replaced with information about occupation-employment collected during the questionnaire interviews. In Table 12-3, all variables to be dropped from consideration for inclusion in a Social Indicators monitoring system are italicized .

Table 12-4 provides pretest-posttest stationariness for 46 KI respondents in Schedule B only. Because many significant differences occurred in the Commercial *Fish:Noncommercial Fish* theoretical contrasts, we presumed that Schedule A pretest-posttest responses on these questions would yield strong, positive PRE coefficients. We asked whether a resource could be managed (always Q2* 1), who should manage it (Q2*2), whether the respondent thought government management would be better than Native management if Natives exercised managerial authority (Q3 *), and whether village

residents influenced management decisions about the resource (Q4*). We then asked some general questions about how long it took to acquire knowledge about the environment (Q6), whether significant symbols were attached to the environment (Q7), whether current sharing practices were similar to earlier practices (Q9), and whether elders received proper treatment (Q1O).

The 46 variables were stable for Schedule B KI respondents at two points in time,

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APPENDIX: MATRICES AND RESEARCH INSTRUMENTS

APPENDIX

The Appendix comprises two parts, matrices and research instruments.

1. Matrices. The AOSIS intra-topic correlation matrices of considerable length follow (Tables Al and A2). Table Al provides internal correlations for all variables in each of five AOSIS sections (A-E) for the theoretical contrasts in the pretest sample (.78X). Table A2 provides those correlations for the theoretical contrasts in the posttest sample (090X).

2. Research Instruments. The second part of the Appendix provides the original version of the AOSIS questionnaire, the revised version administered to the Schedule A posttest sample in 1989 (and the second wave of the B panel and third wave of the A panel), and the revised version administered to the Schedule B posttest sample in 1990 (and the third wave of the B panel). The Key Informant Protocol (KIP) follows. The first KIP is the version administered in 1988. It is identical to the original version for items K1-K41 but in addition contains a new section (items 1 through 11 at the beginning of the instrument). The second KIP is the version administered in 1989. Revisions were made to correct ambiguities encountered in 1988.

TABLE Al
MATRICES OF COEFFICIENTS BY THEORETICAL CONTRASTS, AOSIS QUESTIONNAIRE VARIABLES, 548 PRETEST RESPONDENTS (.78X), SCHEDULES A AND B (COMBINED), 1987-88

HUB VILLAGES (.78X)

SECTION A: TRADITIONAL ACTIVITIES (GAMMA)

	A26A	A26B	A28	A30	A31	A32	A33	A34	A35
A26A	1.000								
A26B	0.621	1.000							
A26	-0.109	-0,015	1.000						
A30	-0.031	-0.165	0.609	1.000					
A31	-0.263	0.020	-0.703	-0<635	1.000				
A32	-0.100	0.024	0.162	0.349	-0.003	1.000			
A33	0.016	-0.125	0.455	0.462	-0.301	0.263	1.000		
A34	-0.260	0.057	0,191	0.246	-0.036	0.430	0.413	1.000	
A35	0.069	-0.029	0.114	0.266	-0.209	0.099	0.223	0.370	1.000
A36	-0.130	-0.156	0.141	0s05	-0.231	0.036	0.101	0.660	0.549
A36	0.301	0.257	-0.061	-0.149	0.107	-0.226	-0.061	-0.080	-0.012

	A36	A36
A36	1.000	
A36	0.000	1.000

SECTION B: HEALTH (GAMMA)

	B1	B3	B5	B6	B7	B8	B9	B1O	BII
B1	1.000								
B3	0.541	1.000							
B5	0.779	0.254	1.000						
B6	0.572	0.435	0.059	1.000					
B7	0.646	0.444	0.100	0.657	1.000				
B8	0.581	0.478	0.370	0.557	0.645	1.000			
B9	-0.409	-0.350	-0.103	-0.378	-0.458	-0.389	1.000		
B1O	-0.226	-0.408	0.229	0.260	-0.186	-0.273	0.628	1.000	
B11	-0.106	0.090	0.057	0.023	-0.011	-0.038	-0.044	0.319	1.000

SECTION C: EDUCATION AND EMPLOYMENT (GAMMA)

	c l	C2	C3	C4	C5	C6M	C6N	C12	C12M
c l	1.000								
C2	0.775	1.000							
C3	0.433	0.571	1.000						
C4	0350	0.579	0.792	1.000					
C5	0.272	0.536	0.495	0.725	1.000				
C6M	0.251	0.119	0.305	0.152	0.106	1.000			
C6N	0.241	0.014	0.252	0.082	0.130	1.000	1.000		
C12	0.464	0.290	0.211	0.466	0.484	0.394	0.576	1.000	
C12M	0,268	0.362	-0.124	-0.524	-0.166	0.496	0.750	0.775	1.000

SECTION D: INCOME, GOODS & SERVICES (GAMMA)

	D3	D6	D9	D10	D11	012	D19	D20	D21
D3	1.000								
D6	-0.187	1.000							
D9	-0.012	0.325	1.000						
D10	0.137	0.156	0.168	1.000					
D11	0.335	-0.110	0.069	0.605	1.000				
D12	0.076	0.276	0.320	-0.101	-0.080	1.000			
D19	-0.253	0.043	-0.378	-0.264	-0.814	-0.025	1.000		
D20	0.065	-0.106	-0.229	-0.124	-0.206	-0.141	0.974	1.000	
D21	0.147	-0.295	0.075	0.130	-0.041	-0.216	0.350	0.436	1.000
D22	0.040	-0.212	0.177	-0.228	-0.742	-0.235	-0.024	-0.137	0.767
D23	-0.044	-0.264	-0.136	-0.159	-0.654	-0.215	0.126	0.060	0.761
D24	-0.016	-0.070	-0.033	0.127	-0.466	-0.169	-0.040	0.278	0.557
D26	0.190	0.126	0.051	0.066	0.563	0.101	0.042	-0s367	-0.446
D28	0.233	0.355	-0.069	-0.201	0.630	0.075	0.306	0.166	-1.000
D29	-0.052	0.459	0.461	-0.209	-0.296	0.317	0.118	0.160	0.119
D29A	-0.174	-0.034	-0.016	0.021	0.025	-0.007	-0.227	-0.353	-0.214

	D22	D23	D24	D26	D28	D29	D29A
D22	1.000						
D23	0.962	1.000					
D24	0.670	0.739	1.000				
D26	-0.705	-0.707	-0.731	1.000			
D28	-0.965	-0.978	-1.000	0.929	1.000		
D29	0.326	0.190	0.180	-0.224	-0.163	1.000	
D29A	-0.511	-0.405	-0.360	0.346	0.550	-0.900	1.000

SECTION D: INCOME, GOODS& SERVICES (PEARSONIAN)

	DIA	D1B	D1C	DID	DIE	DIF	D2	D3A	D4	D5
DIA	1.000									
D1 B	0.457	1.000								
D1C	0.325	0.446	1.000							
D1D	0.221	-0.053	-0.156	1.000						
D1E	0.449	0.222	0,449	0.070	1.000					
D1F	0.258	-0.076	-0.219	0.558	-0.006	1.000				
D2	0.027	0.009	0.484	-0.214	0.202	-0.267	1.000			
D3A	0.001	0.103	0.200	0.133	0.077	0.264	-0.104	1.000		
D4	0.246	0.392	0.539	-0.326	0.291	-0.060	0.447	0.126	1.000	
D5	0.297	-0.041	0.315	-0.270	0.264	-0.192	0.333	-0.049	0.347	1 .000

SECTION E: PERCEIVED WELLBEING (GAMMA)

	E10	E12	E17	E23	E29	E30	E31	E34	E35
E10	1.000								
E12	0.293	1.000							
E17	0.494	0.598	1.000						
E23	0.214	0.474	0.310	1.000					
E29	0.292	0.574	0.563	-0.061	1.000				
E30	0.257	0.563	0.630	0.196	0.456	1.000			
E31	o.155	0.574	0.719	0.063	0.287	0.881	1.000		
E34	-0.004	0!511	0.590	0.396	0.117	0.600	0.569	1 .000	
E35	0.330	0.506	0.509	0.562	0.254	0.221	0.395	0.598	1.000
E41	-0.039	0.007	0.271	0.266	-0.357	0.306	0.521	0.603	0.442

	E10	E12	E17	E23	E29	E30	E31	E34	E35
E46	0.142	0.260	0.176	0.286	0.209	0.217	0.411	0.421	0.538
E50	-0.086	0.200	0.038	0.071	-0.238	0.108	0.156	0.171	0.342

	E41	E46	E50
E41	1.000		
E46	0.505	1.000	
E50	0.362	0.083	1.000

PERIPHERY VILLAGES(.78X)

SECTION A TRADITIONAL ACTIVITIES (GAMMA)

	A26A	A26B	A28	A30	A31
A26A	1.000				
A26B	0.712	1.000			
A28	-0.736	-0.466	1.000		
A30	0.040	-0.192	0.646	1.000	
A31	0.267	0.060	-0.690	-0.541	1.000
A32	0.265	0.049	0.160	0.288	0.014
A33	0.098	-0.186	0.246	0.778	-0.407
A34	O.000	0.102	0.141	0.000	0.117
A35	-0.168	0.151	0.127	*-0.163*	-0.357
A36	-0.410	*-0.118*	0.283	-0.039	-0.325
A38	0.007	-0.199	0.336	0.731	-0.117

	A32	A33	A34	A35	A36	A38
A32	1.000					
A33	0.180	1.000				
A34	-0.023	0.038	1.000			
A35	-0.179	0.082	0.210	1.000		
A38	-0.502	-0.184	-0.239	0.786	1.000	
A38	0.162	0.301	-0.190	-0.222	-0.509	1.000

SECTION B: HEALTH (GAMMA)

	B1	B3	B5	B6	B7	B8	B9	B1O	B11
B1	1.000								
B3	0.510	1.000							
B5	0.377	0.335	1.000						
B6	0.437	0.423	0.324	1.000					
B7	0.473	0.430	0.284	0.741	1.000				
B8	0.252	0.243	0.382	0.351	0.544	1.000			
B9	-0.729	-0.562	-0.401	-0.468	-0.589	-0.438	1.000		
B1o	-0.222	-0.277	0.185	-0.175	0.089	0.368	-0.388	1.000	
B11	-0.015	0.080	0.131	0.207	0.307	-0.010	-0.294	-0.513	1.000

SECTION C: EDUCATION AND EMPLOYMENT (GAMMA)

	c l	C2	C3	C4	C5	C6M	C6N	C12	C12M
c l	1.000								
C2	0.183	1.000							
C3	0.384	0.083	1.000						
C4	0.171	0.793	0.881	1.000					
C5	0.256	0.767	0.829	0.804	1.000				

	c I	C2	C3	C4	C5	C5M	C6N	C12	C12M
C6M	0.328	-0.174	-0.038	0.051	-0.083	1.000			
C5N	0365	0.041	0.103	0.128	-0.042	1.000	1.000		
C12	0.535	0.218	-0.222	-0.072	-0.147	0.549	0.578	1.000	
C12M	0.551	-1.000	0.320	0.793	-0.046	0.778	1.000	0.674	1.000

SECTION D: INCOME, GOODS& SERVICES (GAMMA)

	D3	D6	D9	D1O	D11	D12	D19	D20	D21
D3	1.000								
D5	-0.157	1.000							
D9	-0.307	0.143	1.000						
D1O	0.659	-0.213	-0.158	1.000					
D11	0.714	-0.175	-0.328	0.958	1.000				
D12	-0.140	0.184	0.158	0.014	-0.026	1.000			
D19	0.083	0.112	-0.098	0.015	-0.174	-0.193	1.000		
D20	-0.249	-0.152	-0.256	-0.142	-0.413	-0.051	0.924	1.000	
D21	0.349	0.342	-0.493	0.195	0.277	0.039	0.845	0.687	1.000
D22	0.258	-0.025	-0.400	-0.148	-0.133	-0.413	0.333	-0.010	0.070
D23	0.318	-0.057	-0.115	-0.219	-0.249	-0.285	0.470	0.153	0.112
D24	-0.295	0.087	-0.131	-0.400	-0.472	-0.050	0.290	0.446	0.193
D26	0.155	-0.187	0.099	0.363	0.422	0.008	-0.015	-0.103	-0.139
D28	-0.378	-0.060	0356	0.504	0.594	0.656	-0.833	-0.667	-1.000
D29	-0.010	-0.009	0054	0.070	-0.025	0.159	0.309	0.468	-0.111
D29A	0.013	0.071	-0.039	0.094	0.297	0.118	-0.549	-0.629	-0.146

	D22	D23	D24	D26	D28	D29	D29A
D22	1.000						
D23	0.918	1.000					
D24	0.252	0.453	1.000				
D26	-0.332	-0.449	-0.774	1.000			
D28	-0.840	-0.904	-1.000	0.954	1.000		
D29	-0.146	0.311	0.081	-0.155	1.000	1.000	
D29A	-0.272	-0.427	-0.011	0.154	0.350	-0.953	1.000

SECTION D: INCOME, GOODS& SERVICES (PEARSONIAN)

	DIA	DIB	D1C	DID	D1E	D1 F	D2	D3A	D4	D5
DIA	1.000									
D1B	0.453	1.000								
D1C	0.164	0.435	1.000							
D1D	-0.087	0.034	0.277	1.000						
D1E	0.441	0.260	-0.048	-0.209	1.000					
D1F	-0.033	-0.316	-0.155	-0.306	-0.043	1.000				
D2	0.344	0.077	0.011	0.007	0.209	0.257	1.000			
D3A	-0.058	0.067	-0.101	0.136	-0.230	0.261	0.106	1.000		
D4	0.307	0.126	0.074	-0.066	0.163	0.135	0.758	-0.059	1.000	
D5	0.196	0.166	0.256	-0.031	0.165	0.335	0.620	0.100	0.572	1.000

SECTION E: PERCEIVED WELLBEING (GAMMA)

	E10	E12	E17	E23	E29	E30	E31	E34	E35
E10	1.000								
E12	0.460	1.000							

	E10	E12	E17	E23	E29	E30	E31	E34	E35
E17	0.380	0.258	1.000						
E23	0.510	0.732	0.529	1.000					
E29	0.044	-0.095	0.327	-0.073	1.000				
E30	0.200	0.100	0.648	0.510	0S08	1.000			
E31	0.254	0.866	0.485	0.504	-0.002	0.654	1.000		
E34	-0.031	0.568	0.468	0.302	-0.108	0.455	0.549	1.000	
E35	0.301	0.113	0.406	0.264	0.369	0.327	0.471	0.105	1.000
E41	0.217	0.388	0.381	0.412	-0.048	0.111	0.457	0.175	0.612
E45	0.225	0.300	0.442	0.288	-0.071	0.233	0.480	0.603	0.260
E50	0.059	0.152	0.272	0.327	0.098	0.266	0.403	0.272	0.204

	E41	E46	E50
E41	1.000		
E46	0.534	1.000	
E50	0.182	0.195	1.000

TEST VILLAGES(.78X)

SECTION A: TRADITIONAL ACTIVITIES (GAMMA)

	A26A	A26B	A28	A30	A31
A26A	1.000				
A26B	0.501	1.000			
A28	-0.197	-0.014	1.000		
A30	0.011	-0.125	0.571	1.000	
A31	-0.228	-0.008	-0.672	-0.592	1.000
A32	-0.053	0.116	0.123	0.341	-0.012
A33	0.105	-0.048	0.326	0.470	-0.307
A34	-0.263	0.120	0.168	0208	-0.117
A35	0.054	0.064	0.150	0.302	-0.232
A36	-0.129	-0.158	0.170	0.536	-0.247
A38	0.257	0.220	-0.024	-0.103	0.151

	A32	A33	A34	A35	A36	A38
A32	1.000					
A33	0.354	1.000				
A34	0.451	0.385	1.000			
A35	0.149	0.232	0.401	1.000		
A36	-0.069	0.048	0.637	0.516	1.000	
A38	-0.148	-0.064	-0.088	-0.036	-0.065	1.000

SECTION B: HEALTH (GAMMA)

	B1	B3	B5	B6	B7	B8	B9	B10	B11
B1	1.000								
B3	0.544	1.000							
B5	0.191	0.202	1.000						
B6	0.531	0.433	0.063	1.000					
B7	0.593	0.400	0.070	0.834	1.000				
B8	0.446	0.358	0.422	0.478	0.588	1.000			
B9	-0.469	-0.428	-0.125	-0.313	-0.520	-0354	1.000		
B10	-0.261	-0.360	0.248	0.188	-0.137	-0.107	0.545	1.000	
B11	-0.138	0.053	0.130	0.019	0066	0.040	-0.043	0.149	1.000

SECTION C: EDUCATION AND EMPLOYMENT (GAMMA)

	c l	C2	C3	C4	C5	C6M	C6N	C12	C12M
c l	1.000								
C2	0.414	1.000							
C3	0.533	0.760	1.000						
C4	0.473	0.742	0.857	1.000					
C5	0.334	0.641	0.596	0.754	1.000				
C6M	0.230	-0.075	0.161	0.199	0.006	1.000			
C6N	0.233	0.013	0.173	0.190	0.088	1.000	1.000		
C12	0.511	0.101	0.107	0.480	0.331	0.379	0.536	1.000	
C12M	0380	0.346	0,079	-0.407	-OC103	0.523	0.73s	0.806	1000

SECTION D: INCOME, GOODS& SERVICES (GAMMA)

	D3	D6	D9	D1o	011	D12	D19	D20	D21
03	1.000								
D6	-0.220	1.000							
09	-0.116	0.2s0	1.000						
D1o	0.337	0.111	0.027	1.000					
D11	0.502	-0.026	0.070	0.891	1.000				
D12	0.106	0.247	0.224	0.038	0.053	1.000			
D19	-0.226	0.035	-0.489	-0.095	-0.377	-0.069	1.000		
D20	0.053	-0.080	-0.331	-0.066	-0.246	-0.166	0.978	1.000	
D21	0.313	-0.166	-0.260	*0.273*	0.237	-0.2s0	0.446	0.496	1.000
D22	0.056	-0.213	0.127	*-0.393*	-0.715	-0.216	-0.035	-0.163	0.657
D23	-0.070	-0.292	-0.161	-0.331	-0.702	-0.1ss	0.098	0.006	0.646
D24	-0.124	0.022	-0.031	-0.084	-0.443	-0.090	0.007	0.326	0.429
D26	0.242	0.040	0.060	0.237	0.501	0.021	0.034	-0.112	-0.249
D28	0.246	0.229	-0.115	0.131	0.637	0.098	0.143	-0.022	-1.000
D29	0.011	0.405	0.343	-0.343	-0.414	0.326	0.058	0.159	0.053
D29A	-0.237	-0.003	0006	0.198	0.307	-0.027	-0.279	-0.429	-0.164

	D22	D23	024	026	D28	029	D29A
D22	1.000						
D23	0.974	1.000					
024	0.615	0.708	1.000				
D26	-0.692	-0.729	*-0.754*	1.000			
D26	-0.933	-0.979	-1.000	0.919	1.000		
D29	0.438	0.339	0.201	-0.291	-0.217	1.000	
D29A	-0.556	-0.492	-0.344	0.359	*0.558*	-0.921	1.000

SECTION D: INCOME, GOODS& SERVICES (PEARSONIAN)

	D1A	D1B	D1C	D1D	D1E	DIF	D2	D3A	D4	D5
DIA	1.000									
D1B	0.427	1.000								
DIC	0.232	0.499	1.000							
D1D	0.161	-0.067	-0.149	1.000						
DIE	0.362	0.145	0.328	0.004	1.000					
D1F	0.264	-0.211	-0.360	0.4s9	0.033	1.000				
D2	-0.010	0.018	0.454	-0.225	0.176	-0.239	1.000			
D3A	0,014	0.062	0.125	0.159	-0s245	0.284	-0.092	1.000		
04	0.1s5	0.395	0.537	-0.325	0.287	-0.141	0.463	0.081	1.000	
D5	0.234	-0.020	0.316	-0.236	0.173	-0.188	0.361	-0.043	0.342	1.000

SECTION E: PERCEIVED WELLBEING (GAMMA)

	E1O	E12	E17	E23	E29	E30	E31	E34	E35
Elo	1.000								
E12	0.348	1.000							
E17	0.495	0.633	1.000						
E23	0.289	0.501	0.466	1.000					
E29	0.214	0.395	0.518	-0.047	1.000				
E30	0.277	0.480	0.800	0.280	0.462	1.000			
E31	0.207	0.698	0.676	0.256	0.188	0.792	1.000		
E34	0.026	0.624	0.564	0.503	0.050	0.593	0.573	1.000	
E35	0.342	0.453	0.510	0.594	0.319	0.282	0.417	0.407	1.000
E41	-0.019	0.319	0.288	0.319	-0.198	0.210	0.489	0.503	0.441
E46	0.151	0.391	0.344	0.392	0.158	0.244	0.453	0.544	0.345
E50	-0.120	0.308	0.075	0.207	-0.102	0.130	0.321	0.347	0.240

	E41	E45	E50
E41	1.000		
E46	0.548	1.000	
E50	0.239	0.111	1.000

CONTROL VILLAGES (.78X)

SECTION A: TRADITIONAL ACTIVITIES (GAMMA)

	A26A	A26B	A28	A30	A31
A26A	1.000				
A26B	0.848	1.000			
A28	-0.733	-0.515	1.000		
A30	-0.250	-0.028	0.613	1.000	
A31	0.266	0.055	-0.904	-0.701	1.000
A32	0.265	-0.041	0.155	0.188	-0.080
A33	-0.154	-0.322	0.654	0.855	-0.450
A34	0.088	0.016	0.233	0.000	0.288
A35	-0.138	-0.118	0.278	-0.128	-0.433
A36	-0.462	-0.115	0.314	-0.384	-0.297
A38	0.000	-0.062	0.034	0.710	-0.243

	A32	A33	A34	A35	A36	A3
A32	1.000					
A33	0.044	1.000				
A34	-0.183	0.045	1.000			
A35	-0.264	0.142	0.153	1.000		
A36	-0.392	-0.143	-0.200	0.950	1.000	
A38	-0.070	0.259	-0.313	-0.153	-0.512	1.000

SECTION B: HEALTH (GAMMA)

	B1	B3	B5	B6	B7	B8	B9	B1o	B11
B1	1.000								
B3	0.516	1.000							
B5	0.460	0.495	1.000						
B6	0.511	0.452	0.463	1.000					
B7	0.536	0.552	0.410	0.756	1.000				
68	0.412	0.460	0.329	0.450	0.623	1.000			

	B1	B3	B5	B6	B7	B8	B9	B10	B11
B9	-0.868	-0.428	-0.447	-0.609	-0.500	-0.500	1.000		
B10	-0.112	-0.391	0.035	-0.268	0.130	0.326	-1.000	1.000	
B11	0.071	0.122	-0.031	0.257	0.270	-0.201	-0.407	-0.654	1.000

SECTION C: EDUCATION AND EMPLOYMENT (GAMMA)

	c I	C2	C3	C4	C5	C6M	C8N	C12	C12M
C1	1.000								
C2	0.778	1.000							
C3	0.274	-0.333	1.000						
C4	-0.108	0.847	0.817	1.000					
C5	0.226	0.733	0.854	0.817	1.000				
C6M	0.396	0.182	-0.022	-0.101	0.003	1.000			
C6N	0385	0.074	0.088	-0.081	-0.038	1.000	1.000		
C12	0.724	0.624	-0.182	-0.268	-0.104	0.675	0.645	1.000	
C12M	0.580	-1.000	0.241	0.647	0.011	0.773	1.000	0.688	1.000

SECTION D: INCOME, GOODS& SERVICES (GAMMA)

	D3	D8	D9	D10	D11	D12	D19	D20	D21
D3	1.000								
D6	-0.044	1.000							
D9	-0.164	0.146	1.000						
D10	0.551	-0.208	0.075	1.000					
D11	0.651	-0.137	-0.297	0.835	1.000				
D12	-0.273	0.240	0.326	-0.100	-0.108	1.000			
D19	0.089	0.188	0.141	-0.162	-0.315	-0.177	1.000		
D20	-0.280	-0.247	-0.185	-0.183	-0.382	0.038	0.807	1.000	
D21	0.040	0.354	-0.173	-0.204	-0.173	0.101	0.842	0.720	1.000
D22	0.280	-0.019	-0.491	-0.003	0.111	-0.497	0.467	0.051	0.335
D23	0.374	0.034	-0.135	-0.133	-0.013	-0.402	0.593	0.278	0.332
D24	-0.166	-0.105	-0.173	-0.280	-0.417	-0.190	0.336	0.393	0.407
D26	0.082	-0.111	0.114	0.270	0.410	0.186	-0.023	-0.028	-0.407
D28	-0.188	0.516	0.580	0.417	1.000	0.862	-0.493	-0.227	-1.000
D29	-0.112	-0.059	0.176	0.451	0.307	0.084	0.474	0.542	-0.046
D28A	0.153	0.112	0.033	-0.012	0.198	0.233	-0.516	-0.528	-0.318

	D22	D23	D24	D26	D28	D29	D29A
D22	1.000						
D23	0.851	1.000					
D24	0.281	0.487	1.000				
D26	-0.287	-0.328	-0.738	1.000			
D28	-1.000	-0.914	-1.000	0.980	1.000		
D28	-0.558	-0.010	-0.007	0.016	1.000	1.000	
D28A	-0.213	-0.324	-0.069	0.159	0.524	-0.919	1.000

SECTION D: INCOME, GOODS& SERVICES (PEARSONIAN)

	DIA	D1B	DIC	D1D	D1E	D1 F	D2	D3A	D4
D1A	1.000								
DIB	0.425	1.000							
D1C	0.215	0.420	1.000						
DID	-0.041	0.082	0.2s5	1.000					
DIE	0.651	0.519	0.036	-0.168	1.000				
D1F	-0.208	-0.187	-0.054	-0.479	-0.188	1.000			

Table AI, continued
Control Villages (.78X)

	DIA	DIB	D1C	D1D	D1E	D1F	D2	D3A	*D4*	*D5*
D2	0.544	0.261	0.053	0.054	0.210	0.126	1.000			
D3A	-0.271	0.371	-0.065	0.043	-0.166	-0.109	-0.130	1.000		
D4	0.471	0.107	0.043	-0.048	0.135	0.232	0.839	-0.014	1.000	
D5	0.285	0.324	0.278	-0.082	0.283	0.356	0.600	0.019	0.772	1.000

SECTION E: PERCEIVED WELLBEING (GAMMA)

	E10	E12	E17	E23	E29	E30	E31	E34	E35
E10	1.000								
E12	0.365	1.000							
E17	0.258	-0.129	1.000						
E23	0.524	0.662	0.365	1.000					
E29	0.012	-0.157	0.370	-0.088	1.000				
E30	0043	0.032	0.617	0.426	0.288	1.000			
E31	0.129	0.409	0.393	0.410	0.221	0.721	1000		
E34	-0.158	0.247	0.418	-0.174	-0.061	0.304	0.415	1.000	
E35	0.203	-0.050	0.379	-0.067	0.351	0.250	0.505	0.121	1.000
E41	0.335	-0.042	0.363	0.358	-0.105	0.188	0.446	0.044	0.709
E46	0.225	-0.104	0.154	-0.032	-0.231	0.008	0.231	0.449	0.503
E50	0.209	-0.164	0.374	0.177	0.091	0.305	0.228	-0.038	0.385

	E41	E46	E60
E41	1.000		
E45	0.431	1.000	
E50	0.346	0.168	1.000

NATIVE VILLAGES (.78)()

SECTION A: TRADITIONAL ACTIVITIES (GAMMA)

	A26A	A26B	A28	A30	A31
A26A	1.000				
A26B	0.710	1.000			
A28	-0.780	-0.576	1.000		
A30	0.083	-0.091	0.642	1.000	
A31	-0.054	0.154	-0.202	-0.158	1.000
A32	0.521	0.351	-0.057	0.409	-0.012
A33	0.319	-0.183	-0.193	0.747	-0.327
A34	0.274	0.315	0043	-0.041	0.269
A35	-0.152	0.150	0.262	-0.134	-0.191
A3	-0.606	-0.347	0.462	-0.075	-0.209
A36	0.201	-0.167	0.491	0.664	-0.101

	A32	A33	A34	A35	A36	A38
A32	1.000					
A33	*0.124*	1.000				
A34	0.420	-0.057	1.000			
A35	-0.101	0.117	0.193	1.000		
A36	-0.526	-0.159	-0.110	0.798	1.000	
A38	0.329	0.294	-0.171	-0.297	-0.612	1.000

SECTION B: HEALTH (GAMMA)

	B1	B3	B5	B6	87	88	B9	B10	B11
B1	1.000								
B3	0.544	1.000							
B5	0.324	0.235	1.000						
B6	0.481	0.377	0.159	1.000					
B7	0.530	0.452	0.152	0.809	1.000				
B8	0.285	0.311	0.308	0.334	0.553	1000			
B9	-0.620	-0.571	-0.274	-0.343	-0.518	-0.358	1.000		
B10	0.026	-0.121	0.176	-0.019	0.049	0.514	-0.001	1.000	
B11	0.120	0.088	0.148	*0.247*	0.253	0.116	-0.300	-0.236	1.000

SECTION C: EDUCATION AND EMPLOYMENT (GAMMA)

	c l	C2	C3	C4	C5	C8M	C6N	C12	C12M
c l	1.000								
C2	0.359	1.000							
C3	0s34	0.171	1.000						
C4	0.165	0.667	0.803	1 .000					
C5	0.215	0.689	0.769	0.820	1.000				
C6M	0.379	-0.354	0.010	0.081	-0.072	1.000			
C5N	0.380	-0.246	0.115	0.145	-0.002	1.000	1.000		
C12	0.600	0.075	-0.264	0.017	0.045	0.382	0.482	1.000	
C12M	0.727	-1.000	0.750	0.567	-0.103	0.746	1.000	0.123	1.000

SECTION D: INCOME, GOODS& SERVICES (GAMMA)

	D3	D6	D9	D10	D11	D12	D19	D20	D21
D3	1.000								
D5	-0.295	1.000							
D9	-0.062	0.143	1.000						
D10	0.585	-0.105	0.038	1.000					
D11	0.555	-0.153	-0.169	0.959	1.000				
D12	-0.149	0.196	0.138	-0.021	-0.044	1.000			
D19	-0.033	0.149	-0.265	-0.063	-0.162	0.019	1.000		
D20	-0.231	-0.094	-0.253	-0.039	-0.201	0.057	0.935	1.000	
D21	0.255	0.113	-0.357	0.123	0.241	-0.117	0.698	0.613	1.000
D22	0.330	-0.050	-0.217	-0.092	-0.135	-0.312	0.249	-0.095	0.295
D23	0.404	-0.169	-0.001	-0.159	-0.232	-0.217	0.354	0.072	0.275
D24	-0.143	0.085	-0.041	-0.101	-0.176	-0.051	0.090	0.443	0.325
D26	0.179	-0.161	0.068	0.207	0.254	0.029	-0.116	-0.225	-0.319
D28	-1.000	-0.041	-0.367	0.080	0.262	0.588	-0.767	-0.627	-1.000
D29	0.157	0.172	0.238	0.095	0.234	0.488	0.407	0.559	-0.230
D28A	-0.172	-0.004	-0.260	0.093	0.076	-0.210	-0.575	-0.607	-0.074

	D22	D23	D24	D26	D26	D29	D29A
D22	1.000						
D23	0.924	1.000					
D24	0.258	0.443	1.000				
D26	-0.378	-0.407	*-0.783*	1.000			
D28	-0.774	-0.S58	-1.000	0.9s4	1.000		
D29	0.012	0.279	0.051	-0.164	1.000	1.000	
	-0.410	-0.366	-0.007	0.261	0.719	-0.960	1.000

SECTION D: INCOME, GOODS & SERVICES (PEARSONIAN)

	DIA	D1B	D1C	DID	DIE	D1F	D2	D3A	D4	D5
DIA	1.000									
D1 B	0.381	1.000								
DIC	0.238	0.432	1 .000							
DID	0.089	-0.034	0.240	1 .000						
DIE	0.335	0.217	0.070	0.005	1.000					
DIF	-0.010	-0.396	-0.098	0.051	-0.169	1.000				
D2	0.290	-0.115	0.043	0.029	0.152	0.285	1.000			
D3A	-0.098	-0.045	-0.202	0.265	-0.305	0.271	0.085	1.000		
D4	0.100	0.188	0.044	-0.071	0.033	0.297	0.544	0.091	1.000	
05	0.082	0.157	0.305	0.045	, 0.072	0.153	0.594	-0.086	0.508	1 .000

SECTION E: PERCEIVED WELLBEING (GAMMA)

	E10	E12	E17	E23	E29	E30	E31	E34	E35
E10	1.000								
E12	0.386	1.000							
E17	0.525	0.281	1.000						
E23	0.405	0.618	0.622	1.000					
E29	0.145	-0.089	0.238	-0.130	1.000				
E30	0.228	0.287	0.628	0.597	0.337	1.000			
E31	0.252	0.684	0.495	0.587	-0.114	0.755	1.000		
E34	0.006	0.416	0.551	0.465	-0.275	0.500	0.511	1.000	
E35	0.195	0.028	0.473	0.392	0.310	0.396	0.420	0.185	1.000
E41	0.042	0.358	0.511	0.449	-0.324	0.285	0.652	0.343	0.571
E46	0.161	0.294	0.495	0.446	-0.051	0.219	0.522	0.615	0.415
E50	-0.028	0.194	0.203	0.311	0.036	0.331	0.452	0.332	0.257

	E41	E48	E50
E41	1.000		
E46	0.605	1.000	
E50	0.293	0.169	1.000

MIXED VILLAGES(.78X)

SECTION A: TRADITIONAL ACTIVITIES (GAMMA)

	A26A	A26B	A28	A30	A31
A26A	1.000				
A26B	0.519	1.000			
A28	o.139	0.204	1.000		
A30	0.180	-0s364	0.557	1.000	
A31	-0.254	-0.088	-0.854	-0.807	1.000
A32	-0.076	-0.079	0.214	0.301	-0.107
A33	0.125	-0.010	0.508	0.437	-0.389
A34	-0.315	-0.085	0.272	0.335	-0.219
A35	-0.004	-0.113	0.160	0.337	-0.266
A35	-0.007	-0.014	0.063	0.556	-0.275
A38	0.196	0.222	-0.043	-0.046	0.081

	A32	A33	A34	A35	A36
A32	1.000				
A33	0.381	1.000			
A34	0.214	0.539	1 .000		

	A32	A33	A34	A35	A36	A36
A35	0.085	0.226	0.365	1.000		
A36	0.123	0.053	0.579	0.547	1.000	
A38	-0.287	-0.002	4.081	0.012	0.009	1.000

SECTION B: HEALTH (GAMMA)

	B1	B3	B5	B6	B7	B8	B9	B10	B11
B1	100o								
B3	0.473	1.000							
B5	0.132	0.320	1.000						
B6	0.532	0.461	0.183	1.000					
B7	0.601	0.393	0.196	0.808	1.000				
B8	0.539	0.402	0.426	0.608	0.641	1.000			
B9	-0.427	-0.222	-0.109	-0.451	-0.495	-0.434	1.000		
B10	-0.417	-0.552	0.293	0.228	-0.221	-0.512	0.645	1.000	
B11	-0.207	0.126	0.060	-0.027	0.009	-0.181	0.010	0.194	1.000

SECTION C: EDUCATION AND EMPLOYMENT (GAMMA)

	c l	C2	C3	C4	C5	C6M	C6N	C12	C12M
c l	1.000								
C2	0.866	1.000							
C3	0.514	0.667	1.000						
C4	0.456	0.778	0.958	1.000					
C5	0.405	0.667	0.581	0.697	1.000				
C6M	0.149	0.556	0.220	0.127	0.106	1.000			
C6N	0.173	0.465	0.187	0.001	0050	1.000	1.000		
C12	0.492	0.523	0.318	0.545	0.354	0.473	0.609	1.000	
C12M	0.262	0.339	-0.306	-0.251	-0.125	0.526	0.764	0.634	1.000

SECTION D: INCOME, GOODS& SERVICES (GAMMA)

	D3	D6	D9	D10	D11	D12	D19	D20	D21
D3	1.000								
D6	0.017	1.000							
D9	-0.348	0.360	1.000						
D10	0.032	0.164	0.192	1.000					
D11	0.326	-0.039	0.070	0.579	1.000				
D12	0.156	0.246	0.366	-0.046	-0.032	1.000			
D19	-0.214	-0.017	-0.172	-0.240	-0.829	*-0.227*	1.000		
D20	0.081	-0.093	-0.176	-0.159	-0.377	*-0.222*	0.970	1.000	
D21	0.234	-0.074	-0.067	-0.132	-0.253	0.015	0.508	0.413	1.000
D22	-0.130	-0.226	0.056	-0.483	-0.793	-0.275	-0.023	-0.159	0.698
D23	-0.233	-0.178	-0.303	-0.423	-0.725	-0.236	0.175	0.024	0.745
D24	-0.187	-0.059	-0.053	-0.181	-0.691	-0.160	0.074	0.176	0.331
D26	0.248	0.136	0.039	0.311	0.711	0.055	0.192	0.170	-0.137
D28	0.349	0.268	0.151	0.217	0.765	0.130	0.231	0.249	-1.000
D29	-0.213	0.417	0.390	-0.132	-0.488	0.149	-0.013	-0.022	0.093
D29A	-0.033	-0.068	0.168	0.088	0.263	0.132	-0.165	-0.256	-0.102

	D22	D23	D24	D26	D28	D29	D29A
D22	1.000						
D23	0.966	1.000					
D24	0.731	0.787	1.000				
D26	*-0.737*	-0.771	-0.677	1.000			

	D22	D23	D24	D26	D28	D29	D29A
D28	-0.970	-0.982	-1.000	0.894	1 .000		
D29	0.155	0.090	0.064	-0.099	0.106	1.000	
D29A	-0.367	-0.329	-0.240	0.157	0.258	-0.863	1.000

SECTION D: INCOME, GOODS& SERVICES (PEARSONIAN)

	DIA	D1B	DIC	DID	DIE	DIF	D2	D3A	D4	D5
DIA	1.000									
D1B	0.447	1 .000								
D1C	0.246	0.471	1.000							
DID	0.?19	-0.064	-0.210	1.000						
D1E	0.500	0.239	0.377	-0.082	1 .000					
D1F	0.303	-0.016	-0.192	0.439	0.066	1.000				
D2	0.027	0.056	0.368	-0.292	0.238	-0.225	1 .000			
D3A	0.009	0.192	0.297	0.054	0.133	0.208	-0.072	1.000		
D4	0.363	0.394	0,569	-0.422	0.420	-0.219	0.529	0.060	1.000	
D5	0.329	-0.028	0.304	-0.336	0.315	-0.081	0.336	0.077	0.413	1.000

SECTION E: PERCEIVED WELLBEING (GAMMA)

	E10	E12	E17	E23	E29	E30	E31	E34	E35
E10	1.000								
E12	0.373	1.000							
E17	0.343	0.574	1.000						
E23	0.292	0.614	0,152	1.000					
E29	0.224	0.690	0.675	0.115	1.000				
E30	0.237	0.489	0.855	0.000	0.456	1.000			
E31	0.156	0.534	0.697	-0.073	0,516	0.800	1.000		
E34	-0.058	0.683	0.539	0.081	0.478	0.560	0.626	1.000	
E35	0.484	0.708	0.427	0.496	0.360	0.046	0.455	0.628	1.030
E41	0.173	-0.002	0.075	0.119	0.173	0.102	0,241	0,400	0.447
E45	0.240	0.235	0.093	0.000	0.289	0.232	0.332	0.368	0.328
E50	-0.030	0.156	0.120	0.036	-0.206	-0.010	0.056	0.039	0.322

	E41	E46	E60
E41	1000		
E46	0.345	1.000	
E50	0.224	0.076	1.000

BOROUGH VILLAGES (.78X)

SECTION A: TRADITIONAL ACTIVITIES (GAMMA)

	A26A	A26B	A28	A30	A31
A26A	1.000				
A26B	0.472	1.000			
A28	0.184	0.449	1.000		
A30	0.176	-0.019	0.545	1.000	
A31	-0.165	-0.217	-0.889	-0.735	1.000
A32	-0.144	0.097	0.118	0.286	-0.123
A33	0.321	0.149	0437	0.546	-0.629
A34	-0.278	-0.011	0.092	-0.036	-0.282
A35	-0.037	0.092	0.051	0.465	-0.142
A35	0.050	0.189	-0.049	0.636	-0.173

	A26A	A26B	A28	A30	A31
A38	0.236	0.146	-0.419	-0.064	0.315

	A32	A33	A34	A35	A36	A36
A32	1.000					
A33	0.416	1.000				
A34	-0.082	*0.273*	1.000			
A35	0.206	0.163	0.571	1.000		
A36	0.035	0.053	0.406	0.671	1.000	
A38	-0.497	-0.290	-0.235	-0.051	-0.268	1.000

SECTION B: HEALTH (GAMMA)

	B1	B3	B5	86	B7	B6	B9	B10	B11
B1	1.000								
B3	0.464	1.000							
B5	0.103	0.228	1.000						
88	0.524	0.446	-0.030	1.000					
B7	0.555	0.517	0.053	0.795	1.000				
86	0.335	0.321	0.446	0.444	0.514	1.000			
B9	-0.325	-0.346	-0.256	-0.233	-0.335	-0.265	1.000		
B1O	-0.436	-0.822	0.244	-0.169	-0.113	-0.332	0.468	1.000	
B11	-0.104	0.179	0.207	-0.080	0.124	0.066	-0.200	-0.169	1.000

SECTION C: EDUCATION AND EMPLOYMENT (GAMMA)

	c l	C2	C3	C4	C5	C6M	C6N	C12	C12M
c l	1.000								
C2	0.529	1.000							
C3	0.519	0.750	1.000						
C4	0.326	0.750	0.737	1.000					
C5	0.20s	0.571	0.498	0.693	1.000				
C6M	0.272	-0.560	0.054	0.065	-0.007	1.000			
C6N	0.302	-0.545	0.102	0.076	-0.034	1.000	1.000		
C12	0.468	-1.000	-0.155	0.631	0.331	0.461	0.523	1.000	
C12M	0.578	-1.000	-0.183	0.060	-0.350	0.s30	0.951	1.000	1.000

SECTION D: INCOME, GOODS & SERVICES (GAMMA)

	D3	D6	D9	D10	D11	D12	D19	D20	D21
D3	1.000								
D6	-0.055	1.000							
D9	-0.230	-0.205	1.000						
D10	0.625	0.212	-0.280	1.000					
D11	0.937	0.135	-0.358	0.989	1.000				
D12	0.249	0.156	0.473	0.324	0.410	1.000			
D19	0.007	0.230	-0.267	-0.065	-0.171	-0.257	1.000		
D20	-0.191	-0.052	-0.615	-0.183	-0.287	-0.231	0.976	1.000	
D21	0.462	0.372	-0.466	-0.043	0.159	0,067	0.813	0.748	1.000
D22	0.143	-0.114	-0.373	-0.510	-0.433	-0.423	0.128	-0.058	0.210
D23	-0.294	0.037	-0.372	-0.798	-0.766	-0.574	0.315	0.066	0.316
D24	-0.416	-0.039	-0.222	-0.495	-0.569	-0.162	0.229	0.526	-0.050
D26	0.313	0.085	0.356	0.504	0.564	0.146	0.132	-0.136	0.192
D28	0.246	0.143	0.298	0.809	0.778	0.557	-0.590	-0.535	-1.000
D29	-0.445	0.052	-0.369	-0.244	-0.674	0.166	0.160	0.326	-0.326
D29A	0.282	0.194	0.182	0.244	0.465	0.084	-0.432	-0.506	0.064

	D22	D23	D24	D26	D28	D29	D29A
D22	1.000						
D23	0S66	1.000					
D24	0.469	0.633	1.000				
D26	-0.546	-0.753	-0.833	1.000			
D28	-0.917	-0.954	-1.000	0.979	1.000		
D29	0.038	0.292	0.136	-0.168	0.107	1.000	
D29A	-0.400	-0.550	-0.336	0.275	0.608	-0.975	1.000

SECTION D: INCOME, GOODS& SERVICES (PEARSONIAN)

	DIA	D1B	D1C	D1D	DIE	DIF	D2	D3A	D4	D5
DIA	1.000									
D1B	0.309	1.000								
DIC	0.013	0.590	1.000							
D1D	-0.018	-0.046	-0.144	1.000						
D1E	0.213	0.163	0.254	-0.360	1.000					
DIF	0.263	-0.299	-0.446	0.111	0. 150	1.000				
D2	0.123	0.352	0.429	-0.343	0.352	-0.029	1.000			
D3A	0.001	0.164	0.232	-0.134	-0.068	0.279	0.134	1.000		
D4	0.248	0.308	0.513	-0.438	0.493	-0.155	0.657	0.171	1.000	
D5	0.264	4.034	0.360	-0<280	0.185	0.067	0.441	0.211	0.557	1.000

SECTION E: PERCEIVED WELLBEING (GAMMA)

	E10	E12	E17	E23	E29	E30	E31	E34	E35
E10	1.000								
E12	0.392	1.000							
E17	0.249	0.333	1.000						
E23	0.398	0.508	0.374	1.000					
E29	0.108	0.060	0.364	-0.126	1.000				
E30	0.172	0.330	0.564	0.495	0.228	1.000			
E31	0.096	0.716	0.486	0.314	0.117	0.742	1000		
E34	-O.1O4	0.529	0.449	0.291	-0.354	0.324	0.617	1.000	
E35	0.340	0.246	0.205	0.332	0.266	0.256	0.415	0.160	1.000
E41	0.123	0.266	0.124	0.246	-0.220	0.150	0.189	0220	0.485
E46	0.054	0.276	0.387	0.286	-00081	0.357	0.464	0.681	0.296
E50	0.011	-0.224	-0.040	0.116	0.007	0.173	0.054	0S)66	0.037

	E41	E46	E50
E41	1.000		
E48	0.471	1.000	
E50	0.214	0.045	1.000

NOT BOROUGH VILLAGES (.78X)

SECTION A: TRADITIONAL ACTIVITIES (GAMMA)

	A26A	A26B	A28	A30	A31
A26A	1.000				
A26B	0.586	1.000			
A28	-0.222	-0.286	1.000		
A30	0.136	-0.151	0.673	1.000	
A31	-0.234	0.174	-0.624	-0.634	1.000
A32	0.322	0.126	0.212	0.422	-0.072

	A26A	A26B	A28	*A30*	A31
A33	0.049	-0.265	0.425	0.626	-0.231
A34	-0.019	0,095	0.288	0.333	0.093
A35	-0.102	-0.088	0.273	0.035	-0.294
A36	-0.411	-0.403	0.359	0.100	-0.262
A3s	0.079	-0.152	0.737	0.540	-0.279

	A32	A33	A34	*A35*	A36	*A38*
A32	1.000					
A33	0.340	1.000				
A34	0.451	0.355	1.000			
A35	-0.060	0.159	0.198	1.000		
A36	-0.234	-0.096	0.253	0.632	1.000	
A38	0.333	0.458	0.077	-0.285	-0.175	1.000

SECTION B: HEALTH (GAMMA)

	B1	B3	B5	B6	B7	*B6*	B9	B10	B11
B1	1.000								
B3	0.578	1.000							
B5	0.420	0.374	1.000						
B6	0.525	0.444	*o.3n*	1.000					
B7	0.593	0.418	0294	0.827	1.000				
B8	0.517	0.478	0,356	0.501	0.670	1.000			
B9	-0.653	-0.464	-0.210	-0.511	-0.612	-0.511	1.000		
B10	-0.125	-0.024	0.206	0.222	-0.048	0.208	0.298	1,000	
B11	-0.044	-0.006	-0.026	0.238	0.131	-0.136	-0.098	0.072	1.000

SECTION C: EDUCATION AND EMPLOYMENT (GAMMA)

	c l	C2	C3	C4	C5	C6M	C6N	C12	C12M
c l	1.000								
C2	0.507	1,000							
C3	0.368	0.178	1.000						
C4	0.243	0.667	0.937	1 .000					
C5	0343	0.756	0.836	0.665	1.000				
C6M	0.297	0.114	0.111	0.091	0.020	1.000			
C6N	0.255	0.224	0.146	0.117	0.050	1.000	1.000		
C12	0,669	0.540	0.170	-0.132	0.091	0.471	0.564	1.000	
C12M	0.408	0.028	0.336	-0.071	0.078	0.519	0.827	0.446	1.000

SECTION D: INCOME, GOODS& SERVICES (GAMMA)

	D3	D6	D9	D10	D11	D12	D19	D20	D21
D3	1.000								
D6	-0.159	1.000							
D9	-0.068	0.383	1.000						
D1o	0.177	-0.054	0.391	1.000					
D11	0.018	*-0.093*	0.312	0.688	1.000				
D12	-0.076	*0.255*	0.073	-0.207	-0.296	1.000			
D19	-0.128	-0.053	-0.261	-0.151	-0.546	-0,025	1.000		
D20	-0.027	-0.190	-0.124	-0.051	-0.330	-0.023	0.930	1.000	
D21	0.059	-0.075	-0.170	-0.058	-0.341	-0.112	0.635	0.544	1.000
D22	0.161	-0.190	-0.085	-0.032	-0.412	-0.266	0.131	-0.106	0.621
D23	0.309	-0.348	-0.151	0.126	-0.124	-0.103	0.236	0.101	0.631
D24	0.053	-0.053	-0.076	0.146	-0.244	-0.157	0.011	0.255	0.624

	D3	D6	D9	D10	D11	D12	D19	D20	D21
D26	0.068	-0.035	0.024	0.023	0.366	0.054	-0.037	-0.045	*-0.622*
D28	0.016	0.382	0.116	-0.171	0.663	0.164	0.332	0.275	*-1.000*
D29	0.210	0.333	0.388	0.102	0.351	0.254	0.210	0.299	0.210
D29A	-0.317	-0.022	0.000	0.031	0.025	0.035	-0.312	-0.436	-0.391

	D22	D23	D24	D26	D28	D29	D29A
D22	1.000						
D23	0.937	1.000					
D24	0.553	0.654	1.000				
D26	-0.596	-0.538	-0.692	1.000			
D28	-0.958	-0.973	-1.000	0.929	1.000		
D29	0.187	0.196	0.141	-0.198	-0.064	1.000	
D29A	-0.478	-0.376	-0.248	0.319	0.513	43.682	1 .000

SECTION D: INCOME, GOODS & SERVICES (PEARSONIAN)

	D1A	DIB	D1C	DID	DIE	D1F	D2	D3A	D4	D5
DIA	1.000									
D1B	0.487	1.000								
D1C	0.397	0.448	1.000							
DID	0220	-0.014	-0.016	1.000						
DIE	0.606	0.307	0.267	0.152	1.000					
D1F	0.069	-0.149	-0.176	0.351	-0.154	1.000				
D2	0.164	-0.010	0.419	-0.078	0.103	-0.217	1.000			
D3A	-0.011	0.139	0.106	0.286	-0.046	0.175	-0.150	1.000		
D4	0.275	0.385	0.413	-0.171	0.124	0.005	0.520	0.033	1.000	
D5	0.224	0.111	0.330	-0.128	0.262	-0.127	0.510	-0.062	*0.448*	1.000

SECTION E: PERCEIVED WELLBEING (GAMMA)

	E10	E12	E17	E23	E29	E30	E31	E34	E35
E10	1.000								
E12	0.354	1.000							
E17	0.535	0.530	1.000						
E23	0.323	0.745	0.477	1.000					
E29	0.161	0.427	0.502	-0.061	1.000				
E30	0.252	0.455	0.841	0.185	0.533	1.000			
E31	0.271	0.535	0.667	0.318	0.155	0.808	1.000		
E34	0.089	0.533	0.678	0.469	0.331	0686	0.524	1.000	
E35	0.253	0.360	0.600	0.504	0.377	0.284	0.449	0.479	1.000
E41	0.065	0.178	0.451	0.416	-0.210	0,243	0.701	0.517	0.580
E46	0.321	0.289	0.298	0.341	0.140	0.077	0.404	0.373	0.440
E50	-0.032	0s04	0.316	0.276	-0.058	0.225	0.447	0.314	0,440

	E41	E46	E50
E41	1.000		
E46	0.585	1.000	
E50	0.335	0.158	1.000

FISH VILLAGES (.78X)

SECTION A: TRADITIONAL ACTIVITIES (GAMMA)

	A26A	A26B	A28	A30	A31
A26A	1.000.				
A26B	0.687	1.000			
A28	-0.208	-0.138	1.000		
A30	-0.051	-0.292	0.588	1.000	
A31	-0.031	0.087	-0.822	-0.881	1.000
A32	-0.194	-0.145	0.274	0.427	-0.211
A33	-0.080	-0.188	0.520	0.631	-0.444
A34	-0.324	-0.080	0.054	0.172	-0.115
A35	-0.052	0.088	0.047	0.144	-0.260
A36	-0.160	-0.088	-0.017	0.473	-0.243
A36	0.080	0.080	-0.103	-0.006	0.188

	A32	A33	A34	A35	A36	A38
A32	1.000					
A33	0.416	1.000				
A34	0.258	0.345	1.000			
A35	-0.007	0.003	0.240	1.000		
A38	0.058	0.037	0.302	0.832	1.000	
A38	-0.251	-0.030	-0.035	0.007	-0.179	1.000

SECTION B: HEALTH (GAMMA)

	B1	B3	B5	B8	B7	B8	B9	B10	B11
B1	1.000								
B3	0.563	1.000							
B5	0.175	0.173	1.000						
B6	0.513	0.497	0.085	1.000					
B7	0.519	0.445	0.314	0.788	1.000				
B8	0.525	0.498	0.341	0.568	0.783	1.000			
B9	-0.530	-0.293	-0.308	-0.480	-0.509	-0.574	1.000		
B10	-0.071	-0.528	0.279	-0.127	-0.227	-0.117	0.443	1.000	
B11	-0.130	0.066	0.055	-0.053	-0.020	-0.006	-0.179	0.041	1.000

SECTION C: EDUCATION AND EMPLOYMENT (GAMMA)

	c l	C2	C3	C4	C5	C8M	C8N	C12	C12M
c l	1.0041								
C2	0.922	1.000							
C3	0.60s	1.000	1	.000					
C4	0.380	1.000	0.797	1	.000				
C5	0.840	1.000	0.888	0.919	1.000				
C6M	0.185	0.129	0.314	0.258	0.271	1.000			
C8N	0.135	0.235	0.378	0.289	0s237	1.000	1.000		
C12	0.470	0.849	-0.307	0.148	0.202	0.481	0.653	1.000	
C12M	0.414	0.381	-0.118	0.105	0.038	0.808	0.931	0.614	1.000

SECTION D: INCOME, GOODS& SERVICES (GAMMA)

	D3	D6	D9	D10	D11	D12	D19	D20	D21
D3	1.000								
D6	-0.108	1.000							

	D3	D6	D9	D10	D11	012	D19	D20	D21
D9	-0.464	0.482	1000						
D10	-0.156	0.001	0.253	1.000					
D11	-0.311	0.281	0.659	0.977	1.000				
D12	-0.171	0.358	0.325	-0.060	0.174	1.000			
D19	-0.0s7	-0.255	-0.215	0.327	-1.000	-0.295	1.000		
D20	0.001	-0.261	-0.109	0.542	0.606	-0.190	0.942	1 .000	
D21	0.442	0.159	-0?206	0.094	1.000	-0.235	0.808	0.688	1.000
D22	0.403	-0.117	-0.073	-0.186	-1.000	-0.574	0,363	0.012	0.688
D23	0.427	-0.333	-0.415	-0.221	-1.000	-0.364	0.332	0.059	0.819
D24	0.149	-0.059	-0.168	0.179	0.114	-0.321	0.298	0.297	0.584
D26	-0.050	-0.058	-0.005	0.064	-0.220	0.113	0.116	0.120	-0.403
D28	-0.283	0.120	0.081	0.179	1.000	0.625	-0,307	-0.143	-1.000
D29	0.176	0.111	0.364	0.166	0.753	0.065	-0.042	0.026	0.602
D29A	-0.363	0.097	-0.060	-0.113	-0.179	0S33	-0.391	-0.412	-0.636

	D22	D23	D24	D26	028	029	D29A
D22	1.000						
D23	0.943	1.000					
D24	0.568	0.526	1.000				
D26	-0.441	-0.533	-0.662	1.000			
D28	-1.000	-1.000	-1.000	0.934	1.000		
D29	0.296	0.169	0.069	-0.205	-0.188	1.000	
D29A	-0.478	-0.325	-0.162	0.027	0.566	-0.901	1.000

SECTION D: INCOME, GOODS& SERVICES (PEARSONIAN)

	DIA	D1B	D1C	D1D	DIE	D1F	D2	D3A	D4	D5
DIA	1.000									
01 B	0.409	1.000								
D1C	0.285	0.451	1.000							
D1D	0.025	-0.177	-0.137	1.000						
01 E	0.440	0.289	0.402	-0.204	1.000					
D1 F	-0.080	-0.228	-0.202	0.087	-0,074	1.000				
D2	0.289	0.073	0.341	0.036	0,193	0.075	1.000			
D3A	-0.076	0.200	0.362	-0.174	0.137	-0.032	0.102	1.000		
04	0.486	0.161	0.324	-0.285	0.246	0.074	0.642	0.194	1.000	
05	0.344	-0.051	0.276	-0.306	0.257	0.230	0.301	0.131	0.675	1.000

SECTION E: PERCEIVED WELLBEING (GAMMA)

	E10	E12	E17	E23	E29	E30	E31	E34	E35
Elo	1.000								
E12	0.293	1.000							
E17	0.339	0.569	1.000						
E23	0.450	0.519	0.580	1.000					
E29	-0.073	0.552	0.371	-0.150	1.000				
E30	0.122	0.298	0.851	0.212	0.269	1.000			
E31	0.105	0.620	0.573	0.044	0.065	0600	1.000		
E34	-0.028	0.650	0.513	0.228	0.182	0,460	0.580	1.000	
E35	0.512	0.472	0.477	0,603	0.233	0.090	0.372	0.185	1.000
E41	0.042	0.241	0.082	0.334	-0.159	-0.778	0.535	0.381	0.446
E46	0.100	0.110	0.349	-0.002	0.125	0.104	0.362	0.466	0.164
E50	0.151	0.134	0.093	0.423	-0.454	-0.170	0.255	0.048	0.305

	E41	E46	E50
E41	1.000		
E46	0.555	1.000	
E60	0.455	0.044	1.000

NOT FISH VILLAGES (.78X)

SECTION A: TRADITIONAL ACTIVITIES (GAMMA)

	A26A	A26B	A28	A30	A31
A26A	1.000				
A26B	0.203	1.000			
A28	0205	-0.136	1.000		
A30	0.440	0.069	0.833	1.000	
A31	-0.397	0,114	-0.712	-0.669	1.000
A32	0.801	0.406	0.174	0.371	0.017
A33	0.603	-0.171	0.288	0.577	-0.414
A34	0.484	0.407	0.528	0.300	-0.013
A35	-0.053	-0.140	0.294	0.078	-0.071
A36	-0.500	-0.442	0.564	0.009	-0.131
A36	0.752	0.259	0.616	0.490	a.173

	A32	*A33*	*A34*	*A35*	A36	A38
A32	1.000					
A33	0.330	1.000				
A34	0.358	0.304	1.000			
A3	-0.064	0.367	0.435	1.000		
A36	-0.459	-0.207	0.330	0.651	1.000	
A38	0.373	0.281	-0.130	-0.464	-0.240	1.000

SECTION B: HEALTH (GAMMA)

	B1	B3	B5	B6	B7	B8	B9	B10	B11
B1	1.000								
B3	0.522	1.000							
B5	0.348	0.390	1.000						
B6	0.541	0.406	0.272	1.000					
B7	0.626	0.452	0.121	0.823	1.000				
B8	0.376	0.319	0.428	0.417	0.443	1.000			
B9	-0.544	-0.521	-0.160	-0.363	*-0.515*	-0.253	1.000		
B10	-0.312	-0.238	0.165	0.206	*0.032*	0.061	0.332	1.000	
B11	-0.035	0.060	0.095	0.180	*0.232*	-0.053	-0.124	-0.066	1.000

SECTION C: EDUCATION AND EMPLOYMENT (GAMMA)

	c l	C2	C3	C4	C5	C6M	C6N	C12	C12M
c l	1.000								
C2	0.451	1.000							
C3	0.367	0.224	1.000						
C4	0.236	0.566	0.869	1.000					
C5	0.145	0.532	0.690	0.722	1.000				
C6M	0.328	-0.045	0.043	0.024	-0.128	1.000			
C6N	0.366	-0.047	0.065	0.009	-0.100	1.000	1.000		
C12	0.641	0.164	0.133	0.322	0.240	0.440	0.474	1.000	
C12M	0.227	-1.000	0.676	0.568	0.532	-0.365	-0.250	1.000	1.000

SECTION D: INCOME, GOODS & SERVICES (GAMMA)

	D3	D6	D9	D10	D11	D12	D19	D20	D21
D3	1.000								
D6	-0.105	1.000							

	D3	D6	D9	D10	D11	D12	D19	D20	D21
D9	0.256	0.056	1.000						
D10	0.569	0.064	0.111	1.000					
D11	0.459	0.037	-0.016	0.870	1.000				
D12	0.089	0.167	0.192	-0.006	-0.034	1.000			
D19	-0.013	0.235	-0.307	-0.267	*-0.283*	0.039	1.000		
D20	0.128	-0.134	-0.564	-0.357	-0.188	-0.013	0.969	1.000	
D21	0.096	-0.116	-0.386	-0.029	-0.081	-0.024	0.497	0.477	1.000
D22	-0.093	-0.179	-0.200	-0.321	-0.491	-0.142	-0.019	-0.173	0.348
D23	-0.160	-0.142	-0.018	-0.328	-0.502	-0.169	0.219	0.095	0.291
D24	-0.096	-0.037	-0.105	-0.190	-0.311	-0.042	-0.122	0.237	0.267
D26	0.210	0.070	0.248	0.302	0.471	0.050	-0.000	-0.112	-0.283
D28	0.370	0.430	0.177	0.276	0.778	0.039	0.156	-0.009	-1.000
D29	-0.060	0.351	0.085	-0.032	-0.072	0.435	0.367	0.473	-0.445
D28A	0.070	0.008	0.132	0.207	0.306	-0.145	-0.312	-0.496	0.041

	D22	D23	D24	D26	D28	D29	D29A
D22	1.000						
D23	0.954	1.000					
D24	0.663	0.722	1.000				
D26	-0.670	-0.686	-0.770	1.000			
D28	-0.907	-0.949	-1.000	0.950	1.000		
D29	0.031	0.287	0.069	-0.123	0.101	1.000	
D29A	-0.443	-0.517	-0.310	0.437	0.547	-0.940	1.000

SECTION D: INCOME, GOODS& SERVICES (PEARSONIAN)

	DIA	D1B	DIC	D1D	D1E	D1F	D2	D3A	D4	D5
DIA	1.000									
D1B	0.492	1:000								
D1C	0.251	0.518	1.000							
DID	0.180	0.063	0.007	1 .000						
DIE	0.481	0.175	0.121	0.107	1.000					
DIF	0.235	-0.174	-0.331	0.368	0.003	1.000				
D2	0.032	0.081	0.609	-0.343	0.220	-0.315	1.000			
D3A	-0.035	0.072	0.044	0.362	-0.166	0.346	-0.081	1.000		
D4	0.168	0.490	0.536	-0.226	0.249	-0.067	0.459	0.037	1.000	
D5	0.136	0.199	0.447	-0.078	0.192	-0.331	0.674	-0.094	0.304	1.000

SECTION E: PERCEIVED WELLBEING (GAMMA)

	E10	E12	E17	E23	E29	E30	E31	E34	E35	E41	E46	E60
E10	1000											
E12	0.432	1.000										
E17	0.500	0.292	1.000									
E23	0.324	0.655	0.335	1000								
E29	0.242	-0.023	0.485	-0.046	1.000							
E30	0.294	0.432	0.677	0.427	0.601	1.000						
E31	0.267	0.632	0.613	0.487	0.204	0.871	1.000					
E34	0.031	0.465	0.569	0.440	-0.112	0.542	0.543	1.000				
E35	0.104	0.140	0.431	0.297	0.377	0.435	0.515	0.472	1.000			
E41	0.124	0.208	0.465	0.346	-0.226	0.435	0.473	0.387	0.598	1.000		
E46	0.255	0.376	0.296	0.462	-0.066	0.275	0.476	0.572	0.517	0.497	1.000	
E50	-0.099	0.205	0.198	0.061	0.161	0.349	0.292	0.263	0.284	0.191	0.163	

TABLE A2
MATRICES OF COEFFICIENTS BY THEORETICAL CONTRASTS, AOSIS QUESTIONNAIRE VARIABLES, 312 POSTTEST RESPONDENTS (.90)9, SCHEDULES A AND B (COMBINED) 1989-90

HUB VILLAGES (.90)9

SECTION A: TRADITIONAL ACTIVITIES (GAMMA)

	A26A	A26B	A26	A30	A31	A32	A33	A34	A35
A26A	1.000								
A26B	0.233	1.000							
A28	0.269	-0.438	1.000						
A30	0.049	0.363	-0.238	1.000					
A31	-0.519	-0.135	-0.047	0.082	1.000				
A32	0.464	0.165	0.779	0.727	0.010	1.000			
A33	0.095	0.340	0.113	0.720	0.367	0.591	1.000		
A34	-0.093	-0.107	0.103	-0.022	-0.121	-0.117	0.192	1.000	
A35	0.075	0.261	0.260	0.329	0.044	0.193	0.198	-0.121	1.000
A36	-0.055	0.138	0.007	0.275	0.085	0.163	0.318	0.045	0.464
A38	0.063	0.047	0.523	0.495	0.045	0.707	0.330	-0.039	0.095

	A36	A36
A36	1.000	
A36	0.143	1.000

SECTION B: HEALTH (GAMMA)

	B1	B3	B5	B6	B7	B8	B9	B10	B11
B1	1.000								
B3	0.504	1.000							
B5	0.202	0.530	1.000						
B6	0.413	0.591	0.475	1.000					
B7	0.482	0.802	0.549	0.631	1.000				
B8	0.346	0.510	0.595	0.679	0.667	1.000			
69	-0.599	-0.558	-0.421	-0.240	-0.590	-0.390	1.000		
B10	-0.327	0.163	0.007	-0.074	0.232	-0.154	0.323	1.000	
B11	-0.229	-0.118	-0.150	-0.310	-0.248	-0.471	0.253	0.298	1.000

SECTION C: EDUCATION AND EMPLOYMENT (GAMMA)

	c l	C2	C3	C4	C5	C8	C6M	C6N	C12
c l	1.000								
C2	0.300	1.000							
C3	0.571	1.000	1.000						
C4	0.470	-0.163	0.636	1.000					
C5	0.591	0.187	0.866	0.871	1.000				
C6	0.598	0.173	0.640	0.579	0.597	1.000			
C6M	0.655	0.275	0.694	0.615	0.651	1.000	1.000		
C6N	0.788	0.409	0.822	0.811	0.758	1.000	1.000	1.000	
C12	0.580	0.620	0.393	0.313	0685	0.428	0.484	1.000	1.000
C12C	0.449	0.449	0.148	0.401	0.474	0.337	0.389	1.000	0.979
C12M	0.440	0.435	0.219	0.419	0.508	0.311	0.346	1.000	0.987

	C12C	C12M
C12C	1.000	
C12M	0.991	1.000

SECTION D: INCOME, GOODS& SERVICES (GAMMA)

	D3	D6	D9	D10	D11	D12	D19	D20	D21
D3	1.000								
D6	0.570	1.000							
D9	-0.165	0.603	1.000						
D10	0.080	0.465	0.535	1.000					
D11	0.077	0.540	0.818	0.945	1.000				
D12	-0.149	--0.109	0.495	0.315	0.732	1.000			
D19	-0.383	0.260	0.743	0.545	0.765	0.647	1.000		
D20	-0.304	0.407	0.682	0.600	0.778	0.100	0.946	1.000	
D21	-0.342	-0.155	1.000	0.442	0.756	0.529	1.000	1.000	1.000
D22	-0.157	0,038	0.608	0.347	0.592	0.843	0.858	0.455	1.000
D23	-0.383	-0.085	0.259	0.362	0.556	0.647	0.829	0.620	1.000
D24	-0.156	-0.049	-0.277	0.363	0.007	-0.256	0.046	0.150	0.375
D26	-0.176	0.031	-0.124	0.316	0.216	-0.174	0.191	0.339	0.437
D28	0.030	43.024	-0.200	-1.000	-1.000	-0.524	-0.674	-0.226	-1.000
D29	0.077	0.257	-0.036	-0.187	-0.195	0.300	0.268	-0.212	-0.268
D29A	0.208	0.356	0.347	-0.032	0440	0.571	0,362	1.000	0.619

	D22	D23	D24	D26	D28	D29	D28A
D22	1.000						
D23	1.000	1.000					
D24	0.352	0.353	1.000				
D26	0.490	0.510	0.763	1.000			
D28	-1.000	-1.000	-1.000	-0.902	1.000		
D29	0.333	-0.077	-0.387	-0.471	1.000	1.000	
D29A	-0.018	0.362	0.153	-0.106	0.448	-0.111	1.000

SECTION D: INCOME, GOODS& SERVICES (PEARSONIAN)

	DIA	D1B	D1C	DID	DIE	DIF	D2	D3A	D4	D5
D1A	1.000									
D1 B	0.508	1.000								
D1C	0S43	0.304	1.000							
D1D	0.011	0.324	0.171	1.000						
D1E	0.057	0.034	0.099	0.238	1.000					
D1F	0.131	0.315	0.294	0.288	0.176	1.000				
D2	0.247	0.229	0.535	0.251	0.059	0.207	1.000			
D3A	0.275	0.153	0.073	0.085	-0.080	0.389	0.109	1.000		
D4	0.466	0.406	0.602	0.128	0.302	0306	0606	0.158	1.000	
D5	0.017	0.037	0.066	0.266	0.086	0.156	0.208	0.157	0.222	1.000

SECTION E: PERCEIVED WELLBEING (GAMMA)

	Elo	E12	E17	E23	E29	E30	E31	E34	E35
E10	1.000								
E12	0.552	1.000							
E17	0.175	0.376	1.000						
E23	0.058	0.049	0.373	1.000					
E29	0.161	0.508	0.463	0.091	1.000				
E30	0.179	0.462	0.232	0.093	0.550	1.000			
E31	0.015	0.214	0.447	0.476	0.201	0.228	1.000		
E34	-0.031	0.088	0.359	0.297	0.118	0.169	0.315	1.000	
E35	0.192	0.238	0.463	0.284	0.262	0.225	0.222	0.206	1.000

Table A2, continued
Hub Villages (.90X)

	E10	E12	E17	E23	E28	E30	E31	E34	E35
E41	0365	0.255	-0.004	0.064	0.169	0.354	-0.010	0.206	0.081
E46	0.331	0.214	-0.063	0.252	0.114	0.277	-0.039	0.297	-0.057
E50	0.069	0.016	0.107	0.105	-0.011	0.353	-0.042	0.377	0.112

	E41	E46	E50
E41	1.000		
E46	0.450	1.000	
E50	0.432	0.046	1.000

PERIPHERY VILLAGES (.90)()

SECTION A: TRADITIONAL ACTIVITIES (GAMMA)

	A26A	A26B	A28	A30	A31	A32	A33	A34	A35
A26A	1.000								
A26B	0.603	1.000							
A28	-0.198	-0.373	1.000						
A30	0.214	0.105	-0.091	1.000					
A31	-0.079	-0.287	-0.390	-0.406	1.000				
A32	-0.178	-0.319	0.593	0.066	0.240	1.000			
A33	0.040	0.096	0.873	0.666	-0.233	0.119	1.000		
A34	-0.212	0.086	0.546	1.000	-0.424	-0.010	0.493	1.000	
A35	0.223	0.111	0.359	0.254	0.067	0.118	0.134	0.294	1.000
A36	0.153	0.174	0.003	0.063	-0.264	0.042	0.025	0.288	0.481
A38	-0.157	-0.229	0.713	0.366	0.061	0.127	0.572	0.549	0.041

	A36	A38
A36	1.000	
A36	-0.052	1.000

SECTION B: HEALTH (GAMMA)

	B1	B3	B5	86	B7	B8	B9	B10	BI 1
B1	1.000								
B3	0.255	1.000							
B5	-0.120	0.216	1.000						
B6	0.297	0.672	0.451	1.000					
B7	0.263	0.728	0.082	0.844	1.000				
B8	0.090	0.531	-0.064	0.621	0.687	1.000			
B9	-0.562	-0.544	0.126	-0.577	-0.612	-0.082	1.000		
B1o	-0.105	0.547	0.486	0.052	-0.030	0.506	0.266	1.000	
B11	-0.022	0.140	0.230	0.333	0.135	-0.192	0.090	0.656	1.000

SECTION C: EDUCATION AND EMPLOYMENT (GAMMA)

	c l	C2	C3	C4	C5	C-6	C6M	C6N	C12
c1	1.000								
C2	-0.293	1.000							
C3	0.663	1.000	1.000						
C4	0.433	1.000	0.913	1.000					
C5	0.397	1.000	0.896	0.958	1.000				
C6	0.545	-0.711	0,263	0.265	0.176	1.000			
C6M	0.582	-0.674	0.264	0.301	0.205	1.000	1.000		
C6N	0.791	-0.484	0.421	0.642	0.452	0.994	1.000	1.000	

Table A2, continued
Periphery Villages (.90X)

	C1	C2	C3	C4	C5	C6			C6M	C6N	C12	C12C	C12M
C12	0.528		-1.000	0.242		0.541	-0.008	0.196	0.252	1.000	1.000		
C12C	0.307		-1.000	0.173		0.449	0.110	0.165	0.214	1.000	0.965	1.000	
C12M	0.292		-1.000	0.416		0.416	0.087	0.195	0.250	1.000	0.959	1.000	1.000

SECTION D: INCOME, GOODS& SERVICES (GAMMA)

	D3	D6	D9	D10	D11	D12	D19	D20	D21
D3	1.000								
D6	-0.391	1.000							
D9	-0.662	0.568	1.000						
D10	0333	-0.241	*0.358*	1.000					
D11	0,714	-0.695	*-0.097*	1.000	1.000				
D12	0.220	0.152	0.173	0.077	0.556	1.000			
D19	-0.263	0.200	0.115	0.091	-0.429	*0.667*	1.000		
D20	-0.357	0.032	0.468	0.000	-0.500	*0.608*	0.900	1.000	
D21	0.652	-0.200	-0.115	0.444	0.429	-0.291	-0.111	0.167	1.000
D22	-0.455	0.037	-0.034	*-0.669*	-1.000	*0.352*	0.360	0.459	0.045
D23	-0.775	-0.333	0.375	*-0.593*	-0.571	0.531	0.360	0.459	0.045
D24	-0.558	0.455	0.627	0.000	-0.600	0.148	0.571	0.694	-0.156
D26	-0.573	4.185	0.200	*-0.672*	-0.900	-0.306	-0.133	-0.012	-0.179
D28								.	
D29	1:000	*-0.623*	*-0.243*	-0:105	1.000	1.000	0.500	0.200	*0.429*
D29A									

	D22	D23	D24	D26	D28	D29	D29A
D22	1.000						
D23	0.985	1.000					
D24	0.434	0.434	1.000				
026	0.438	0.643	0.549	1.000			
D28	.						
D29	0.310	0.310	0.093	0.260		1.000	
D29A							

SECTION D: INCOME, GOODS& SERVICES (PEARSONIAN)

	DIA	D1B	D1C	D1D	DIE	DIF	D2	D3A	D4	D5
DIA	1.000									
DIB	0.110	1.000								
D1C	0.398	0.239	1.000							
D1D	0.267	0.554	0.448	1.000						
D1E	0.091	0.162	0.144	0.172	1.000					
D1F	-0.156	0.631	0.059	0.435	0.234	1.000				
D2	-0.117	0.392	0.081	0.382	0.295	0.282	1.000			
D3A	-0.344	0.209	-0.172	0.065	0.015	0.334	0.079	1.000		
D4	0.263	0.510	0.335	0.534	0.237	0.392	0.226	0.053	1.000	
D5	-0.045	0.448	0.098	0.070	0.208	0.250	0.310	-0.073	0.282	1.000

SECTION E: PERCEIVED WELLBEING (GAMMA)

	E10	E12	E17	E23	E29	E30	E31	E34	E35
E10	1.000								
E12	0.381	1.000							
E17	0.322	0.221	1.000						
E23	0508	0.434	0.560	1.000					
E29	-0.348	0.174	-0.298	-0.070	1.000				
E30	0.278	0.354	0.048	0.377	0.511	1.000			

	E10	E12	E17	E23	E29	E30	E31	E34	*E35*
E31	0.062	-0.227	0.156	0.377	-0.097	0.015	1.000		
E34	-0.124	0.474	0.549	0.712	-0.113	0.288	0.225	1.000	
E35	0.282	0.456	0.282	0.467	0,072	0.521	-0.065	0.393	1.000
E41	0.533	0.546	-0.066	0.418	-0.158	0.562	-0.006	0.413	0.216
E46	0.417	0.354	0.313	0.513	0.013	0.372	0,063	0.405	0.333
E50	0.331	0.185	-0.034	-0.103	-0.061	0.119	0.055	-0.051	-0.085

	E41	E46	E50
E41	1.000		
E46	0.705	1.000	
E50	0.562	0.515	1.000

TEST VILLAGES (.90)()

SECTION A: TRADITIONAL ACTIVITIES (GAMMA)

	A26A	A26B	A28	A30	*A31*	*A32*	*A33*	A34	*A35*
A26A	1.000								
A26B	0.358	1.000							
A28	0.173	-0.418	1.000						
A30	0.167	0.359	-0.236	1.000					
A31	-0.320	-0.117	-0.169	-0.104	1.000				
A32	0.390	0.129	0.713	0.512	0.117	1.000			
A33	0.127	0.306	0.457	0.704	0.183	0.477	1.000		
A34	-0.070	-0.012	0.197	0.212	-0.130	-0.045	0.302	1.000	
A35	0.175	0.260	0.376	0.357	0.022	0.295	0.271	-0.041	1.000
A36	-0.016	0.140	0.079	0.151	-0.002	0.256	0.196	0.239	0.471
A36	0.119	0.034	0.648	0.410	0.068	0.469	0.533	0.070	0.201

	A36	A36
A36	1.000	
A38	0.029	1.000

SECTION B: HEALTH (GAMMA)

	B1	B3	B5	B6	B7	B8	B9	B10	B11
B1	1.000								
B3	0.481	1.000							
B5	0.115	0.404	1.000						
66	0.395	0.633	0.460	1.000					
B7	0.464	0.776	0.430	0.650	1.000				
B8	0.290	0.532	0.476	0.689	0.676	1.000			
B9	-0.662	-0.583	-0.332	-0.311	-0.596	-0.248	1.000		
B10	-0.263	0.256	0.211	-0.017	0.176	-0.065	0.262	1.000	
B11	-0.232	-0.075	-0.026	-0.180	-0.167	-0.448	0.149	0.299	1.000

SECTION C: EDUCATION AND EMPLOYMENT (GAMMA)

	c l	C2	C3	C4	C5	C6	C6M	C6N	C12
C1	1.000								
C2	0.378	1.000							
C3	0.675	1.000	1.000						
C4	0.564	-0.068	0.886	1.000					
C5	0.609	0.268	0.905	0.905	1.000				

Table A2, continued
Test Villages (.90X)

	c l	C2	C3	C4	C5	C6	C6M	CON	C12
C6	0.610	0.245	0.676	0.598	0.559	1.000			
C6M	0.657	0.345	0,719	0.634	0.608	1.000	1.000		
C6N	0.796	0.478	0.856	0.839	0.762	1.000	1.000	1.000	
C12	0.601	0.668	0.469	0.439	0.576	0.414	0.468	1.000	1.000
C12C	0.463	0.506	0.256	0.506	0.454	0.332	0.366	*1.000*	0.983
C12M	0.455	0.494	0.314	0.522	0.460	0.309	0.346	1.000	0.990

	C12C	C12M
C12C	1.000	
C12M	0.993	1.000

SECTION D: INCOME, GOODS & SERVICES (GAMMA)

	D3	D6	D9	D1o	D11	D12	D19	D20	D21
D3	1.000								
D6	0.355	1.000							
D9	-0.292	0.536	1.000						
D1o	0.236	0.255	0.417	1.000					
D11	0.263	0.340	0.721	*0.985*	1.000				
D12	0.068	0.110	0.376	0.366	0.674	1.000			
D19	-0.238	0.269	0.405	0.310	0.519	0606	1.000		
D20	-0.217	0.295	0.649	0.443	0.584	0.227	0.879	1.000	
D21	-0.059	-0.137	0.508	0284	0.394	0.218	0.640	0.765	1.000
D22	-0.373	0.056	0.354	-0.333	-0.050	0.492	0.736	0.443	0.791
D23	-0.622	-0.115	0.282	-0.128	0.098	0.424	0.671	0.508	0.765
D24	-0.337	0.108	0.035	-0.236	-0.429	-0.276	0.203	0.316	0.194
D26	-0.428	-0.022	-0.063	-0.465	-0.531	-0.498	-0.059	0.010	0.093
D28	0.172	-0.038	-0.099	-1.000	-1.000	-0.352	-0.671	-0.228	-1.000
D29	0.124	0.143	-0.169	-0.417	-0.452	0.312	0.440	-0.053	-0.174
D29A	0.333	0.322	0.440	0.548	0.791	0.667	0.302	1.000	0s63

	D22	D23	D24	D26	D28	D29	D29A
D22	1.000						
D23	0.990	1.000					
D24	0.601	0.464	1.000				
D26	0.531	0.565	0.733	1.000			
D28	-1.000	-1.000	-1.000	-0.934	1.000		
D29	0.373	-0.053	-0.072	-0.078	1.000	1.000	
D29A	-0.333	0.143	-0.135	-0.479	0680	-0.333	1.000

SECTION D: INCOME, GOODS & SERVICES (PEARSONIAN)

	D1A	D1B	D1C	D1D	DIE	D1F	D2	D3A	D4	
D1A	1.000									
D1B	0.068	1.000								
D1C	0.158	0.281	1.000							
D1D	0.167	0.198	0.116	1.000						
DIE	-0.071	0.099	0.047	0.125	1.000					
DIF	-0.122	0.413	0.227	0.169	0.216	1.000				
D2	-0.160	0.351	0.355	0.124	0.238	0.298	1.000			
D3A	-0.075	0203	0.105	-0.049	0.049	0.403	0.235	1.000		
D4	0.129	0.473	0.529	0.135	0.295	0.360	0.527	0.232	1.000	
D5	-0.345	0.371	0.125	-0.080	0.242	0.325	0.376	0.270	0.345	1.000

Table A2, continued
***Test** Villages (.90X)*

SECTION E: PERCEIVED WELLBEING (GAMMA)

	E10	E12	E17	E23	E29	E30	E31	E34	E35
Elo	1000								
E12	0.482	1.000							
E17	0.301	0.365	1.000						
E23	0.312	0.121	0.514	1.000					
E29	0.182	0.447	0.412	0.136	1.000				
E30	0.261	0.457	0.330	0.194	0.596	1.000			
E31	0.091	0.116	0.409	0.485	0.225	0.312	1.000		
E34	0.066	0.169	0.421	0.406	0.204	0.276	0.368	1.000	
E35	0.221	0.300	0.442	0.321	0.216	0.341	0.160	0.267	1.000
E41	0.529	0.266	0.102	0.250	0.215	0.373	0.181	0.297	0.069
E46	0.422	0.206	0.060	0366	0.170	0.354	0.057	0.343	0.053
E50	0.210	0.160	0.154	0.165	-0.045	0.339	0.065	0.361	0.064

	E41	E46	E50
E41	1.000		
E46	0.553	1.000	
E50	0.546	0.200	1.000

CONTROL VILLAGES (.90X)

SECTION A: TRADITIONAL ACTIVITIES (GAMMA)

	A26A	A26B	A28	A30	*A31*	*A32*	A33	A34	A35
A26A	1.000								
A26	0.478	1.000							
A28	-0.538	-0.235	1.000						
A30	-0.538	-0.500	-1.000	1.000					
A31	-0.500	-0.604	-0.172	1.000	1.000				
A32	-0.544	-0.486	0.446	-0.266	0.367	1.000			
A33	-0.233	0.097	0.642	0.556	-0.216	-0.085	1.000		
A34	-0.544	-0.122	1.000	1.000	-1.000	-0.224	0.190	1.000	
A35	-0.073	-0.154	0.081	-0.158	0.109	-0.127	-0.163	0.431	1.000
A36	0.394	0.135	-1.000	0.545	-0.426	-0.336	-0.111	-0.109	0.503
A36	-0.653	-0.329	0.450	1.000	0.193	0.192	0.423	0.600	-0.207

	A36	*A36*
A36	1.000	
A36	-0.185	1.000

SECTION B: HEALTH (GAMMA)

	B1	B3	B5	B6	B7	B8	B9	B10	B11
B1	1.000								
B3	0.164	1.000							
B5	0.069	0.498	1.000						
B6	0.315	0.565	0.526	1.000					
B7	0.165	0.776	0.179	0.742	1.000				
B8	0.174	0.504	-0.500	0.397	0.718	1.000			
B9	-0.127	-0.390	0.492	-0.523	-0.542	-0.406	1.000		
B10	-0.269	0.361	0.065	-0.094	0.069	1.000	0.520	1.000	
B11	0.059	0.131	-0.063	0.244	0.036	-0.111	0.420	0.600	1.000

SECTION C: EDUCATION AND EMPLOYMENT (GAMMA)

	c l	C2		C3	C4	C5	C6	C6M	C6N	C12
c l	1.000									
C2	-0.393	1.000								
C3	0.367		1.000	1.000						
C4	-0.159	1.000		0.878	1.000					
C5	0.085	1.000		0.805	0.949	1.000				
C6	0.504	-0.783		-0.190	-0.222	-0.072	1.000			
C6M	0.556	-0.743		-0.214	-0.201	-0.045	1.000	1.000		
C8N	0.747	-0.574		-0.573	-0.459	-0.075	0.985	1.000	1.000	
C12	0.506	-1.000		0.050	0.297	0.004)	0.291	0.325	1.000	1.000
C12C	0.324	-1.000		0.085	0.250	0.046	0.262	0.300	1.000	0.943
C12M	0.315	-1.000		0.324	0.200	-0.005	0.316	0.364	1.000	0.929

	C12C	C12M
C12C	1 .000	
C12M	1.000	1.000

SECTION D: INCOME, GOODS& SERVICES (GAMMA)

	D3	DE	D9	D1O	D11	D12	D19	D20	D21
D3	1.000								
D6	-1.000	1.000							
D9	-1.000	0.818	1.000						
D1O	1.000	-0.846	-0.111	1.000					
D11	1.000	-1.000	-0.429	1.000	1.000				
D12	-1.000	-1.000	1.000	‘1.000	1.000	1.000			
D19	-1.000	0.000	0.818	-0.111	-0.429	1.000	1.000		
D20	-1.000	0.000	0.818	-0.111	-0.429	1.000	1.000	1.000	
D21	1.000	-0.429	-0.429	0.500	0.714	-1.000	-0.429	0.429	1.000
D22	-1.000	0333	0.333	-0.455	-1.000	-1.000	0.333	0.333	0.143
D23	-1.000	-0.333	0.600	0.200	-0.143	1.000	0.600	0.600	-0.143
D24	-1.000	1.000	1.000	0.111	-1.000	-1.000	1.000	1.000	-1.000
D26	-1.000	1.000	1.000	-1.000	-1.000	-1.000	1.000	1.000	-1.000
D28									
D29	1.000	-1.000	0.000	0.200	1.000	1.000	0.000	0.000	1.000
D29A									

	D22	D23	D24	D26	D28	D29	D29A
D22	1.000						
D23	1.000	1.000					
D24	0.143	-0.143	1.000				
D26	-1.000	-1.000	1.000	1.000			
D28	.	.					
D29	0.333	0.600	-0.429	1.000	.	1.000	
D29A							

SECTION D: INCOME, GOODS& SERVICES (PEARSONIAN)

	DIA	D1 B	DIC	DID	D1 E	D1 F	D2	D3A	D4
D1A	1.000								
D1B	0.522	1.000							
D1C	0.250	0.669	1.000						
DID	0.205	0.842	0.679	1.000					
DIE	-0.079	0.275	0.408	0.229	1.000				
DIF	0.203	0.722	0.629	0.861	0.467	1 .000			

Table A2, *con tinued*
Control Villages (.90X)

	DIA	DIB	D1 C	D1D	D1E	D1 F	D2	D3A	*D4*	*D5*
D2	-0.089	0.428	0.384	0.564	-0.319	0.388	1.000			
D3A	0.151	0.412	0.134	0.498	0.188	0.405	0.229	1.000		
D4	0,455	0.647	0.800	0.801	0.222	0.595	0.339	0.182	1.000	
D5	0.169	0.346	0.608	0.373	-0.131	0.183	0.215	-0.095	0.418	1.000

SECTION E: PERCEIVED WELLBEING (GAMMA)

	Elo	E12	E17	E23	E29	E30	E31	E34	E35
E10	1.000								
E12	0.448	1.000							
E17	0.070	0.092	1.000						
E23	0.113	0.579	0.287	1.000					
E29	-0.388	0.125	-0.595	-0.119	1.000				
E30	0.270	0.194	-0.628	0.467	0.429	1.000			
E31	0.276	0.033	0.345	0.545	-0.057	-0.317	1.000		
E34	-0.215	0.475	0.580	0.718	-0.463	0.114	0.080	1.000	
E36	0.258	0.417	0.194	0.482	0.051	-0.021	-0.063	0.161	1.000
E41	0.470	0.896	-0.204	0.482	-0.099	0.924	-0.317	0.545	0.209
E46	0.232	0.611	0.145	0.246	-0.096	0.096	0.123	0.455	0.058
E50	0.246	-0.302	-0.341	-0.503	0.235	0.000	-0.277	-0.400	-0.158

	E41	E46	E50
E41	1.000		
E46	0.855	1.000	
E50	0.048	0.484	1.000

NATIVE VILLAGES (.90)()

SECTION A: TRADITIONAL ACTIVITIES (GAMMA)

	A26A	A26B	A28	A30	A31	A32	A33	A34	*A35*
A26A	1000								
A26B	0.803	1.000							
A28	0.129	-0,270	1.000						
A30	0.295	0.088	0.164	1.000					
A31	-0.283	-0.335	-0.380	-0.479	1.000				
A32	0.079	-0.095	0.713	0.289	0.013	1.000			
A33	-0.027	0.096	0.678	0.746	-0.138	0.226	1.000		
A34	-0.223	0.096	0.585	0.500	-0.251	0.113	0.579	1.000	
A35	0.180	0.210	0.581	0.488	0.021	0.180	0.264	0.263	1.000
A36	0.138	0.250	-0.054	0.189	-0.289	0.040	0.131	0.310	0.386
A36	-0.153	-0.288	0.623	0.495	0.092	0.072	0.443	0.436	0.129

	A36	A38
A36	1.000	
A36	0.030	1.000

SECTION B: HEALTH (GAMMA)

	B1	B3	B5	B6	B7	B8	B9	B1o	B11
B1	1.000								
B3	0.432	1.000							
B5	0.095	0.388	1.000						
B6	0.394	0.732	0.559	1000					
B7	0.384	0.838	0.324	0.873	1.000				

	01	B3	B5	B6	B7	B8	B9	B1O	B11
B8	0.18?	0.589	0.160	0.646	0.658	1.000			
B9	-0.715	-0.667	-0.204	-0.472	-0.671	-0.285	1.000		
B1O	-0.204	0.326	0.229	0.057	0.165	0.352	0.284	1.000	
011	0.092	0.255	0.299	0.217	0.188	-0.071	0.078	0.512	1.000

SECTION C: EDUCATION AND EMPLOYMENT (GAMMA)

	c l	C2	C3	C4	C5	C8	C6M	C6N	C12
c l	1.000								
C2	-0.119	1.000							
C3	0.731	1.000	1.000						
C4	0.548	1.000	0 s 0 6	1.000					
C5	0.563	1.000	0.905	0.945	1.000				
C6	0.552	-0.521	0.447	0.456	0.399	1.000			
C6M	0.602	-0.514	0.466	0.496	0.446	1.000	1.000		
C6N	0.806	-0.117	0.647	0.738	0.655	0.995	1.000	1.000	
C12	0.571	-1.000	0.449	0.668	0.379	0.276	0.345	1.000	1.000
C12C	0.364	-1.000	0.129	0.578	0.275	0.172	0.220	1.000	0.958
C12M	0.349	-1.000	0.293	0.560	0.262	0.185	0.239	1.000	0.962

	C12C	C12M
C12C	1 .000	
C12M	1.000	1.000

SECTION D: INCOME, GOODS & SERVICES (GAMMA)

	D3	D6	D9	D1o	D11	D12	D19	D20	D21
D3	1.000								
D6	0.209	1.000							
D9	-0.521	0.459	1.000						
D10	0.250	0.102	0.481	1.000					
D11	0.182	0.070	0.732	1.000	1.000				
D12	0.000	0.152	0.458	0.506	0.692	1.000			
D19	-0.302	0.066	0.422	0.333	0.366	0.682	1.000		
D20	-0.429	0.027	0.675	0.417	0.522	0.612	0.951	1.000	
D21	0.421	-0.316	0.328	0.387	0.500	0.169	0.388	0.522	1.000
D22	-0.160	-0.051	0.351	-0.369	-0.238	0.500	0.556	0.495	0.522
D23	-0.494	-0.192	0.500	-0.046	0.182	0.793	0.626	0.563	0.465
D24	-0.197	0.036	0.073	-0.354	-0.578	-0.245	0.095	0.270	-0.138
D26	-0.279	-0.236	-0.136	-0.765	-0.753	-0.483	-0.260	-0.105	-0.181
D28	.					.			
D29	0.239	-0.327	-0:218	-0.280	-0.354	0.452	0.287	-0.071	0.080
D29A	0.333	-0.135	0.121	1.000	1.000	0.925	1.000	1.000	0.632

	D22	D23	D24	D26	D28	D29	D29A
D22	1.000						
D23	0.989	1.000					
D24	0.113	0.063	1.000				
D26	0.209	0.250	0.585	1.000			
D28	.	.	.	.			
D29	0.429	0.280	0.025	0.015	.	1.000	
D29A	-0.214	1.000	0.429	-0.370	.	-0.722	1.000

SECTION D: INCOME, GOODS& SERVICES (PEARSONIAN)

	DIA	DIB	D1C	01 D	D1E	DIF	02	D3A	04	D5
DIA	1.003									
D1 B	0.031	1.000								
D1C	0.231	0.277	1.000							
D1D	0.284	0.392	0.506	1 .000						
D1E	-0.122	0.414	0.311	0.325	1.000					
D1F	-0.175	0546	0.193	0.352	0.425	1.000				
D2	-0.149	0.261	0.292	0.402	0.553	0.272	1.000			
D3A	-0.177	0.100	-0.018	-0.046	0.174	0.319	-0.106	1.000		
D4	0.150	0.465	0.466	0.539	0.457	0,425	0.379	0.120	1.000	
D5	-0.065	0.490	0.320	0.180	0.495	0.372	0.597	0.036	0.451	1.000

SECTION E: PERCEIVED WELLBEING (GAMMA)

	E10	E12	E17	E23	E28	E30	E31	E34	E35
E10	1.000								
E12	0.332	1.000							
E17	0.359	0.335	1.000						
E23	0.536	0.236	0.441	1.04)0					
E29	-0.047	0.225	0.129	-0.033	1.000				
E30	0.268	0.304	0.155	0.288	0.507	1.000			
E31	0.261	-0.062	0.195	0.377	0.153	0.415	1.000		
E34	0.091	0.174	0.270	0.605	0.018	0.428	0.360	1.000	
E35	0.199	0.405	0.339	0.399	0.126	0.410	-0.002	0.151	1.000
E41	0.514	0.202	-0.023	0.436	-0.018	0.534	0.277	0.533	0.064
E46	0.446	0.155	0.279	0.647	0.056	0.363	0.214	0.567	0.247
E50	0.312	0.202	0.033	0.236	-0.038	0.262	0.359	0.220	0.160

	E41	E46	E50
E41	1.000		
E46	0.768	1.000	
E50	0.613	0.542	1.000

MIXED VILLAGES (.90X)

SECTON A: TRADITIONAL ACTIVITIES (GAMMA)

	A26A	A26B	A28	A30	A31	A32	A33	A34	*A35*
A26A	1.000								
A26B	0.102	1.000							
A28	0.015	-0.594	1.000						
A30	-0.124	0.496	-0.554	1.000					
A31	-0.378	-0.043	0.036	0.343	1.000				
A32	0.265	-0.098	0.648	0.759	0.325	1.000			
A33	0.097	0.298	0.166	0,669	0.510	0.528	1.000		
A34	-0.007	-0.061	0.096	0.111	-0.277	-0.234	0.146	1.000	
A35	0.127	0.319	0.099	0.122	0.066	0.211	0.182	-0.236	1.000
A36	-0.079	0.163	0.114	0.256	0.259	0.332	0.450	-0.087	0.563
A36	-0.081	-0.105	0.595	0.406	0.116	0.762	0.345	0.153	0.134

	A 3 6	A 3 8
A36	1.000	
A38	*0.178*	1.000

SECTION B: HEALTH (GAMMA)

	B1	B3	B5	B6	B?	B8	B9	B1O	B11
B1	1.000								
B3	0.425	1.000							
B5	0S389	0.441	1.000						
B6	0.359	0.50s	0.353	1.000					
B7	0.420	0.705	0.431	0.781	1.000				
B8	0.317	0.428	0.553	0.695	0.698	1.000			
B9	-0.450	-0.435	-0.227	-0.224	-0.481	-0.247	1.000		
B1o	-0.299	0.231	0.174	-0.135	0.194	-0.280	0.330	1.000	
BII	-0.346	-0.259	-0.293	-0.376	-0.369	-0.605	0.264	0.151	1.000

SECTION C: EDUCATION AND EMPLOYMENT (GAMMA)

	c l	C2	C3	C4	C5	C6		C6M	C6N	C12
c l	1.000									
C2	0.245	1.000								
C3	0.401	1 .000	1.000							
C4	0.349	-0.279	0.814	1.000						
C5	0.431	0.050	0.823	0.844	1 .000					
C6	0.534	0.147	0.489	0.467	0.486	1.000				
C6M	0.591	0.280	0.569	0.504	0.540	1.000		1.000		
C5N	0.716	0.222	0.672	0.648	0.570	1 .000		1.000	1.000	
C12	0.572	0.670	0.171	0.155	0.463	0.418		0.457	1.000	1.000
C12C	0.468	0.493	0.158	0.260	0368	0.411		0.461	1000	0.987
C12M	0.450	0.478	0.239	0.281	0.392	0.367		0.416	1.000	0.992

	C12C	C12M
C12C	1.000	
C12M	0.989	1.000

SECTION D: INCOME, GOODS& SERVICES (GAMMA)

	D3	D6	D9	D1O	011	D12	D19	D20	D21
03	1.000								
D6	0.500	1.000							
09	0.200	1.000	1.000						
D1O	0.778	0.100	-0.067	1.000					
D11	0.875	0.500	0.200	1.000	1.000				
D12	0.200	-0.250	0.111	0.538	1.000	1.000			
019	-0.333	0.667	0.667	-0.067	0.500	0.667	1.000		
D20	0.200	0.750	0.111	0.143	0.200	-1.000	0.667	1.000	
D21	-1.000	0.400	1.000	-0.200	0.250	1.000	1.000	1.000	1.000
D22	-0.500	0.000	0.200	-0.250	0.333	1.000	1.000	0.200	1.000
D23	-0.714	-0.444	-0.455	-0.053	0.000	0.455	0.714	0.455	1.000
D24	-0,143	-0.053	-0.231	0.333	0.412	0.500	0.733	1.000	1.000
D26	-0.429	-0.400	-0.600	0.143	0200	0.692	0.429	0.692	1.000
D28	-0.200	0.250	-0.111	-1.000	-1.000	-0.846	-0.667	-0.111	-1.000
029	0.200	0.750	0.111	-0.429	0.200	0.111	0.667	0.111	-0.500
D29A	0.250	1.000	1.000	-0.200	0.250	-0.500	-0.250	1.000	0.750

	022	D23	D24	D26	D28	D29	D29A
D22	1.000						
D23	1.000	1.000					
D24	0.750	0.889	1.000				
D26	0.600	0.750	1.000	1.000			

D28	-1.000	-1.000	-1.000	-0.692	1.000		
D29	0.200	-0.455	-0.571	-0.429	1.000	1.000	
D29A	0.250	0.000	-0.111	-0.333	0.500	1.000	1.000

SECTION D: INCOME, GOODS& SERVICES (PEARSONIAN)

	DIA	D1B	D1C	D1D	D1 E	D1 F	D2	D3A	D4	D5
DIA	1.000									
D1B	0.567	1.000								
D1C	0.443	0.382	1.000							
DID	0.008	0.404	0.034	1.000						
DIE	o.137	0.007	0.143	0.012	1.000					
DIF	0.212	0.368	0.269	0.328	0.123	1.000				
D2	0.348	0.393	0.485	0.201	0.041	0.213	1.000			
D3A	0.215	0.187	-0.021	0.171	-0.102	0.371	0.142	1.000		
D4	0.552	0.496	0.610	0.049	0.292	0.299	0.569	0.094	1,000	
D5	0.173	0.153	0.103	0.067	0.161	0.036	-0.040	-0.087	0.220	1.000

SECTION E: PERCEIVED WELLBEING (GAMMA),

	E10	E12	E17	E23	E29	E30	E31	E34	E35
E10	1.000								
E12	0.496	1.000							
E17	0.058	0.238	1.000						
E23	-0.059	0.047	0.425	1.000					
E29	0.158	0.447	0.330	0.192	1.000				
E30	0.178	0.402	0.212	0.138	0.593	1.000			
E31	-0.113	0.124	0.515	0.531	0.151	0.064	1.000		
E34	0.037	0.185	0.612	0.338	0.237	0.147	0.341	1.000	
E35	0.189	0.159	0.408	0.234	0.226	0.175	0.197	0.332	1.000
E41	0.414	0.359	0.019	0.015	0.324	0.333	-0.158	0.096	0.063
E46	0.451	0.383	-0.124	0.079	0.239	0.377	-0.043	0.133	-0.110
E50	0.050	-0.079	0.093	-0.151	0.034	0.307	-0.298	0.337	-0.098

	E41	E46	E50
E41	1.000		
E46	0.371	1000	
E50	0.212	-0.159	1.000

BOROUGH VILLAGES (.90)()

SECTION A: TRADITIONAL ACTIVITIES (GAMMA)

	A26A	A26B	A28	A30	A31	*A32*	*A33*	A34	A35
A26A	1.000								
A26B	0.305	1.000							
A28	0.498	-0.009	1.000						
A30	0.031	0.496	-0.568	1.000					
A31	-0.507	-0.283	-0.612	-0.152	1.000				
A32	0.344	0.193	0.729	0.351	-0.107	1.000			
A33	0.060	0.380	0.449	0.649	-0.109	0.445	1.000		
A34	-0.103	-0.092	0.011	-0.048	0.010	-0.009	0.202	1.000	
A35	-0.045	0.167	0.344	0.206	-0.032	0.332	-0.027	-0.079	1.000
A36	-0.016	-0.023	0.080	0.057	-0.104	0.194	0.128	0.258	0.208
A38	0.250	0.426	0.471	0.506	-0.058	0.421	0.459	-0.002	0.388

	A38	A38
A38	1.000	
A38	0.035	1.000

SECTION B: HEALTH (GAMMA)

	81	B3	B5	B8	B7	B8	B9	B10	B11
B1	1.000								
B3	0.540	1.000							
B5	0.267	0.388	1.000						
B8	0.554	0.676	0.521	1.000					
B7	0.628	0.752	0.475	0.911	1.000				
B8	0.323	0.480	0.231	0540	0.740	1.000			
B9	-0.762	-0.749	-0.315	-0.664	-0.722	-0.319	1.000		
B10	-0.385	0.277	-0.011	*-0.204*	-0.036	*-0.139*	0.165	1.000	
B11	-0.235	-0.297	0.019	-0.044	-0.198	-0.449	0.248	0.265	1,000

SECTION C: EDUCATION AND EMPLOYMENT (GAMMA)

	c l	C2	C3	C4	C5	C6	C8M	C8N	C12
c l	1.000								
C2	0.321	1.000							
C3	0.542	1.000	1.000						
C4	0s31	0.014	0.875	1.000					
C5	0.574	0.425	0.841	0.870	1.000				
C6	0.685	0.187	0.638	0.530	0.472	1.000			
C8M	0.726	0.272	0.656	0.554	0.515	1.000	1.000		
C8N	0.907	0.163	0.813	0.802	0.700	0.998	1.000	1.000	
C12	0.718	0.578	0.389	0.338	0.376	0.393	0.420	1.000	1.000
C12C	0.554	0.450	0.394	0.427	0.351	0.280	0.287	1.000	1.000
C12M	0.577	0.476	0.655	0.415	0.333	0.308	0.315	1.000	1.000

	C12C	C12M
C12C	1.000	
C12M	1,000	1.000

SECTION D: INCOME, GOODS& SERVICES (GAMMA)

	D3	D6	D9	D10	D11	D12	D19	D20	D21
D3	1.000								
D6	0.701	1.000							
D9	-0.114	0.605	1.000						
D10	0,381	0.172	0.262	1.000					
D11	0.333	0.258	0.768	1.000	1.000				
D12	0.047	-0.144	0.458	0.348	0.633	1.000			
D19	-0.209	0.085	0.567	0.483	0.733	0.638	1.000		
D20	-0.053	0.090	0.705	0.749	1.000	0.229	0.880	1.000	
D21	0.487	-0.333	0.541	0.378	0.543	0.267	0548	0.699	1.000
D22	0.082	-0.235	0.453	-0.188	0.091	0.598	0.636	0.263	0.763
D23	-0.053	-0.385	0.216	0.020	0.268	0.757	0.615	0.406	0.699
D24	-0.118	0.152	0.089	-0.097	-0.293	-0.097	0.168	0.242	0.163
D26	-0.284	0084	-0.130	-0.495	-0.481	-0.278	-0.033	0.015	0.040
D28	0.451	-0.068	-0.184	-1.000	-1.000	-0.049	-0.684	*-0.259*	-1.000
D29	0.200	-0.114	-0.021	-0.413	-0.486	0.273	0.333	-0.143	-0.122
D29A	0.721	0.146	0.247	0.745	0.838	0.744	0.130	1.000	0.442

	D22	D23	D24	D26	D28	D29	D29A
D22	1000						
D23	1.000	1.000					
D24	0.395	0.281	1.000				
D26	0.551	0.453	0.729	1.000			
D28	-1.000	-1.000	-1.000	-0.968	1.000		
D29	0.406	0.130	0.023	0.070	1 .000	1.000	
D29A	-0.466	-0.046	-0.107	-0.519	0.745	-0.395	1.000

SECTION D: INCOME, GOODS & SERVICES (PEARSONIAN)

	DIA	D1B	D1C	D1D	DIE	D1F	D2	D3A	D4	D5
DIA	1.000									
D1B	0.025	1.000								
D1C	0.116	0.305	1.000							
DID	0.194	0.346	0.126	1.000						
D1E	-0.024	0.223	0.236	0.114	1.000					
D1F	-0.207	0.556	0.198	0.156	0.268	1.000				
D2	-0.212	0.586	0.392	0.156	0.352	0.462	1.000			
D3A	-0.228	0.5-45	-0.052	-0.020	-0.086	0.478	0.330	1.000		
D4	0.074	0.650	0.553	0.108	0.336	0.560	0.606	0.194	1.000	
D5	-0.346	0.463	0.194	-0.118	0.454	0.323	0.367	0.258	0.450	1.000

SECTION E: PERCEIVED WELLBEING (GAMMA)

	E10	E12	E17	E23	E29	E30	E31	E34	E35
E10	1.000								
E12	0.574	1.000							
E17	0.252	0.521	1.000						
E23	0.423	0.232	0.602	1.000					
E29	0.206	0.431	0.288	0.070	1.000				
E30	0.373	0.293	0.366	0.259	0.525	1.000			
E31	0.181	0.025	0.463	0.371	0.286	0.395	1.000		
E34	-0.004	0.092	0.460	0.456	0.264	0,358	0.398	1.000	
E35	0.321	0.477	0.363	0.371	0.179	0.420	0.126	0,212	1.000
E41	0.588	0.391	0.377	0.464	0.316	0.479	0.352	0.542	0.335
E46	0.410	0.093	0.040	*0.478*	0.098	0.476	0.219	0.371	0.114
E50	0.342	0.063	0.268	0.267	0.173	0.383	0.201	0.457	0.111

	E41	E46	E50
E41	1.000		
E46	0.611	1.000	
E50	0.568	0.324	1.000

NOT BOROUGH VILLAGES (.90X)

SECTION A: TRADITIONAL ACTIVITIES (GAMMA)

	A26A	A26B	A28	A30	A31	A32	A33	A34	A35
A26A	1,000								
A26B	0.425	1.000							
A28	-0.365	-0.710	1.000						
A30	0.306	0.080	0.343	1 .000					
A31	-0.091	-0.147	0.431	-0.101	1.000				
A32	0.066	-0.162	0.664	0.632	0.316	1.000			
A33	0.031	0.061	0.640	0.449	0.340	0.411	1.000		

	A26A	A26B	A28	A30	A31	A32	A33	A34	A35
A34	-0.141	0.096	0.455	0.546	-0.472	-0.207	0.355	1.000	
A35	0.122	0.066	0.421	0.670	0.226	0.198	0.256	0.328	1.000
A36	0.090	0.257	-0.091	0.384	-0.046	0.083	0.135	0,135	0.672
A38	-0.295	-0.332	0.734	0.372	0.164	0.337	0.664	0.279	0.114

	A36	A38
A36	1,000	
A36	-0.029	1.000

SECTION B: HEALTH (GAMMA)

	B1	B3	B5	66	B7	B8	B9	B10	B11
B1	1.000								
B3	0.266	1.000							
B5	-0.060	0.451	1.000						
B6	0.181	0.565	0.429	1.000					
67	0.149	0.601	0.288	0.725	1.000				
B8	0.137	0.560	0.497	0.794	0.618	1.000			
B9	-0.277	-0.109	-0.066	-0.044	-0.357	-0.165	1.000		
BIo	-0.050	0.326	0.538	0.216	0.545	0.511	0.467	1.000	
B11	-0.093	0.287	-0.075	-0.162	-0.049	.0.300	0.102	0.43s	1.000

SECTION C: EDUCATION AND EMPLOYMENT (GAMMA)

	c I	C2	C3	C4	C5	C6	C6M	C6N	C12
c I	1.000								
C2	0.399	1.000							
C3	0.749	1.000	1.000						
C4	0.401	1.000	0.s97	1.000					
C5	0.451	1.000	0.935	0.950	1.000				
C6	0.561	0.095	0.351	0.343	0.416	1.000			
C6M	0.591	0,105	0.402	0.413	0.481	1.000	1.000		
C6N	0.609	1.000	0.470	0.521	0.535	1.000	1.000	1.000	
C12	0.453	0.554	0.409	0.617	0.732	0.397	0.472	1.000	1.000
C12C	0.260	0.278	-0.016	0.453	0.328	0.264	0.334	1.000	0.844
C12M	0.257	0.257	0.049	0.471	0.367	0.247	0.303	1.000	0.958

	C12C	C12M
C12C	1.000	
C12M	0.966	1,000

SECTION D: INCOME, GOODS & SERVICES (GAMMA)

	D3	Da	D9	D10	D11	D12	D19	D20	D21
D3	1.000								
Da	-0.778	1.000							
D9	-0.800	0.368	1.000						
D10	-0.222	-0.222	0.786	1.000					
D11	-0.333	-0.333	0.810	1.000	1.000				
D12	-1.000	0,333	0.579	0.467	0.636	1.000			
D19	-0.600	0.765	-0.111	-0.412	-0.091	1.000	1.000		
D20	-0.600	0.765	-0.111	-0.412	-0.091	1.000	1.000	1.000	
D21	-0.765	0.600	0.111	-0.059	0.091	-0.500	0.365	0.385	1 moo
022	-0.778	0.905	-0.368	-0.600	-0.333	0.333	0.765	0.765	0.600
D23	-1.000	0.500	0.368	0.053	0.538	1.000	0.765	0.765	0.600
D24	-0.294	0.111	-0.636	-0.429	-0.733	0.125	0.529	0.529	0.500

	D3	D6	D9	D1o	D11	D12	D19	D20	*D21*
D26	-0.391	-0.364	-0.071	-0.071	-0.300	-0.428	-0<143	-0.143	*0.545*
D28	.	.	.	.	.	.	.	.	
D28	- 1 .000	1.000	-1.000	-1 .000	-1.000	-0.333	1 .000	1 .000	1.000
D29A	-1.000	1.000	1.000	-0.333	1.000	0.333	1.000	1.000	1.000

	D22	D23	D24	D26	D28	D29	D29A
D22	1.000						
D23	0.805	1.000					
D24	0.111	0.111	1.000				
D26	-0.354	0.250	0.400	1.000			
D28	.	.	.	.			
D29	1.000	1.000	1.000	1.000	,	1.000	
D29A	1.000	1.000	-0.600	-0.429	.	1.000	1.000

SECTION D: INCOME, GOODS& SERVICES (PEARSONIAN)

	DIA	D1B	DIC	DID	D1E	D1F	D2	D3A	*D4*	D5
DIA	1.000									
DIB	0.426	1.000								
D1C	0.305	0.484	1.000							
D1 D	0.021	0.432	0.266	1.000						
D1 E	-0.014	0.145	0.189	0.205	1.000					
D1F	0.159	0.378	0.373	0.578	0.237	1.000				
D2	0.051	0.242	0.473	0.275	0.165	0.167	1.000			
D3A	0.241	-0.147	0.180	0,249	0.105	0.298	0.022	1.000		
D4	0.357	0.403	0.585	0.314	0.363	0.220	0.460	0.195	1.000	
D5	0.078	0.313	0.427	0.327	0.126	0.250	0.526	-0.016	0.379	1.000

SECTION E: PERCEIVED WELLBEING (GAMMA)

	Elo	E12	El?	E23	E29	E30	E31	E34	E35
E10	1.000								
E12	0.364	1.000							
E17	0.287	0.119	1.000						
E23	0.209	0.172	0.354	1.000					
E29	0.041	0.343	0.245	0.158	1.000				
E30	0.222	0.556	0.129	0,287	0.626	1.000			
E31	0.088	0.166	0.353	0.609	0.102	0.162	1.000		
E34	0.198	0346	0.429	0.504	-0.021	0.214	0.308	1.000	
E35	0.158	0.161	0.440	0.352	0.229	0.221	0.188	0.328	1.000
E41	0.510	0.299	-0.166	0.153	0.072	0.499	-0.033	0.113	-0.074
E46	0.428	0.442	0.159	0.308	0.214	0.251	-0.043	0.380	0.034
E50	0.090	0.131	-0.123	-0.091	-0.126	0.212	-0.169	0.105	0.000

	E41	E46	E50
E41	1.000		
E46	0.577	1.000	
E50	0.343	0.142	1.000

FISH VILLAGES (.90)()

SECTION A: TRADITIONAL ACTIVITIES (GAMMA)

	A26A	A26B	A28	A30	A31	A32	A33	A34	*A35*
A26A	1.000								

	A26A	A26B	A28	A30	A31	A32	A33	A34	A35
A26B	0.065	1.000							
A28	0.033	-0.457	1.000						
A30	-0.437	0.310	-1.000	1.000					
A31	-0..342	-0.157	-0.130	0.231	1.000				
A32	-0.082	-0.680	0.819	0.636	0087	1.000			
A33	-0.294	0.169	0.386	0.576	0.513	0.219	1.000		
A34	0.009	0.081	-0.043	0.130	-0.536	-0.373	-0.138	1.000	
A35	0.084	0.213	-0.242	-0.119	-0.015	-0.261	-0.166	-0.276	1.000
A36	0.020	0.149	0.288	-0.119	-0.193	0.051	0.184	-0.027	0.612
A38	-0.251	-0.315	0.598	0.409	-0.095	0.677	0.309	0.085	-0.238

	A36	A36
A36	1.000	
A38	-0.162	1.000

SECTION B: HEALTH (GAMMA)

	B1	B3	65	66	B?	B8	69	B1O	B11
B1	1.000								
63	0.220	1.000							
B5	0.020	0.631	1.000						
68	0.152	0.458	0.401	1 .000					
67	0.082	0.641	0.412	0.714	1.000				
68	-0.015	0.260	0.368	0.679	0.660	1.000			
B9	-0.498	-0.296	0.453	-0.261	-0.352	0.166	1.000		
B1O	-0.235	0.445	0.115	-0.283	0.063	0.073	0.459	1.000	
611	-0.311	-0.207	-0.243	-0.390	-0.297	-0.386	0.247	-0.051	1.000

SECTION C: EDUCATION AND EMPLOYMENT (GAMMA)

	cl	C2	C3	C4	C5	C6	C8M	C6N	C12
c l	1.000								
C2	0.210	1.000							
C3	0.194	1.000	1.000						
C4	-0.040	*-0.437*	0.884	1.000					
C5	0.127	*0.204*	0.932	0.889	1.000				
C8	0.588	*0.148*	0.217	0.019	0.272	1.000			
C8M	0.653	*0.336*	0.286	0.098	0.352	1000	1.000		
C8N	0.771	-0.106	0.326	-0.355	0.126	1.000	1.000	1.000	
C12	0.477	0.734	0.019	-0.081	0.015	0.587	0.614	1.000	1.000
C12C	0.219	0.545	-0.039	-0.083	-0.004	0.339	0.384	1.000	0.947
C12M	0.170	0.517	0.035	-0.026	0.058	0.315	0.361	1.000	0.954

	C12C	C12M
C12C	1.000	
C12M	0.990	1.000

SECTION D: INCOME, GOODS& SERVICES (GAMMA)

	D3	D6	D9	D1O	D11	D12	019	D20
D3	1.000							
D8	-0.887	1.000						
D9	0.382	0.055	1.000					
D1O	-0.415	0.232	0.473	1.000				
D11	1.000	-1.000	0.780	1.000	1.000			

Table A2, continued
Fish Villages(. 90x)

	D3	*D6*	D9	D10	D11	D12	D19	D20	D22
D12	-0.527	0.160	-0.291	-0.413	-1.000	1.000			
D19	0.440	*-0.476*	0.037	-0.257	1.000	-0.160	1.000		
D20	0.670	-0.667	0.476	-0.140	1.000	0.091	0.910	1.000	
D22	0.845	*-0.439*	0.306	0.059	1.000	-0.400	0.086	0.333	1.000
D23	0.716	-0.542	0.211	-0.058	1.000	-0.539	0.311	0.486	*0.988*
D24	0.494	*-0.326*	0.019	-0.158	-1.000	-0.166	-0.126	-0.100	*0.546*
D26	0.364	*-0.267*	0.026	-0.139	-1.000	-0,264	-0.193	-0.200	*0.427*
D28	-0.832	*0.609*	-0.327	-0.214	1.000	0.767	-0.130	0.135	-1.000
D29	0.333	*0.048*	-1.000	-1.000	-1.000	-0.321	-0.268	0.111	1.000
D29A	-0.674	*0.525*	-0.448	-0.120	1.000	0.325	0.115	0.161	-0.791

	D23	D24	D26	D28	D29	D29A
D23	1.000					
D24	0.600	1.000				
D26	0.374	0.958	1.000			
D28	-1.000	-1.000	-0.917	1.000		
D29	1.000	-1.000	-1.000	1.000	1.000	
D29A	-0.867	-0.684	-0.609	1.000	0.128	1.000

SECTION D: INCOME, GOODS & SERVICES (PEARSONIAN)

	DIA	D1B	D1C	DID	D1E	D1F	D2	D3A	D4	D5	.
DIA	1.000										
D1B	0.552	1.000									
D1C	0.310	0.452	1.000								
DID	0.161	0.566	0.211	1.000							
D1E	0.136	0.332	0.412	0.091	1.000						
DIF	0.242	0.575	0.343	0.344	0.204	1.000					
D2	0.192	0.494	0.558	0.234	0.178	0.164	1.000				
D3A	0.196	0.270	-0.035	0.143	-0.056	0.377	0.045	1 .000			
D4	0.586	0564	0.707	0.149	0.458	0.412	0.576	0.157	1.000		
D5	0.291	0.497	0.550	0.068	0.166	0.261	0.456	0.110	0.482	1.000	

SECTION E: PERCEIVED WELLBEING (GAMMA)

	E10	E12	E17	E23	*E29*	E30	E31	E34	E35
E10	1,000								
E12	0.599	1.000							
E17	-0.058	-0.014	1.000						
E23	-0.063	-0.072	0.562	1.000					
E29	0.322	0.262	-0.016	0.126	1.000				
E30	0.442	0.312	-0.165	0.095	0.500	1.000			
E31	-0.098	0.084	0.421	0.502	0.050	0.024	1.000		
E34	-0.037	0.029	0.598	0.557	-0.115	0.160	0.506	1.000	
E35	0.100	0.188	0.349	0.249	0.171	0.016	0.114	0.405	1.000
E41	0.655	0.406	0.052	0.097	0.517	0.727	-0.077	0.134	0.089
E46	0.493	0.220	-0.289	-0.178	0.244	0.430	0.091	0.025	-0.141
E50	0.476	0.282	-0.040	-0.331	0.261	0.418	-0.331	0.020	-0.204

	E41	E46	E50
E41	1.000		
E46	0.639	1.000	
E50	0.524	0.191	1.000

NOT FISH VILLAGES (.90)9

SECTION A TRADITIONAL ACTIVITIES (GAMMA)

	A26A	A26B	A28	A30	A31	A32	A33	A34	A35
A26A	1.000								
A26B	0.484	1.000							
A28	0.085	-0.580	1.000						
A30	0.371	0.361	0.200	1.000					
A31	-0.304	-0.181	-0.206	*-0.274*	1.000				
A32	0.282	0.143	0.621	0.450	0.175	1.000			
A33	0.175	0.210	0.575	0.770	-0.053	0.480	1.000		
A34	-0.175	0.053	0.662	0.318	-0.119	0.140	0.612	1.000	
A35	0.173	0.244	0.590	0.450	0.077	0.356	0.317	0.229	1.000
A36	0.062	0.177	-0.170	0.334	-0.046	0.158	0.140	0.264	0.421
A38	0.035	-0.024	0.574	0.467	0.186	0.244	0.580	0.336	0.236

	A36	A3
A36	1.000	
A38	0.104	1.000

SECTION B: HEALTH (GAMMA)

	B1	B3	B5	B6	B7	B6	B9	B1o	B11
B1	1.000								
B3	0.654	1.000							
B5	0.179	0.332	1.000						
B6	0.561	0.723	0.524	1.000					
B7	0.625	0.853	0.360	0.879	1.000				
B8	0.420	0.675	0.375	0.658	0.696	1.000			
B9	-0.660	-0.704	-0.581	-0.412	-0.702	-0.467	1.000		
B1o	-0.264	0.159	0.226	0.113	0.206	0.044	0.216	1.000	
B11	-0.055	0.064	0.122	0.091	-0.011	-0.361	0.162	0.565	1.000

SECTION C: EDUCATION AND EMPLOYMENT (GAMMA)

	c I	C2	C3	C4	C5	C6	C6M	C6N	C12
c I	1.000								
C2	0.336	1.000							
C3	0.808	1.000	1.000						
C4	0.787	1.000	0.881	1.000					
C5	0.718	0.447	0.651	0.939	1.000				
C6	0.616	0.076	0.600	0.714	0.546	1.000			
C6M	0.654	0.068	0.626	0.728	0.579	1.000	1.000		
C6N	0.772	0.354	0.753	0.891	0.761	0.887	1.000	1.000	
C12	0.628	0.269	0.668	1.000	0.771	0.238	0.297	1.000	1.000
C12C	0.530	0.012	0.264	1.000	0.542	0.242	0.262	1.000	0.983
C12M	0.553	0.051	0.444	1.000	0.527	0.237	0.259	1.000	0.990

	C12C	C12M
C12C	1.000	
C12M	0.999	1.000

SECTION C: INCOME, GOODS & SERVICES (GAMMA)

	D3	D6	D9	D1o	D11	D12	D19	D20	D21
D3	1.000								
D6	0.231	1.000							
D9	-0.343	0s47	1.000						
D1O	0.414	0.030	0.305	1.000					
D11	0.476	0.048	0.573	0.988	1.000				
D12	0.156	-0.085	0.316	0.417	0.688	1.000			
D19	-0.358	0.261	0.480	0.311	0.489	0.671	1.000		
D20	-0.341	0.281	0.607	0.462	0.574	0.374	0.913	1.000	
D21	0.163	-0.206	0.388	0.295	0.441	0.158	0.446	0.538	1.000
D22	-0.304	0.013	0.277	-0.377	-0.219	0.352	0.694	0.476	0.678
D23	-0.571	-0.207	0.271	-0.103	0.029	0.481	0.674	0.571	0.615
D24	-0.381	0.186	0.130	-0.182	-0.409	-0.235	0.205	0.294	0.168
D26	-0.426	0.028	-0.030	-0.480	-0.539	-0.437	-0.078	-0.020	0.065
D28	0.212	-0.043	-0.095	-1.000	-1.000	-0.205	-0.670	-0.212	-1.000
D29	0.243	-0.063	-0.184	-0.350	-0.344	0.319	0.400	0.000	-0.029
D29A	0.368	0.313	0.448	0.609	0.827	0.706	0.293	1.000	0.597

	D22	D23	D24	D26	D28	D29	D29A
D22	1.000						
D23	0.989	1.000					
D24	0.450	0.392	1.000				
D26	0.488	0.475	0.713	1.000			
D28	-1.000	-1.000	-1.000	-0.944	1.000		
D29	0.344	0.090	-0.046	0.000	1.000	1.000	
D29A	-0.186	0.250	-0.171	-0.505	0.719	-0.276	1.000

SECTION D: INCOME, GOODS& SERVICES (PEARSONIAN)

	DIA	DIB	D1C	DID	D1E	D1F	D2	D3A	D4	D5
D1A	1,000									
D1B	0.043	1.000								
DIC	0.167	0.341	1.000							
DID	0.158	0.222	0.224	1.000						
D1E	-0.239	0.204	0.104	0.139	1.000					
D1F	-0.159	0.393	0.252	0.301	0.371	1.000				
D2	-0.202	0.313	0.372	0.242	0.360	0.405	1.000			
D3A	-0.080	0.115	0.144	0.049	0.269	0.398	0.265	1.000		
D4	0.061	0.480	0.496	0.300	0.378	0.377	0.513	0.179	1.000	
D5	-0.463	0.319	0.120	0.027	0.376	0.324	0.425	0.197	0.370	1.000

SECTION E: PERCEIVED WELLBEING (GAMMA)

	EIO	E12	E17	E23	E29	E30	E31	E34	E35
E10	1.000								
E12	0.404	1.000							
E17	0.406	0.493	1.000						
E23	0.461	0.345	0.425	1.000					
E29	0.011	0.463	0.408	0.110	1.000				
E30	0.237	0.491	0444	0.379	0.623	1.000			
E31	0.252	0.118	0.404	0.502	0.265	0.397	1.000		
E34	0.170	0.309	0.409	0.504	0.254	0.347	0.283	1.000	
E35	0.303	0.395	0.418	0.395	0.231	0.489	0.180	0.231	1.000
E41	0.482	0.317	0.119	0.415	0.053	0.395	0.264	0443	*0.142*

	E10	E12	E17	E23	E29	E30	E31	E34	E35
E46	0.392	0.283	0.282	0.641	0.106	0.331	0.085	0.516	0.192
E50	0.098	-0.040	0.119	0.244	-0.126	0.230	0.198	0.402	0,176

	E41	E46	E50
E41	1.000		
E46	0.615	1.000	
E50	0.399	0.258	1.000

THE ORIGINAL **AOSIS** QUESTIONNAIRE lNSTRUMENT WITH COVER SHEET, 1987

OMB No. 1010-0069

9/30/88
OMB Expiration Date

U.S. Department of the Interior
Minerals Management Service

Alaska OCS Social Indicators Study
Cover Sheet

1. INTERVIEW NUMBER _____

2. DATE OF INTERVIEW _____

3. LENGTH OF INTERVIEW _____

4. COMMUNITY _____

5. CALL RECORD

CALL NUMBER	1	2	3	4	COMMENTS
DATE					
DAY OF WEEK					
TIME OF DAY					
RESULT					
INTVWR INITIALS					

6. RESPONDENT SELECTION

Hello. I'm (NAME) with (NAME OF SURVEY ORGANIZATION). I am a member of a special research team. We are doing a study on the well-being of people in rural Alaska. Your household has been randomly chosen, and I would like to ask you some questions which will help us to describe the quality of life in rural Alaska.

In this survey, the people we interview are randomly selected, so the first thing I need to know is who lives here. Starting with the oldest person, please tell me who normally lives in your household by telling me their first name, their sex, their age, and their relationship to the oldest person. Who is the oldest person? (PROBE: Is there anyone who you haven't mentioned that lives here sometimes?)

(IF YES, DETERMINE IF THIS HOUSEHOLD IS PRINCIPAL RESIDENCE OF PERSON AND LIST IF APPROPRIATE)

In addition to the individuals you have mentioned so far, are there any family members or friends who have eaten or slept here during the last week? (IF YES, could you please give me their first names and relationship to the oldest person who lives here?)

FIRST NAME	RELATIONSHIP TO OLDEST	SEX	AGE	PERSON NUMBER	RESPOND-ENT	Oil Worker	Food Stamps	AFDC G.A. WIC	Unem-ployed	Pen-sion	50C. Sec.	SSI	Arts & Crafts	Trap-ping
				1										
				2										
				3										
				4										
				5										
				6										
				7										
				8										

INTERVIEWER: SELECT RESPONDENT USING RANDOM NUMBER TABLE RECORD SELECTION WITH AN ● R" BESIDE PERSON NO.

'The person I need to speak with is (NAME OF R1). Is (she/he) home now? (IF R IS NOT HOME, ARRANGE FOR TIME FOR INTERVIEW, OTHERWISE CONTINUE WITH QUESTIONNAIRE. I

OMB No. 1010-0069

TIME:

9/30/88
OMB Expiration Date

U.S. DEPARTMENT OF THE INTERIOR
MINERALS MANAGEMENT SERVICE

ALASKA OCS SOCIAL INDICATORS STUDY
QUESTIONNAIRE
OMB REVIEW DRAFT

1. INTERVIEW NUMBER _____ (1-4)
2. DECK NUMBER 01 (5-6)
3. MONTH ____ (7-8)
4. DAY ____ (9-10)
5. YEAR ____ (11-12)
6. PLACE CODE _____ (13-16)
7. CENSUS AREA CODE (17-19)
8. INTERVIEWER ID _____ (20-27)
9. INTERVIEWER'S INTERVIEW NO. _____ (28-30)

IF SCREENING" WAS **NOT DONE** WITH RESPONDENT, START HERE

Hello. I'm **(NAME)** with **(NAME OF SURVEY ORGANIZATION)**. I am a **member of** a special research team. **We** are doing a study **on** the well-being **of** people in **rural** Alaska. **'four** household has been" randomly chosen, **and** I would **like** to **ask** you some questions which will **help** us to describe the **qualityof** life in **rural** Alaska. 1

CONTINUE BELOW

IF SCREENING WAS DONE WITH RESPONDENT, START HERE

The interview takes **about 30 minutes.** Your participation is **voluntary,** and **you can choose not to answer any question,** but your **participation in** the survey **is very** important. Your answers **will** help the federal **government** to take **the well-being of rural Alaskans into account** in its **planning** activities. Your answers will only be used in **combination with the answers of other Alaskans.** **Do you have any questions** before **we** begin?

SECTION A
HUNTING, FISHING, AND CULTURE

A1. The first part of this interview is about the activities you may do like hunting, fishing, preserving wildfoods, or skin sewing. During the last year, did you (ACTIVITY ONE)?

1. YES → A2
5. NO → SKIP TO Q. A3
8. CAN'T REMEMBER → SKIP TO Q. A3
9. REFUSED → SKIP TO Q. A3

A2. The last time you (ACTIVITY ONE), did you do it alone, or with someone else?

1. ALONE → SKIP TO Q. A3
2. WITH SOMEONE ELSE → A2a
8. DON'T KNOW → SKIP TO Q. A3
9. REFUSED → SKIP TO Q. A3

A2a. The last time you (ACTIVITY ONE), did you do it with a relative or friend who lives in another household?

1. YES → A2b
5. NO → SKIP TO Q. A3
8. DK → SKIP TO Q. A3
9. REFUSED → SKIP TO Q. A3

A2b. What was the name of this person? _____

A2c. How is this person related to you? _____

CONTINUE WITH Q. A3

A3. During the last year, did you (ACTIVITY TWO)?

1. YES → A4
5. NO → SKIP TO Q. A5
8. CAN'T REMEMBER → SKIP TO Q. A5
9. REFUSED → SKIP TO Q. A5

A4. The last time you (ACTIVITY TWO), did you do it alone, or with someone else?

1. ALONE → SKIP TO Q. A5
2. WITH SOMEONE ELSE → A4a
8. DON'T KNOW → SKIP TO Q. A5
9. REFUSED → SKIP TO Q. A5

A4a. The last time you (ACTIVITY TWO), did you do it with a relative or friend who lives in another household?

1. YES → A4b
5. NO → SKIP TO Q. A5
8. DK → SKIP TO Q. A5
9. REFUSED → SKIP TO Q. A5

A4b. What was the name of this person? _____

A4c. How is this person related to you? _____

CONTINUE WITH Q. A5

A5. During the last year, did you personally (ACTIVITY THREE)?

1. YES | 5. NO | 8. CAN'T REMEMBER | 9. REFUSED

SKIP TO Q. A7

A6. The last time you (ACTIVITY THREE), did you do it alone, or with someone else?

1. ALONE → SKIP TO Q. A7

2. WITH SOMEONE ELSE

8. DON'T KNOW → SKIP TO Q. A7

9. REFUSED → SKIP TO Q. A7

A6a. The last time you (ACTIVITY THREE), did you do it with a relative or friend who lives in another household?

1. YES

5. NO | 8. DK | 9. REFUSED → SKIP TO Q. A7

A6b. What was the name of this person? _____

A6c. How is this person related to you? _____

CONTINUE WITH Q. A7

A7. During the last year, did you (ACTIVITY FOUR)?

1. YES

5. NO | 8. CAN*T REMEMBER | 9. REFUSED → SKIP TO Q. A9

A8. The last time you (ACTIVITY FOUR), did you do it alone, or with someone else?

1. ALONE → SKIP TO Q. A9

2. WITH SOMEONE ELSE

8. DON'T KNOW → SKIP TO Q. A9

9. REFUSED → SKIP TO Q. A9

A8a. The last time you (ACTIVITY FOUR), did you do it with a relative or friend who lives in another household?

1. YES

5. NO | 8. DK | 9. REFUSED → SKIP TO Q. A9

A8b. What was the name of this person? _____

A8c. How is this person related to you? _____

CONTINUE WITH Q. A9

A9. During the last year, did YOU personally (ACTIVITY FIVE)?

1. YES
5. NO
8. CAN'T REMEMBER
9. REFUSED

SKIP TO Q. All

A10. The last time YOU (ACTIVITY FIVE), did YOU do it alone, or with someone else?

1. ALONE → SKIP TO Q. A11
2. WITH SOMEONE ELSE
8. DON'T KNOW → SKIP TO Q. A11
9. REFUSED → SKIP TO Q. A11

A10a. The last time you (ACTIVITY FIVE), did you do it with a relative or friend who lives in another household?

1. YES
5. NO → SKIP TO Q. A11
8. DK → SKIP TO Q. A11
9. REFUSED → SKIP TO Q. A11

A10b. What was the name of this person? _____

A10C. How is this person related to you? _____

CONTINUE WITH Q. All

All. During the last year, did you (ACTIVITY SIX)?

1. YES
5. NO
8. CAN'T REMEMBER
9. REFUSED

SKIP TO Q. A13

A12. The last time you (ACTIVITY SIX), did you do it alone, or with someone else?

1. ALONE → SKIP TO Q. A13
2. WITH SOMEONE ELSE
8. DON'T KNOW → SKIP TO Q. A13
9. REFUSED → SKIP TO Q. A13

A12a. The last time you (ACTIVITY FOUR), did you do it with a relative or friend who lives in another household?

1. YES
5. NO → SKIP TO Q. A13
8. DK → SKIP TO Q. A13
9. REFUSED → SKIP TO Q. A13

A12b. What was the name of this person? _____

A12c. How is this person related to you? _____

CONTINUE WITH Q. A13

A13. During the last year, did you personally (ACTIVITY SEVEN)?

1. YES | 5. NO | 8. CAN'T REMEMBER | 9. REFUSED

SKIP TO Q. A15

A14. The last time you (ACTIVITY SEVEN), did you do it alone, or with someone else?

1. ALONE → SKIP TO Q. A15

2. WITH SOMEONE ELSE

8. DON'T KNOW → SKIP TO Q. A15

9. REFUSED → SKIP TO Q. A15

A14a. The last time you (ACTIVITY SEVEN), did you do it with a relative or friend who lives in another household?

1. YES

5. NO | 8. DK | 9. REFUSED → SKIP TO Q. A15

A14b. What was the name of this person? _____

A14c. How is this person related to you? _____

CONTINUE WITH Q. A15

A15. During the last year, did you (ACTIVITY EIGHT)?

1. YES

5. NO | 8. CAN'T REMEMBER | 9. REFUSED → SKIP TO Q. A17

A16. The last time you (ACTIVITY EIGHT), did you do it alone, or with someone else?

1. ALONE → SKIP TO Q. A17

2. WITH SOMEONE ELSE

8. DON'T KNOW → SKIP TO Q. A17

9. REFUSED → SKIP TO Q. A17

A16a. The last time you (ACTIVITY EIGHT), did you do it with a relative or friend who lives in another household?

1. YES

5. NO | 8. DK | 9. REFUSED → SKIP TO Q. A17

A16b. What was the name of this person? _____

A16c. How is this person related to you? _____

CONTINUE WITH Q. A17

A17. During the last year, did you personally (ACTIVITY NINE)?

1. YES | 5. NO | 8. CAN'T REMEMBER | 9. REFUSED

SKIP TO Q. A19

A18. The last time you (ACTIVITY NINE), did you do it alone, or with someone else?

1. ALONE → SKIP TO Q. A19

2. WITH SOMEONE ELSE

8. DON'T KNOW → SKIP TO Q. A19

9. REFUSED → SKIP TO Q. A19

A18a. The last time you (ACTIVITY NINE), did you do it with a relative or friend who lives in another household?

1. YES | 5. NO | 8. DK | 9. REFUSED

SKIP TO Q. A19

A18b. What was the name of this person? _____

A18c. How is this person related to you? _____

CONTINUE WITH Q. A19

A19. During the last year, did you (ACTIVITY TEN)?

1. YES | 5. NO | 8. CAN'T REMEMBER | 9. REFUSED

SKIP TO Q. A21

A20. The last time you (ACTIVITY TEN), did you do it alone, or with someone else?

1. ALONE

2. WITH SOMEONE ELSE

8. DON'T KNOW → SKIP TO Q. A21

A20a. The last time you (ACTIVITY EIGHT), did you do it with a relative or friend who lives in another household?

1. YES | 5. NO | 8. DK | 9. REFUSED

SKIP TO Q. A21

A20b. What was the name of this person? _____

A20c. How is this person related to you? _____

CONTINUE WITH Q. A21

A21. During the last year, did you personally (ACTIVITY ELEVEN)?

1. YES I
5. NO
8. CAN'T REMEMBER
9. REFUSED

SKIP TO Q. A23

A22. The last time you (ACTIVITY ELEVEN), did you do it alone, or with someone else?

1. ALONE
2. WITH SOMEONE ELSE
8. DON'T KNOW
9. REFUSED

SKIP TO Q. A23

SKIP TO Q. A23

A22a. The last time you (ACTIVITY ELEVEN), did you do it with a relative or friend who lives in another household?

1. YES
5. NO
8. DK
9. REFUSED

SKIP TO Q. A23

A22b. What was the name of this person? _____

A22c. How is this person related to you? _____

CONTINUE WITH Q. A23

A23. During the last year, did you (ACTIVITY TWELVE)?

1. YES
5. NO
8. CAN'T REMEMBER
9. REFUSED

SKIP TO Q. A25

A24. The last time you (ACTIVITY TWELVE), did you do it alone, or with someone else?

1. ALONE
2. WITH SOMEONE ELSE
8. DON'T KNOW
9. REFUSED

SKIP TO Q. A25

SKIP TO Q. A25

A24a. The last time You (ACTIVITY TWELVE?, did you do it with a relative or friend who lives in another household?

1. YES
5. NO
8. DK
9. REFUSED

SKIP TO Q. A25

A24b. What was the name of this person? _____

A24c. How is this person related to you? _____

CONTINUE WITH Q. A25

A25. Did you spend five or more days altogether on subsistence activities in May of last year? (IF YES, "X*' MONTH. REPEAT F(IR ALL MONTHS)

MO. 1	MO. 2	MO. 3	MO. 4	MO. 5	MO. 6	MO. 7	MO. 8	MO. 9	MO. 10	MO. 11	MO. 12

NO MONTHS

A26. During the last 5 years, would you say that the amount of game and fish there is to harvest has increased, decreased, or stayed the same?

1. INCREASED | 2. DECREASED | 3. STAYED THE SAME | 8. DON'T KNOW | 9. NA

A27. Do you think that 5 years from now the amount of game and fish there is to harvest will increase, decrease, or stay the same?

1. INCREASE | 2. DECREASE | 3. STAY THE SAME | 8. DON'T KNOW | 9. NA

A28. Was subsistence food a large part of any of the meals you ate yesterday?

1. YES | 5. NO | 8. DON'T KNOW | 9. REFUSED

5. NO / 8. DON'T KNOW / 9. REFUSED → SKIP TO Q. A30

A29. Was any of this subsistence food harvested by someone who lives in another household?

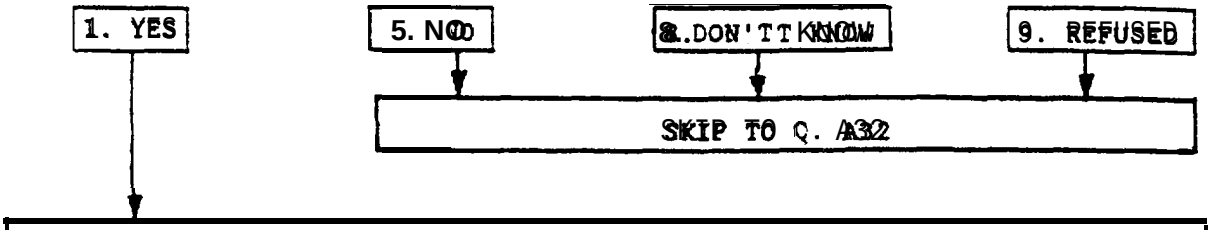
1. YES | 5. NO | 8. DON'T KNOW | 9. REFUSED

5. NO / 8. DON'T KNOW / 9. REFUSED → SKIP TO Q. A30

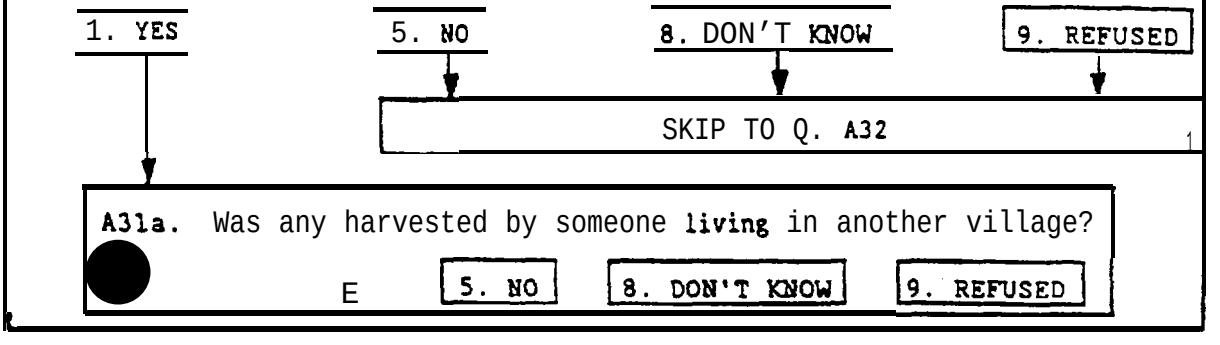
A29a. Was any harvested by someone living in another village?

1. YES | 5. NO | 8. DON'T KNOW | 9. REFUSED

A30. How about the day before yesterday, (DAY OF WEEK) ; did you eat any meals in which subsistence food was a large part of the meal?



A31. Was any of this fish or game harvested by someone who lives in another household?



A32. In the last two days, how many meals did you eat with a relative who lives in another household?

m NO. OF MEALS

7. 7+ MEALS

8. DON'T KNOW

9. REFUSED

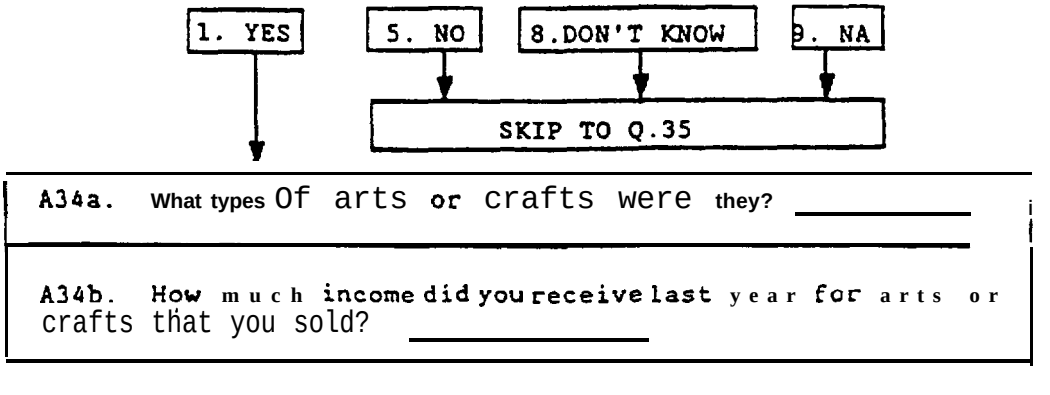
A33. What percent of all the meat and fish that you ate in the last year was subsistence food? (Would you say more than one-quarter or less than one-quarter? CONTINUE TO PROBE FOR BEST, SINGLE ESTIMATE OF PERCENT)

PERCENT

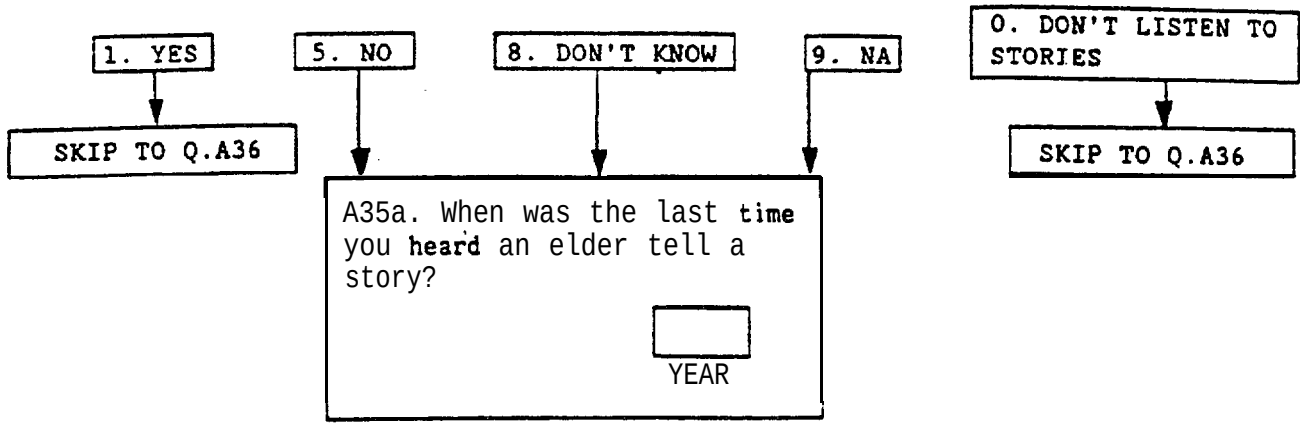
8. DON'T KNOW

9. NOT ASCERTAINED

A34. Have you made any art or crafts in the last year?



A35. During the last week, have you **personally** heard an elder tell a story?



A36. When was the last time YOU asked an elder for advice?

U
YEAR

195. NEVER

98. CAN'T REMEMBER

99. NA

A37 Would you say that elders get **more,** less, **or the same** amount of raspect from people in your community now **than they did** 5 years ago?

1. MORE | 2. LESS | 3. THE SAME | 8. DON'T KNOW | 9. NA

A38. How often do you speak (NATIVE LANGUAGE) at home: never, sometimes, most of the time, or always? (Ii? RESPONSE VARIES ACCORDING TO PERSON R SPEAKS TO, GET BEST OVERALL RESPONSE)

1. NEVER | 2. SOMETIMES | 3. MOST OF THE TIME | ' - 1 | 8. DON'T KNOW | 9. NA

SECTION B
HEALTH

B1. In general, how would yOU describe your health? Would you say it was very good, good, fair, poor, or very poor?

1. VERY GOOD | 2. GOOD | 3. FAIR | 4. POOR | 5. VERY POOR

8. DON'T KNOW | 9. NA

B2. Considering the level of health other people like you have, about how good do you think your health really should be: very good, good, fair, poor,. or very poor?

1. VERY GOOD | 2. GOOD | 3. FAIR | 4. POOR | 5. VERY POOR

8. DON'T KNOW | 9. NA

B3. How much do you suffer from any long-standing illness, the effects of an injury, or any disability: a lot, some, or not at all?

1. A LOT | 3. SOME | 5. NOT AT ALL | 8. DON'T KNOW | 9. NA

B4. How clearly can you normally see faces on the other side of the room: very clearly, somewhat clearly, or not at all clearly? (OTHER SIDE OF ROOM MEANS ABOUT 15 FEET)

1. VERY CLEARLY | 3. SOMEWHAT CLEARLY | 5. NOT AT ALL CLEARLY | 8. DON'T KNOW | 9. NA

B5. How clearly can you normally hear what is said in a conversation: would YOU say very clearly, somewhat clearly, or not at all clearly?

1. VERY CLEARLY | 3. SOMEWHAT CLEARLY | 5. NOT AT ALL CLEARLY | 8. DON'T KNOW | 9. NA

B6. How easily can you run at least 100 yards (300 feet): with no difficulty with some difficulty, or not at all?

1. NO DIFFICULTY | 3. WITH SOME DIFFICULTY | 5. NOT AT ALL | 8. DON'T KNOW | 9. NA

07. How easily can You carry 25 pounds thirty feet: very easily, with some difficulty, or not at all? (That's about the weight of a two-year old)

1. VERY EASILY	3. WITH SOME DIFFICULTY	5. NOT AT ALL	8. DON'T KNOW	9. NA

B8. How easily can you bite and chew on hard foods (like Pinuktuk/salmon strips, beef jerky): very easily, with some difficulty, or not at all?

1. VERY EASILY	3. WITH SOME DIFFICULTY	5. NOT AT ALL	8. DON'T KNOW	9. NA

B9. Within the past two weeks, were there times that you could not do some of your everyday activities due to illness or injury?

1. YES	5. NO	8. DON'T KNOW	9. NA

B10. During the past twelve months, has anyone ever intentionally struck you or physically hurt you in some way?

1. YES	5. NO	8. DON'T KNOW	9. NA

B11. Do you currently smoke cigarettes?

1. YES	5. NO	8. DON*T KNOW	9. NA

SKIP TO Q B12.

B11a. About how many cigarettes do you usually smoke each day?

[ ] CIGARETTES	98. DON'T KNOW	99. NA	00. DON'T SMOKE

B12. In the last week, on how many days did you drink alcohol?

[ ] DAYS	8. DON'T KNOW	9. NA

B12a. On how many of these (_) days did you have more than 3 drinks?

[ ] DAYS	8. DON'T KNOW	9. NA

SECTION C
EDUCATION AND EMPLOYMENT

C1. The next series of questions are about your education and employment. First, how many years of education have you completed (HIGH SCHOOL = 12; TRADE SCHOOL = 14; COLLEGE GRADUATE, BA OR BS = 16; MASTERS = 18; LAWYER, DOCTOR, PHD = 19)?

GRADE SCHOOL								HIGH SCHOOL				COLLEGE						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

C2. Are you currently enrolled in school?

1. YES | 5. NO | 9. NA

C3. How easily can You read a magazine like Newsweek or Readers Digest: easily, with some difficulty, or with great difficulty?

1. EASILY | 2. SOME DIFFICULTY | 3. GREAT DIFFICULTY | 4. CAN'T READ | 8. DON'T KNOW | 9. REFUSED

C4. How easily could you add a list of the prices of fifteen items: easily, with some difficulty, or with great difficulty?

1. EASILY | 2. SOME DIFFICULTY | 3. GREAT DIFFICULTY | 4. CAN'T ADD | 8. DON'T KNOW | 9. REFUSED

C5. How easily could you figure out the answer to a problem like 583 divided by 17, using pencil and paper: easily, with some difficulty, or with great difficulty?

1. EASILY | 2. SOME DIFFICULTY | 3. GREAT DIFFICULTY | 4. CAN'T DIVIDE | 8. DON'T KNOW | 9. REFUSED

C6. Last year, during which months didyouwork for pay, for two weeks or more? (Have you included any commercial fishing? INCLUDE IN RESPONSE TO Q. C6)

MO. 1 | MO. 2 | MO. 3 | MO. 4 | MO. 5 | MO. 6 | MO. 7 | MO. 8 | MO. 9 | MO. 10 | MO. 11 | MO. 12

ALL MONTHS | NO MONTHS

IF RESPONDENT WORKED 12 MONTHS, SKIP TO Q. C9

C7. Which months in the last year were you unemployed but wanted a job?

MO. 1	MO. 2	MO. 3	MO. 4	MO. 5	MO. 6	MO. 7	MO. 8	MO. 9	MO. 10	MO. 11	MO. 12

ALL MONTHS NO MONTHS

C8. Which months in the last year did you decide not to work for wages *(or* commercial fish)?

MO. 1	MO. 2	MO. 3	MO. 4	MO. 5	MO. 6	MO. 7	MO. 8	MO. 9	MO. 10	MO. 11	MO. 12

ALL MONTHS NO MONTHS

C9. What are the main kinds of work to earn money that you did in the last year?

(PROBE FOR EXACT OCCUPATIONS STARTING WITH MOST RECENT)) _____

C10 What kind of businesses did you work for in the last year? (PROBE) _____

C11. If you had your choice, what kind of work would yOU do? _____

C12. Did you work at all away from your community in the last year?

1. YES

5. NO

SKIP TO Q. C13

C12a. What kind of work did you do away from your community? _____

C12b. Where did you work? _____

C12c. During how many months did you work 2 weeks or more away from home? ☐ MONTHS

C13. In the last year, how much of the subsistence activities that you wanted to do did you actually have the time to do: all, most, some, few, or none?

1. ALL 2. MOST 3. SOME 4. FEW 5. NONE

8. DON'T KNOW 9. NA

SECTION D
INCOKE, GOODS AND SERVTCES

D1. Let's turn now to your housing situation. About how much money did your household spend on heating costs last year? How much on electricity? How much on housing payments? On telephone? How much *on* water and other utilities? And how much *on* repairs? Wereyou reimbursed for any of these costs? (ADD NON-REIMBURSED COSTS AND SAY:) So would you say that (AMOUNT) is about what your total housing costs were Last year?

	WARM MONTHS PER MO.	WARM MONTHS NO. MOS.	COLD MONTHS PER MO.	COLD MONTHS NO. MOS.	REIM-BURSED	TOTAL
HEATING						
ELECTRICITY						
HOUSING PAYMENTS						
TELEPHONE						
WATER/OTHER UTIL.						
REPAIRS						

D2. Considering all sources of income you and all other members of your household received last year, what was your total household income last year, before taxes and deductions were made? Please tell me the figure to the nearest thousand dollars. (Whatis your best guess?)

[ ]
INCOME IN THOUSANDS

[998. DON'T KNOW] [999. NA]

[SKIP TO Q. D2b.]

D2a. We don't need the exact dollar figure; could you tell me which of these broad categories it fails into:

Less than $5,000	c1 1
Between $5,000 and $10,000	2
Between $10,000 and $20,000	3
Between $20,000 and $30,000	n4
Between $30,000 and $40,000	c5 1
Between $40,000 and $50,000	6
Or more than $50,000?	•7 1

[8. DON'T KNOW] [9. NA] [0. INAP]

D2b. Has any household member or any individual that slept or ate here in the last week received any income in the last year from an oil company or company doing work for an oil company? (CHECK APPROPRIATE BOX ON COVER SHEET AND CONTINUE WITH NEXT SOURCE.)

D3. Are you a commercial fisherman or do you have your own business?

1. YES | 2. NO | 9. NA

SKIP TO Q. D4

D3a. How much of your total household income **last year went toward commercial** fishing or business expenses? (What is your best guess?)

[ ]1
EXPENSES IN THOUSANDS

995. NOT SELF-EMPLOYED | 998. DON'T KNOW | 999. NA

D4. What is the very smallest amount of income per month your household needs to make ends meet?

[ ]
INCOME IN DOLLARS

998. DON'T KNOW | 999. REFUSED

D5. **How** about the family income **you'd like to** have. Of course, we'd all **like** to have huge incomes, but considering what other households **like yours have,** what you deserve, and what you **need,** about how much income **per** month do you think would be about **right** for your family?

[ ]1
INCOME IN DOLLARS

998. DON*T KNOW | 999. REFUSED

D6. Would you say that your household is better off, the same, or worse off financially now than five years ago?

1. BETTER NOW | 3. SAME | 5. WORSE NOW | 8. DON'T KNOW | 9. NA

D7. Do you think that five years from now your household will be better off financially, worse off, or about the same as *now?*

1. BETTER OFF | 3. SAME | 5. WORSE OFF | 8. UNCERTAIN | 9. NA

D8. How many rooms do you have in your house, not counting bathrooms?

[ ] NO. ROOMS

[98. DON'T KNOW]

[99. NA]

D9. Would you say that your household has no trouble getting enough good drinking water, some trouble, or quite a bit of trouble?

[1. NO TROUBLE] [2. SOHE TROUBLE] [3. QUITE A BIT OF TROUBLE] [8. DON'T KNOW] [9. NA]

D10. What happens to the water you use for washing dishes and bathing: does it empty out on the ground near your household, does it go into a septic system, or is it piped away?

[1. EMPTIES ON GROUND] [2. SEPTIC SYSTEM] [3. PIPED AWAY]

[7. OTHER _____] [8. DON'T KNOW] [9. NA]

D11. Does your household have honey buckets, flush toilets, or chemical toilets?

[1. HONEY BUCKETS] → [SKIP TO Q. D12]

[2. FLUSH TOILETS] → D11a. How frequently does (the sewer system/your chemical toilet) break down? Would you say rarely or never, occasionally, or frequently?

[3. CHEMICAL TOILETS] → D11a. How frequently does (the sewer system/your chemical toilet) break down? Would you say rarely or never, occasionally, or frequently?

[1. RARELY OR NEVER] [2. OCCASIONALLY] [3. FREQUENTLY]

[5. DON'T KNOW] [9. NA] [0. INAP]

D12. On cold, windy days, how easy is it to keep your house or apartment warm: not difficult, somewhat difficult, or very difficult?

[1. NOT DIFFICULT] [2. SOMEWHAT DIFFICULT] [3. VERY DIFFICULT] [8. DON'T KNOW] [9. NA]

D13. Now I would like to ask about some of you weekly activities. During the last week, on how many days did yougovisit with friends or relatives? (What is your best guess?)

[ ] DAYS [8. DON'T KNOW] [9. NA]

D14. During the last week, on how many days did you spend half an hour or more on some recreational activity other than watching television?

[ ] DAYS [8. DON'T KNOW] [9. NA]

IF ZERO DAYS OR DK OR NA, SKIP TO Q. D15.

D14a. What kinds of things did you do for recreation?

D15. How many hours during the last week did YOU sit down and watch television?

[ ] HOURS [98. DON'T KNOW] [99. NA]

D16. During the last month, how many times did you attend a public meeting?

[ ] TIMES [98. DON'T KNOW] [99. NA]

D17. This next, set of questions concerns local and regional organizations. How effective is your community's city council in doing what you think it should be doing? Would you say very effective, somewhat effective, or not at all effective? (REPEAT FOR OTHER ORGANIZATIONS)

		1. VERY EFFECTIVE	2. SOMEWHAT EFFECTIVE	3. NOT AT ALL EFFECTIVE	0. DOESN'T APPLY	8. DON'T KNOW	9.
D17a.	CITY COUNCIL	☐	c1	☐	☐	☐	☐
D17b.	TRAD . IRA COUNCIL	☐	☐	☐	☐	☐	☐
D17c.	VILL. NATIVE CORPORATION	☐	☐	☐	☐	n	☐
D17d.	REGIONAL PROFIT NATIVE CORP.	☐	☐	c1	☐	☐	☐
D17e.	REGIONAL NONPROFIT NATIVE CORP.	☐	☐	☐	☐	☐	☐

D18 . How much difference do you think your opinion makes in what happens in your community? Would you say your opinion makes a lot of difference, some difference, not much difference, or no difference in what happens in your community?

1. A LOT OF DIFFERENCE
2. SOME DIFFERENCE
3. NOT MUCH DIFFERENCE
4. NO DIFFERENCE
8. DOI?*T KNOW
9. NA

D19 . Did you happen to vote in the last city council election on (DATE)?

1. YES
2. NO
8. DON'T KNOW

D20 . Did you happen to vote in the last statewide election on (DATE)?

1. YES
2. NO
8. DON'T KNOW

D21. And the last tribal council election?

1. YES	2. NO	8. DON'T KNOW	0. NON-NATIVE

D22. The last village Native corporation election?

1. YES	2. NO	8. DON'T KNOW	0. NON-NATIVE

D23. The last regional Native corporation election?

1. YES	2. NO	8. DON'T KNOW	0. NON-NATIVE

D24. In what community were you born? _____

D25. How many years have you lived in (COMMUNITY)?

[ ] YEARS

97. ALL MY LIFE	99. NA

IF RESPONDENT LIVED IN COMMUNITY MORE THAN TEN YEARS, SKIP TO Q. 027

D26. Where did you live before you moved to (COMMUNITY)? _____

D27. During the last year, how many times have you left your community and visited relatives or friends?

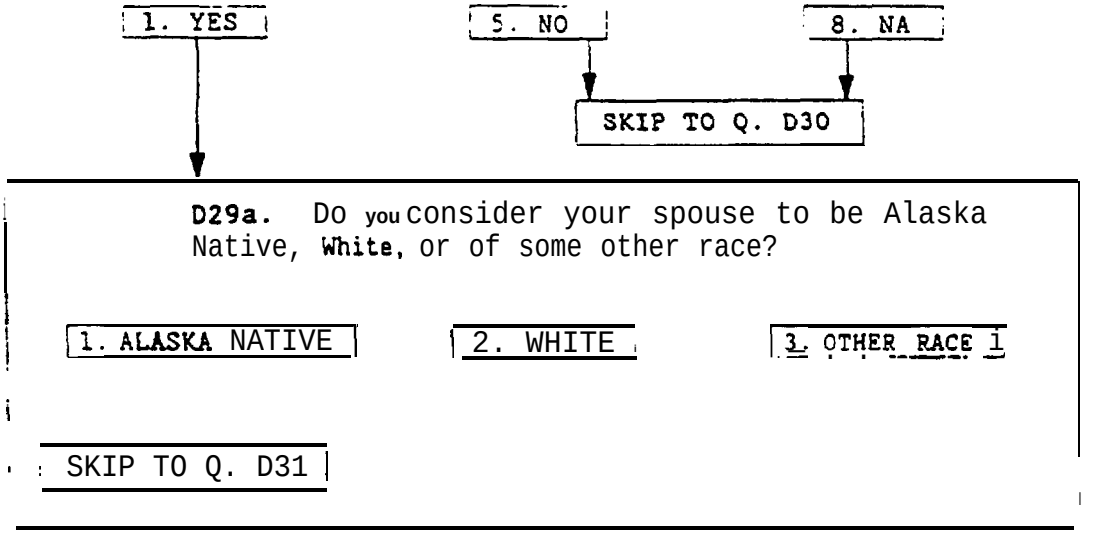
[ ] TIMES

98. DON'T KNOW	99. NA

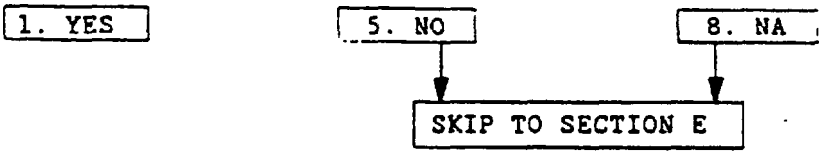
D28. (UNLESS RACE IS OBVIOUS, ASK:) Do you consider yourself to be Alaska Native, White, or of some other race?

1. ALASKA NATIVE	2. WHITE	3. OTHER RACE

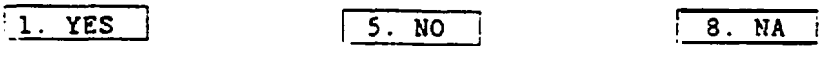
D29. Are you currently married?



030. Have you ever been married?



D31. Have you ever been divorced or separated?



SECTION E
PERCEIVED WELL-BEING

In the next section of this interview, we want to find out how YOU feel about parts of your life and life in this community as you see it. Please tell me the feelings you have now--taking into account what has happened in the last year and what you expect in the near future.

I am going to read a list of things. I would like you to tell me how satisfied you are with each one, using one of five answers: 5 for completely satisfied, 4 for very satisfied, 3 for mostly satisfied, 2 for somewhat satisfied, or 1 for not satisfied. (Here is a card You can use to choose your answers/If *you* have a pencil and paper, let me read them to you so that you can write them down.)

5. COMPLETELY SATISFIED	4. VERY SATISFIED	3. MOSTLY SATISFIED	2. SOMEWHAT SATISFIED	1. NOT SATISFIED

8. NEVER THOUGHT	0. DOES NOT APPLY	9. NA

E1. First of all, how do you feel about your house (or apartment)? (What number fits best for you?) ☐

E2. How do you feel about your life as a whole? ☐

E3. How do you feel about the amount of game and fish there is to available to harvest? ☐

E4. How do you feel about the amount of subsistence activities that you do? ☐

E5. How do you feel about the extent to which you respect elders? ☐

E7. How do you feel about the sharing you were able to do last year? ☐

E8. The amount of time you spend with relatives who live in another household? ☐

E9. The extent you work on things cooperatively with other people? ☐

E10. Your ability to speak (NATIVE LANGUAGE)? ☐

En. The amount of time you spend listening to stories? ☐

E12. The social ties you have to people in other communities?

E13. The arts and crafts you do?

E14. How do you feel about your own health and physical condition?

E15. The way you handle the problems that come up in your life?

E16. The amount of respect you get from others?

E17. What you are accomplishing in life?

E18. Yourself?

E19. How much fun you are having these days?

E20. How well members of your family get along with each other?

E21. The amount of visiting you do?

E22. The usefulness, for you personally; of your education?

F.23. And how do you feel about the usefulness of the education children in this community are getting these days?

E24. The opportunities you have for finding a good job?

E25. Your present job? (IF 0, SKIP TO Q. E28)

E26. The people you work with?

E27. The work you do on your job?

E28. The time you have for subsistence activities?

E29. The income you (and your family) have?

E30. Your standard of living--the things you have like housing, snow machines, furniture, televisions, and the like?

E31. How do you feel about the opportunity you have to Live in good housing that you can afford?

E32. How do you feel about the food you have to eat?

E33. The water you have to drink?

E34. How safe you feel in this community?

E35. The goods and services you can get in your community--like food, appliances, "and clothing?

E36. The goods and services you can get in your community--like food, appliances, and clothing? ☐

E37. How do YOU feel about the amount of local influence over the harvest of game and fish? ☐

E38. . . . And the amount of local influence over local education? ☐

E39. . . . And the amount of local influence over development? ☐

E40. The amount of influence YOU have over local affairs? ☐

E41. The condition of the land and buildings in your community? ☐

E42. The condition of the land and water near your community? ☐

E43. Overall, how do YOU feel about your community? ☐

E44. How do YOU feel about how comfortable and well-off you are? ☐

E45. How do you feel about the time YOU spend with friends and relatives? ☐

E46. How do you feel about the opportunities children have to grow up to be adults that you can be proud of? ☐

E48. And how do you feel about the opportunities children have to learn subsistence skills? ☐

E49. Finally, how do you feel about your life as a whole? ☐

E50. I just asked you how you feel about your life as a whole. Now I'd like to ask you a slightly different question. Some people are very satisfied with their life but recognize that, objectively speaking, it isn't very good. Other people, objectively speaking, are doing well but are not very satisfied. How would you rate your overall life quality: would you say it is excellent, very good, good, fair, or poor?

1. EXCELLENT	2. VERY GOOD	3. GOOD	4. FAIR	5. POOR

8. DON'T KNOW	9. NA

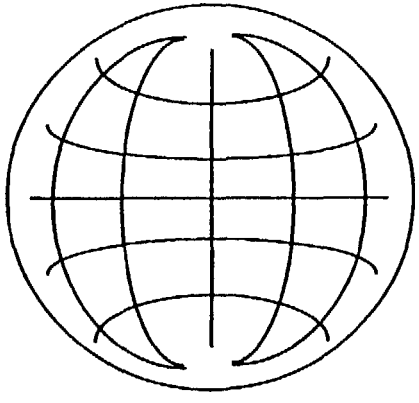
E51. Have you heard that the Federal Government is thinking of letting oil companies pay to look for oil in (BASIN)?

1. YES	5. NO	8. DON'T KNOW	9. NA

REVISED **AOSIS** QUESTIONNAIRE INSTRUMENT WITH COVER SHEET, 1989

Administered to Schedule A Posttest (.9AD), Panel A third wave (.9A3), and Panel B second wave (.9B2).

OMB No. 1010-0069



AOSIS QUESTIONNAIRE
[3rd Revision]

HUMAN RELATIONS AREA FILES
Yale University
1989

RESPONDENT:

Name: _____

Address: _____

Phone: _____

Message Phone: _____

INTERVIEWER:

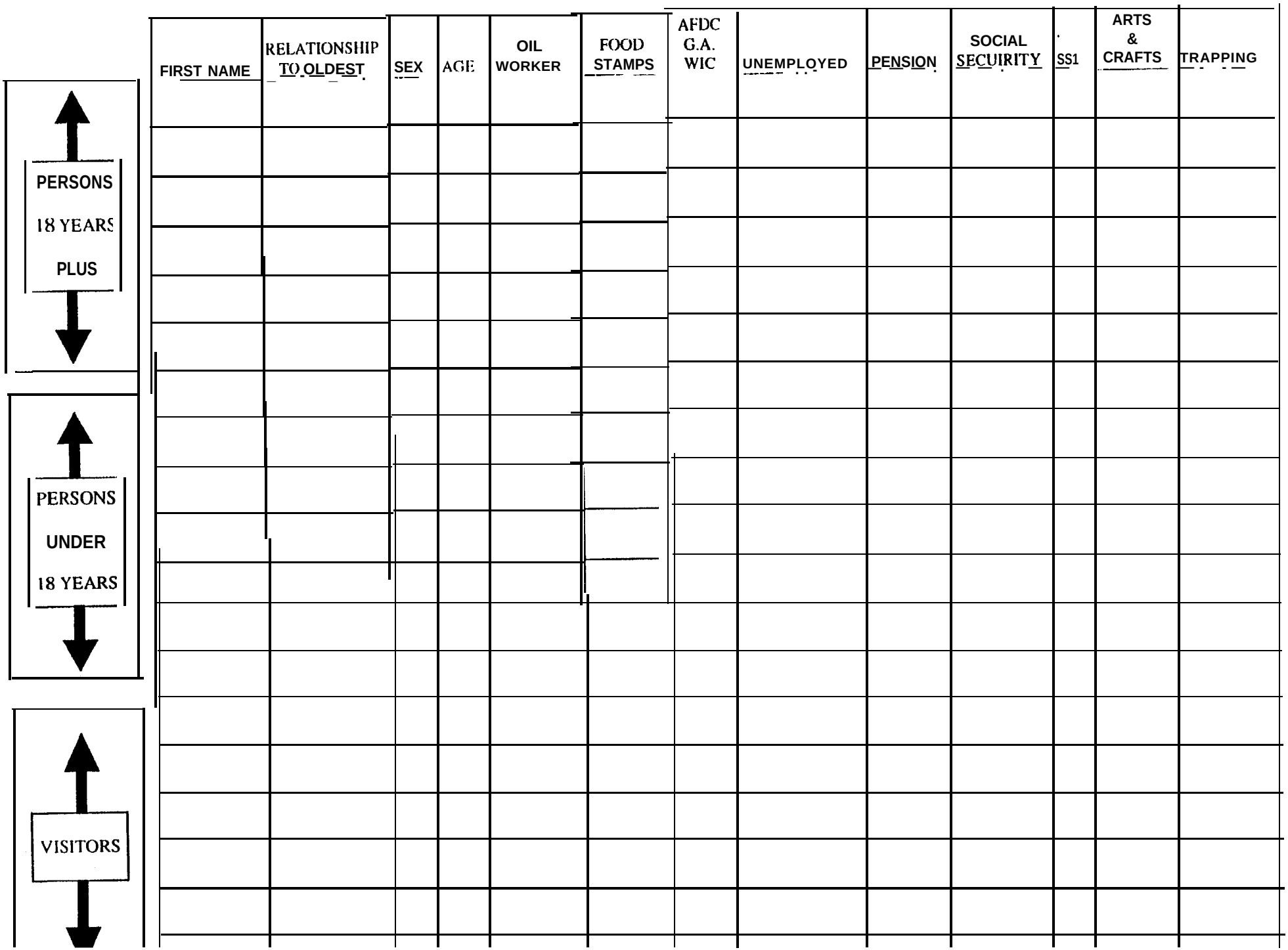
Name: _____

Region: _____

Village: _____

Date: _____

Time: _____


FIRST NAME
RELATIONSHIP TO OLDEST
SEX
AGE
OIL WORKER
FOOD STAMPS
AFDC G.A. WIC
UNEMPLOYED
PENSION
SOCIAL SECUIRITY
SSI
ARTS & CRAFTS
TRAPPING
PERSONS 18 YEARS PLUS
PERSONS UNDER 18 YEARS
VISITORS

SECTION A: TRADITIONAL ACTIVITIES

Interviewer:

Each respondent is asked about twelve activities, depending on region. Your supervisor has blocked out 21 activities that do not apply. For each activity, indicate whether, in the last twelve months, the activity was done alone, with another, and the number of days. Refer any questions ot your supervisor.

	When?	With?	Days'?
1. Hunt moose or caribou			
2. Hunt ringed seal			
3. Hunt walrus			
4. Hunt bearded seal			
5. Hunt waterfowl			
6. Attend feast/ceremony			
7. Camp as part of hunting/fishing			
8. Winter fishing			
9. Gather greens/berries			
10. Gather eggs			
11. Hunt Beluka			
12. Fur trapping			
13. Herring fishing			
14. Build/repair boat			
15. Make/repair fish net, trap, wheel			
16. Make/repair sled			
17. Sew skins			
18. Harvest fur seals			
19. Hunt other seals			
20. Hunt sea lions			
21. Hunt other birds			
22. Harvest reef food or shellfish			
23. Hum sheep			
24. Maintain/use ice cellar			
25. Bowhead whaling			
26. Hunt deer			
27. Hunt ptarmigan			
28. Hunt mouse caches			
29. Hook fishing			
31. Cut fish for drying			
32. Gather firewood			
33. Set black fish traps			
34. Set nets for salmon, etc.			

SECTION A: TRADITIONAL ACTIVITIES

A26A. **During the last five years, would you say that the amount of game there is to harvest has. . .**

1.	Decreased
2.	Stayed same
3.	Increased
	N

A26B. During the last five years, would you say that *the* **amount of** fish **there is to harvest has. . .**

1.	Decreased
2.	Stayed same
3.	increased
9.	NA

A28. Was subsistence food a **large** part of any of the **meals you ate yesterday?**

0.	No
1.	Yes
9.	NA

A30. How about the **day** before yesterday? Did you **eat** any meals in which subsistence food **was** a large part of the meal?

O.	No
1.	Yes
9.	NA

A31. On either day, was this food **harvested by . . .**

1.	Self
2.	Other, same HH
3.	Other
9.	NA

A32. In the last two days, how many meals did **you eat** with a relative who lives in another household?

1.	None
4.	More
9.	NA

A33. What percent of **all** the meat and fish **that** you ate in the last year was native food?

1.	None
2.	<5070
3.	<75%
4.	75%+
9.	NA

A34. Have you made any arts or crafts in the last year?

O.	No
1.	Yes
9.	NA

A35. **When was the last time that you heard an elder tell a story?**

1.	More than a year ago
2.	Last year
3.	Last month
4.	Last week
9.	NA

A36. When was the last time that you asked an elder for advice?

1.	More than a year ago
2.	Last year
3.	Last month
4.	Last week
9.	NA

A38. How often do you speak (native language) at home: Never, sometimes, most of the time, or always? (If response varies according to person R speaks to, get the best overall response.)

1.	Never
2.	Sometimes
3.	Most of the time
4.	Always
9.	NA

SECTION B: HEALTH

B1. In general, how would you describe your health? Would you say it was very good, good, fair, poor, or very poor?

1.	Very poor
2.	Poor
3.	Fair
4.	Good
5.	Very good
9.	NA

B3. How much do you suffer from long standing illness, the effectis of an injury, or a disability: a lot, some, or not at all?

1.	A lot
2.	Some
3.	Not at all
9.	NA 1 0

B4. How clearly can you normally see faces on the other side of the room?

1.	Not at all
2.	Somewhat
3.	Very
9.	NA

B5. How clearly can you normally hear a conversation?

1.	Not at all
2.	Somewhat
3.	Very
9.	NA

116. How easily **can you run at least 100 yards (300 feet)?**

1.	Not at all	⬭
2,	Some difficulty	⬭
3.	No difficulty	⬭
9.	NA	⬭

B7. How **easily can** you carry 25 pounds **thirty** feet?

1.	Not at all	⬭
2.	Some difficulty	⬭
3.	Very easily	⬭
9.	NA	⬭

B8. How easily can you bite and chew on hard foods?

1.	Not at all	⬭
2.	Some difficulty	⬭
3.	Very easily	⬭
9.	NA	⬭

B9. Within the past two weeks, were there times when you could not do some of your everyday activities due to illness or injury?

0.	No	⬭
1.	Yes	⬭
9.	NA	⬭

B10. During the past **twelve mont hs,** has anyone intentionally struck you or physically hurt you in **some** way?

0.	No	⬭
1.	Yes	⬭

B11. Do **you** smoke **cigarettes?**

0.	No	1 0
1.	Yes	⬭
9.	NA	⬭

SECTION C: EDUCATION AND EMPLOYMENT

c1, How many years of education do you have?

1.	None	⬭
2.	1-8	⬭
3.	9-12	⬭
4.	College	⬭
5 .	Higher	⬭
9.	NA	⬭

C2. Are you currently enrolled in school?

O.	No	⬭
1.	Yes	⬭
9.	NA	⬭

C3. How easily can you read a magazine like *Newsweek* or *Readers' Digest?*

1.	Great difficulty	o
2.	Some difficulty	⬭
3	Easily	⬭
9.	NA	1 0

C4. **1 low easily** can you **add** a list of fifteen prices?

1.	Great difficulty	⬭
2.	Some difficulty	⬭
3.	Easily	⬭
9.	NA	⬭

C5. How easily could you figure out the answer to **a** problem like 583 divided by 17, using a pencil and paper?

1.	Great difficulty	⬭
2.	Some **difficulty**	⬭
3.	Easily "	⬭
9.	NA	⬭

C6. Last year, during which months did you work for pay for two weeks or more? (Have you included any commercial fishing?)

Total: _____

JAN	⬭
FEB	⬭
MAR	⬭
APR	⬭
MAY	⬭
JUN	⬭
JUL	⬭
AUG	⬭
SEP	⬭
OCT	⬭
NOV	⬭
DEC	⬭

C9. What are **the** main kinds of work to earn money that you did **in** the last year?

_____

C10. **What** kind of business did you work for in the **last** year?

_____

C11. If you had your choice, what kind of work would **you** do?

_____

C12. Did you work at all away from your community last year?

O.	No	⬭
1.	Yes	⬭
.9.	NA	⬭

C12A. What kind of work did you do away from the community?

_____

C12B. Where did you work'?

_____

C12C. During how many months did you work 2 weeks or **more away from** home?

Total: _____

JAN	○
FEB	○
MAR	○
APR	○
MAY	○
JUN	○
JUL	○
AUG	○
SEP	○
OCT	○
NOV	○
DEC	○

SECTION D: INCOME, GOODS & SERVICES

D1. Annual household expenses:

D1A. Annual heating cost?

1.	<$250	○
2.	<$750	○
3.	<$1500	○
4.	<$2250	○
5.	<$3000	○
6.	>$3000	○
9.	NA	○

D1B. Annual electricity cost?

1.	<$100	○
2.	<$500	○
3.	<$750	○
4.	<$1000	○
5.	<$1500	○
6.	>$1500	○
9.	NA	○

D1C. Annual housing cost?

1.	<$1800	○
2.	<4800	○
3.	<$8400	○
4.	<$10800	○
5.	>$10800	○
9.	NA	○

D1D. Annual telephone cost'!

1.	<$480	○
2.	<$1080	○
3.	<$1800	○
4.	>$1800	○
9.	NA	○

D1E. Annual utility cost?

1.	<$240	○
2.	<$480	○
3.	<$720	○
4.	<$1080	○
6.	>$1080	○
9.	NA	○

D1F. **Annual repair cost?**

1.	<$360
2.	<$840
3.	<$1800
4.	>$1800
9.	NA

D2. Annual household income?

1.	<$5000
2.	<$10000
3.	<$20000
4.	<$30000
5.	<$40000
6.	<$50000
7.	>$50000
9.	NA

D3. Are you a commercial **fisherman or do you own** your own business?

0.	No
1.	Yes
9:	NA

D3A. How much of your total household income last year **went** toward commercial fishing or business expenses?

1.	None
2.	<$2K
3.	<$5K
4.	≥$5K
9.	NA

D4. What is the very smallest amount of income per month your household needs to make ends meet?

1.	<$500
2.	<$1000
3.	<$1500
4,	<$2000
5.	<$2500
6.	≥$2500
9.	NA

D5. **How about** the family income that you would like **ot** have: Of course, we'd all like to have huge incomes, but considering what other households like yours have, what you deserve, and what you need, **about how much** income per month do you think would be right for your family?

1.	<$500
2.	<$1000
3.	<$1500
4.	<$2000
5.	<$2500
6.	≥$2500
9.	NA

D6. Would you say that your household is better off, the same, or worse off financially now than five years ago?

1.	Worse now
2.	Same
3.	Better off
9.	NA

D8. How many rooms do you have in your house?

Number of rooms _____ 999. N A

D9. Would you say that your household has no trouble getting enough good drinking water, some trouble, or much trouble?

1.	Much trouble	○
2.	Some trouble	○
3.	No trouble	○
9.	NA	○

D lo. What happens to the drinking water you use for washing dishes and bathing: does it empty out on the ground near your house, does it go into a septic system, or is it piped away'?

1.	Empties on the ground	○
2.	Septic system	○
3.	Piped away	○
7.	Other _____	○
9.	NA	○

D11. Does your household have honey buckets, flush toilets, or chemical toilets?

1.	Honey buckets	○
2.	Flush toilets	○
3.	Chemical toilets	○

D12. On cold, windy days, how easy is it to keep your house or apartment warm?

1.	Difficult	1 0
2.	Easy	○
3.	Very easy	○
9.	NA	○

D 13. Now 1 would like to ask you some about your weekly activities. During the last week, on how many days did you go visit with friends or relatives? (What is your best guess?)

1.	None	○
2.	1-2 days	○
3.	3-4 days	○
4.	>4 days	○
9.	NA	○

D 14A. What things did you do for recreation?_____

_____

D16. During the last month, how many times did you attend a public meeting?

1.	None	○
2.	1-2 times	○
3.	3+ times	○
9.	NA	○

D 19. Did you happen to vote in the last city council election?

0.	No	○
1.	Yes	○
9.	NA	○

D20. Did you happen to vote in the last state wide election'?

0.	No
1.	Yes
9.	NA

D21. At the last tribal council election?

0.	No
1.	Yes
9.	NA

D22. The last village Native Corporation election?

0.	No
1.	Yes
9.	NA

D23. The last Native Corporation election?

0.	No
1.	Yes
9.	NA

[)24. In what community were you born?

1.	Other
2.	Alaska
3.	This region
4.	Here
9.	NA

D25. How many years have you lived in (Community)?

1.	Year or less
2.	2-5 years
3.	6-10 years
9.	NA

D26. Where did you live before you moved to (Community)?

1.	Other
2.	Alaska
3.	This region
4.	Here
9.	NA

D27. During (he last year, how many times have you left your community and visited relatives or friends?

1.	None
2.	1-2 times
3.	>2 times
9.	NA

D28. Do you consider yourself to be an Alaska Native?

1.	Alaska Native
2.	Other race
	N

D29. Are you currently married?

0.	No
1.	Yes
9.	NA

D29A. Do you consider your spouse to be.. Alaska Native?

1.	Alaska Native	⬭
2.	Other race	⬭
9.	NA	⬭

Interviewer:

Valid responses to the following items are:

1. Not satisfied
2. Somewhat satisfied
3. Completely satisfied
9. NA

SECTION E: PERCEIVED WELLBEING

E10. How do you feel **about** your ability to speak (native language)?

1.	Not satisfied	⬭
2.	Somewhat satisfied	⬭
3.	Completely satisfied	⬭
9	NA	⬭

E 12. How do you **feel** about the social ties you have to people in other **communities?**

1.	Not satisfied	⬭
2.	Somewhat satisfied	⬭
3.	Completely satisfied	⬭
	N	⬭

E 17. How do you feel **about what you are accomplishing** in life?

1.	Not satisfied	⬭
2.	Somewhat satisfied	⬭
3.	Completely satisfied	⬭
9.	NA	⬭

E23. And how do you feel about the usefulness of the education children in this community are getting these days?

1.	Not satisfied	⬭
2.	Somewhat satisfied	⬭
3.	Completely satisfied	⬭
9.	NA	⬭

E29. How do you feel about the income you (and your family) have?

1.	Not satisfied	⬭
2.	Somewhat satisfied	⬭
3.	Completely satisfied	⬭
9.	NA	⬭

E30. How **do you feel about** your standard of living—the things you have like housing, snow machines, furniture, television, and **the** like?

1.	Not satisfied
2.	Somewhat satisfied
3.	Completely satisfied
9.	NA

E31. How do you feel about the opportunity you have to live in good housing that you can afford?

1.	Not satisfied
2.	Somewhat satisfied
3.	Completely satisfied
9.	NA

10

E34. How safe do you feel in this community?

1.	Not satisfied
2.	Somewhat satisfied
3.	Completely satisfied
9.	NA

E35. How do you feel about the goods and services you get in your community—like food, appliances, and clothing?

1.	Not satisfied
2.	Somewhat satisfied
3.	Completely satisfied
9.	NA

E41. How do you feel about the amount of local influence over the condition of the land and water near your community'?

1.	Not satisfied
2.	Somewhat satisfied
3.	Completely satisfied
9.	NA

E45. How do you feel about the opportunities children have to grow up to be adults that you can be proud of?

1.	Not satisfied
2.	Somewhat satisfied
3.	Completely satisfied
9.	NA

E46. How do you feel about the opportunities children have to learn subsistence skills?

1.	Not satisfied
2.	Somewhat satisfied
3.	Completely satisfied
9.	NA

E50. If the federal government lets oil companies search for oil in the basin, do you think that the search for oil will create more jobs for residents of the region?

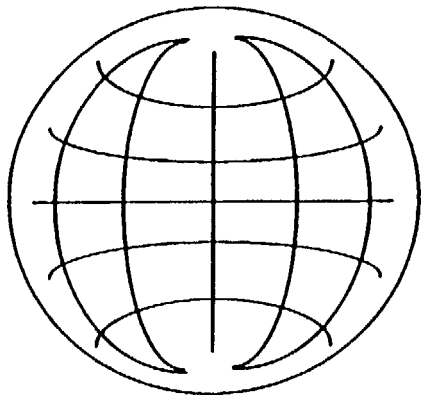
O.	No
1.	Yes
9.	NA

10

REVISED AOSIS QUESTIONNAIRE INSTRUMENT WITH COVER SHEET, 1990

Administered to Schedule B Posttest (.0BD) and Panel B third wave (.0BD).

OMB No. I 010-0069



AOSIS QUESTIONNAIRE
[3rd Revision]

HUMAN RELATIONS AREA FILES
Yale University
1989-90

RESPONDENT:

Name:

Address:

Phone:

Message Phone:

INTERVIEWER:

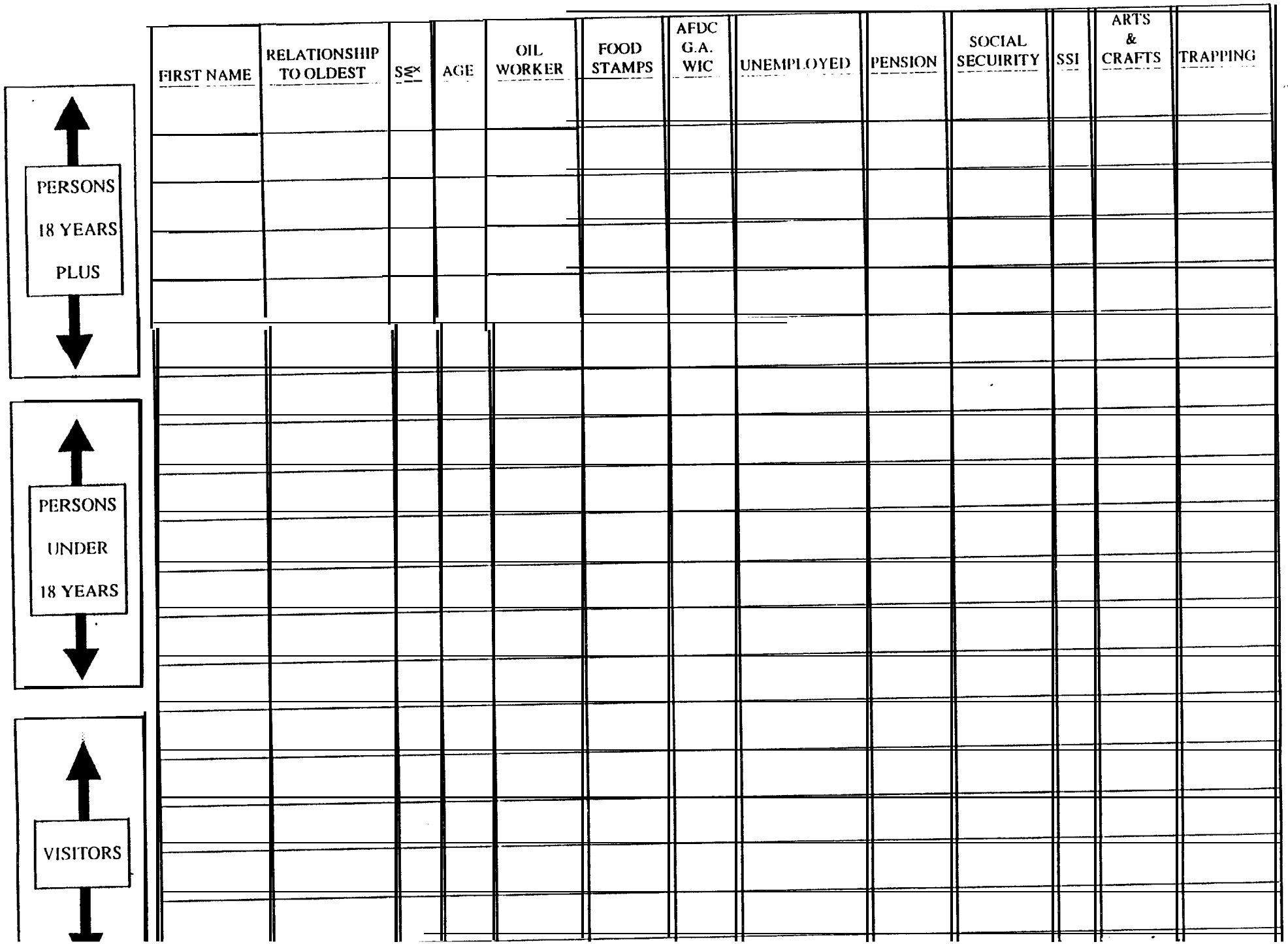
Name:

Region:

Village:

Date:

Time:


PERSONS 18 YEARS PLUS
PERSONS UNDER 18 YEARS
VISITORS
FIRST NAME
RELATIONSHIP TO OLDEST
SEX
AGE
OIL WORKER
FOOD STAMPS
AFDC G.A. WIC
UNEMPLOYED
PENSION
SOCIAL SECUIRITY
SSI
ARTS & CRAFTS
TRAPPING

SECTION A: TRADITIONAL ACTIVITIES

Interviewer:

Each respondent is asked about twelve activities, depending on region. Your supervisor has blocked out 21 activities that do not apply. For each activity, indicate whether, in the last twelve months, the activity was done alone, with another, and the number of days. Refer any questions ot your supervisor.

	When?	REL With?	Days'!
1. Hunt moose or caribou			
2. Hunt ringed seal			
3. Hunt walrus			
4. Hunt bearded seal			
5. Hunt waterfowl			
6. Attend feast/ceremony			
7. Camp as part of hunting/fishing			
8. Winter fishing			
9. Gather greens/berries			
10. Gather eggs			
11. Hunt Beluka			
12. Fur trapping			
13. Herring fishing			
14. Build/repair boat			
15. Make/repair fish net, trap, wheel			
16. Make/repair sled			
17. Scw skins			
18. Harvest fur seals			
19. Hunt other seals			
20. Hunt sea lions			
21. Hunt other birds			
22. Harvest reef food or shellfish			
23. Hunt sheep			
24. Maintain/use ice cellar			
25. Bowhead whaling			
26. Hunt deer			
27. Hunt ptarmigan			
28. Hunt mouse caches			
29. Hook fishing			
31. Cut fish for drying			
32. Gather firewood			
33. Set black fish traps			
34. Set nets for salmon, etc.			

SECTION A: TRADITIONAL ACTIVITIES

A26A. During the last five years, **would you say that the amount of game there is to harvest has. . .**

1.	Decreased
2.	Stayed same
3.	Increased
9.	NA

A26B. During the last five years, **would you** say that the amount of fish there is to harvest has . . .

1.	Decreased
2.	Stayed same
3.	Increased
9.	NA

A28. Was subsistence food a **large** part of any of the meals you ate yesterday?

O.	No
1.	Yes
9.	NA

0

A30. **How** about the day before **yesterday?** Did you **eat** any meals in which subsistence food was a large part of the meal?

0	N
1.	Yes
9.	NA

A31. On either **day,** was this food harvested by . . .

1.	Self
2.	Other, same HH
3.	Other
9.	NA

A32. In the **last two** days, how many **meals** did you eat with a relative who lives in another household?

1.	None.
2.	1-3
4.	More
9.	NA

A33. What percent of all the **meat and** fish **that** you ate **in the** last year was native food?

1.	None
2.	<5070
3.	<75%
4.	75%+
9.	NA

A34. Have you made any arts or crafts in the last year?

0	N
	N

A35. When was the last time that you heard an elder tell a story'?

1.	More than a year ago	⬭
2.	Last vear	⬭
3.	Last month	⬭
4.	Last week	⬭
9.	NA	⬭

A36. When was the last time that you asked an elder for advice?

1.	More than a year ago	⬭
2.	Last vear	⬭
3.	Last month	⬭
4.	Last week	⬭
9.	NA	⬭

A38. How often do you speak (native language) at home: Never, sometimes, most of the time, or always? (If response varies according to person R speaks to, get the best overall response.)

1.	Never	⬭
2.	Sometimes	⬭
3.	Most of the time	⬭
4.	Always	⬭
9.	NA	⬭

SECTION B: HEALTH

B1. In general, how would you describe your health? Would you say it was very good, good, fair, poor, or very poor?

1.	Very poor	0
2.	Poor	⬭
3.	Fair	⬭
4.	Good	⬭
5.	Very good	⬭
9.	N A	⬭

B3. How much do you suffer from long standing illness, the effects of an injury, or a disability: a lot, some, or not at all?

1.	A lot	⬭
2.	Some	⬭
3.	Not at all	⬭
9.	NA	⬭

B4. How clearly can you normally see faces on the other side of the room?

1.	Not at all	⬭
2.	Somewhat	⬭
3.	Ver y	0
9.	NA	⬭

B5. How clearly can you normally hear a conversation?

1.	Not at all	⬭
2.	Somewhat	⬭
3.	Very	⬭
9.	NA	⬭

136. **How easily can you run at** least 1(M) yards (300 feet)?

1.	Not at all
2.	Some difficulty
3.	No difficulty
9.	NA

B7. How easily can you carry 25 pounds thirty feet?

1.	Not at **all**
2.	Some difficulty
3.	Very easily
9.	NA

B8. How easily can you bite and chew on hard foods?

1.	Not at all
2.	Some difficulty
3.	Very easily
9.	**NA**

B9. Within the past two weeks, were there times when you could not do some of your everyday activities **due** to illness or injury?

0.	No
1.	Yes
9.	NA

B 10. During the past twelve months, has anyone **intentionally struck you or physically** hurt you in some way?

0.	No
1.	Yes
9.	NA

- 0

B 11. Do you smoke cigarettes?

0.	No
1.	Y e s
9.	NA

SECTION C: EDUCATION AND EMPLOYMENT

C1. How many years of education do you have?

1.	None
2.	1-8
3.	9-12
4.	College
5.	**Higher**
9.	NA

C2. Are you currently enrolled in school?

O.	No
1.	Yes
9.	NA

C3. How easily can you read a magazine like *Newsweek* or *Readers' Digest?*

1.	**Great difficulty**
2.	**Some difficulty**
3.	**Easily**
9.	**NA**

C4. **How easily can you add** a list of fifteen prices?

1.	Great difficulty
2.	Some difficulty
3.	Easily
9.	NA

C5. How easily could you figure out the answer to a problem like 583 divided by 17, using a pencil and paper?

1.	Great difficulty
2.	Some difficulty
3.	Easily
9.	NA

C6. Last year, during which months did you work for pay for two weeks or more? (Have **you included** any commercial fishing?)

Total: _____

JAN
FEB
MAR
APR
M
N
U
AUG
SEP
OCT
NOV
DEC

C9. **What are the main kinds** of work to corn money that you did in the last year?

_____

c I (). What kind of business did you work for in the last year?

_____

C11. If you had your choice, what kind of work would you do?

_____

C12. Did you work at all away from your community last year'?

O.	No
1.	Yes
9.	NA

0

C12A. Wha[kind of work did you do away from the community?

_____

C12B. Where did you work?

_____

C12C. During how many months did you work 2 weeks or more away from home?

Total: ___ . .

JAN	○
FEB	○
MAR	○
APR	○
M	○
UN	○
U	○
AUG	○
SEP	○
OCT	○
NOV	○
DEC	○

SECTION D: INCOME, GOODS & SERVICES

D1. Annual **household** expenses:

D1A. Annual heating cost?

1. <$250	○
2. <$750	○
3. <$1500	○
4. <$2250	○
5. <$3000	○
6. >$3000	○
9. NA	○

D1B. Annual electricity cost?

1. <$1 ()()	○
2. <$500	○
3. <$750	○
4. <$1 000"	○
5. <$ I 500	○
6. >$1500	○
9. NA	○

D1C. Annual housing cost?

1. <$1800	○
2. <4800	○
3. <$8400	○
4. <$10800	○
5. >$10800	0
9. NA	○

D1D. Annual telephone cost?

1. <$480	○
2. <$1080	○
3. <$1800	○
4. >$1800"	○
9. NA	○

D1E. Annual utility cost?

1. <$240	○
2. <$480	○
3. <$720	○
4. <$1080"	○
6. >$1080"	○
9. NA	○

DIF. Annual repair cost?

1.	<$360
2.	<$840
3.	<$1800
4.	>$1800
9.	NA

D2. Annual household income?

1.	<$5000
2.	<$1OOOO
3.	<$20000
4.	**<$30000**
5.	<$40000
6.	<$50000
7.	**>$50000**
9.	**NA**

D3. Are you a commercial fisherman or do you own your own business?

O.	No
1.	Yes
9.	NA

D3A. How **much** of your total household income last year **went** toward commercial fishing or business expenses?

1.	None
2.	**<$2K**
3.	**<$5K**
4.	**≥$5K**
9.	NA

D4. What is the very smallest amount of income per month your household needs to make ends meet?

1.	**<$500**
2.	<$1000"
3.	<$1500
4.	<$2000
5.	**<$2500**
6.	>$2500
9.	NA

D5. **How about the family** income **that** you **would** like **(or have:** Of course, we'd all like to have huge incomes, but considering what other households like yours have, what you deserve, and what you need, about how much income per month do you think would be right for your family?

1.	<$500
2.	**<$1000**
3.	<$1500
4.	<$2000
5.	<$2500
6.	**≥$2500**
9.	NA

1 0

D6. Would you say that your household is better off, the same, or worse off financially now than five years ago?

1.	Worse now
2.	Same
3.	Better off
9.	NA

D8. How many rooms do you have in your house?

Number of moms _____ 999. NA

D9. Would you say that your household has no trouble getting enough good drinking water, some trouble, or much trouble?

1.	Much trouble	○
2	Some trouble	○
3.	No trouble	○
9	NA	○

D 1 (). What happens to the drinking water you use for washing dishes and bathing: does it empty out on the ground near your house, does it go into a septic system, or is it piped away?

1.	Empties on the ground	1 0
2.	Septic system	
3.	Piped away	○
7.	Other _____	○
9.	NA	○

D 11. Does your household have honey buckets, flush toilets, or chemical toilets?

1.	Honey buckets	○
2.	Flush toilets	○
13.	Chemical toilets	1 0

D 12. On cold, windy days, how easy is it to keep your house or apartment warm?

1.	Difficult	○
2.	Easy	○
3.	Very easy	○
9.	NA	○

D 13. Now I would like to ask you some about your weekly activities. During the last week, on how many days did you go visit with friends or relatives? (What is your best guess?)

1.	None	○
2.	1-2 days	○
3.	3-4 days	○
4.	>4 days	○
9.	NA	○

D14A. What things did you do for recreation?_____

_____

D 16. During the last month, how many times did you attend a public meeting?

1.	None	○
2.	1-2 times	○
3.	3+ times	○
9.	NA	○

D19. Did you happen to vote in the last city council election?

0	N	○
1.	Yes	○
9.	NA	○

D20. Did you happen to vote in the last state wide election?

0.	No
1.	Yes
9.	NA

D21. At the last tribal council election?

0.	No
1.	Yes
9.	NA

D22. The last village Native Corporation election?

O.	No
1.	Yes
9.	NA

D23. The last Native Corporation election?

O.	No
1.	Yes
9.	NA

D24. In what community were you born?

1.	Other
2.	Alaska
3.	This region
4.	Here
9.	NA

D25. How many years have you lived in (Community)?

1.	Year or less
2.	2-5 years
3.	6-10 years
9.	NA

D26. Where did you live before you moved to (Community)?

1.	Other
2.	Alaska
3.	This region
4.	Here
9.	NA

D27. **During the last year, how many times have you left** your community and visited relatives or friends?

1.	None
2.	1-2 times
3.	> 2 times
9	NA

D28. Do you consider yourself to be an Alaska Native?

1,	Alaska Native
2.	Other race
9.	NA

D29. Are you currently married?

O,	No
1.	Yes
9.	NA

D29A. Do you consider your spouse to be an Alaska Native?

1.	Alaska Native
2.	Other race
9.	NA

Interviewer:

Valid responses to the following items are:

1. Not satisfied
2. Somewhat satisfied
3. Completely satisfied
9. NA

SECTION E: PERCEIVED WELLBEING

E10. How do you feel about your ability to speak (native language)?

1.	Not satisfied
2.	Somewhat satisfied
3.	Completely satisfied
9.	NA

E 12. How do you feel about the social ties you have to people in other communities'?

1.	Not satisfied
2.	Somewhat satisfied
3.	Completely satisfied
9.	NA

E 17. How do you feel about what you are accomplishing in life?

1.	Not satisfied
2.	Somewhat satisfied
3.	Completely satisfied
9.	NA

E23. And how do you feel about the usefulness of the education children in this community are getting these days?

1.	Not satisfied
2.	Somewhat satisfied
3.	Completely satisfied
9.	NA

E29. How do you feel about the income you (and your family) have?

1.	Not satisfied
2.	Somewhat satisfied
3.	Completely satisfied
9.	NA

E30. How do you feel about your standard of living—the things you have like housing, snow machines, furniture, television, and the like?

1.	Not satisfied
2.	Somewhat satisfied
3.	Completely satisfied
	N

E31. How do you feel about the opportunity you have to live in good housing that you can afford?

1.	Not satisfied
2.	Somewhat satisfied
3.	Completely satisfied
9.	NA

E34. How safe do you feel in this community?

1.	Not satisfied
2.	Somewhat satisfied
3.	Completely satisfied
9.	NA

E35. How do you feel about the goods and services you get in your community—like food, appliances, and clothing?

1.	Not satisfied
2.	Somewhat satisfied
3.	Completely satisfied
9.	NA

E41. How do you feel about the amount of local influence over the condition of the land and water near your community?

1.	Not satisfied
2.	Somewhat satisfied
3.	Completely satisfied
9.	NA

E45. How do you feel about the opportunities children have to grow up to be adults that you can be proud of?

1.	Not satisfied
2.	Somewhat satisfied
3.	Completely satisfied
9.	NA

E46. How do you feel about the opportunities children have to learn subsistence skills?

1.	Not satisfied
2.	Somewhat satisfied
3.	Completely satisfied
9.	NA

E50. If the federal government lets oil companies search for oil in the basin, do you think that the search for oil will create more jobs for residents of the region?

0.	No
1.	Yes
9.	NA

E51. Do you think the search for oil off shore in this area would reduce the mount of fish and game, increase the amount of fish and game, or not change the remount of fish and game?

1.	Reduce	⬭
2.	No change	⬭
3.	Increase	⬭
9.	NA	⬭

E52. '1' hinking about all the good things and bad things that might happen, do you think that the search for oil off shore in this area is a good idea, a bad idea, or do you have mixed feelings about it?

1.	Bad	⬭
2.	Mixed feelings	⬭
3.	Good	⬭
9	N	⬭

E58. Who or what do you think is responsible for the *Exxon Valdez* oil spill of 3/24/89?

		1 0
1.	It was an unavoidable accident	⬭
2.	It was caused by the captain's errors	⬭
3.	It was caused by the breakdown of some of the ship's technology	⬭
4.	It was caused by Exxon Company's negligence	⬭
5.	It was caused by the State of Alaska's negligence	⬭
6.	It was caused by the Federal Government's negligence	⬭
7.	It was caused by a combination of all but 1	⬭

ORIGINAL KI VARIABLE DEFINITION CODE AS ADMINISTERED TO SCHEDULE A RESPONDENTS IN 1987

ORIGINAL KI VARIABLE DEFINITION CODE
As Administered to Schedule A Respondents in 1987

I Subsistence Economy
This set comprises questions about what a family harvests and/or consumes; how many resources (tools, cash) are allocated to the harvest; and what percentage of the total proteins in a household diet is derived from subsistence harvests? An activity list and a resource extraction area map focused on subsistence accompanies the genealogy.

K1. Subsistence harvesting expenses as an estimated percentage of total annual income. Expenses include purchase and repair of equipment, purchase of fuel, purchase and repair of clothing, ammunition, purchase of food and incidentals required for travel and camping.

1. **Very Low (O to 9%)**
2. **Low (lo to 19%)**
3. **Medium (20 to 29%)**
4. **High (30% and over)**

K2. Variety of naturally occurring resources harvested annually.
We seek information as to the number of species of plants, sea mammals, land mammals, birds, shellfish and fish harvested annually by the informant's family household. We want a tally of the total of all species for the aggregate six categories.

1. **No naturally-occurring species harvested.**
2. **Few species harvested, and none harvested in some of the six categories.**
3. **At least one species in each category.**
4. **At least two but no more than three species in each category.**
5. **More than three species in each category (the exception is invertebrates--if not available).**

K3. Harvested protein Proportion of household diet. The proportion of protein in the aggregate household diet that is obtained from naturally-occurring species. This measure includes items that are harvested by the household as well as those that are received by household members through gifting, sharing, or exchange.

1. Less than 25%
2. 25-49%
3. 50-75%
4. 76-100%

II. Economics
This set comprises questions about household incomes, the sources and stability of incomes, and labor and resource allocation within and among households.

K4. Household annual income. Household income is an estimate provided by the informant of the aggregate income for all members of the household. The household comprises co-residents under a single roof, but includes persons residing in attached housing whose domestic activities are integrated with those of the main residence.

1. **$0-10,000**
2. **10,001-20,000**
3. **20,001-30,000**
4. **30,001-40,000**
5. **40,001-60,000**
6. **60,001-over**

K5. Percentage of total household income earned. Income from salary, hourly work, product sales (including fish,

shellfish), rents and investments,

1. O-24%
2. 25-49%
3. 50-74%
4. 75-loo%

K6. Percentage of total household income unearned. *Income* from per capita distributions, welfare, gifts, shareholder receipts, lease royalties and transfer payments.

1. O-24%
2. 25-49%
3. 50-74%
4. 75-100

K7. Governmental (public) source of total household earned income by Percentage. Employment with Federal, state, or local government, or through contracts with or sales and services to government agencies or government employees.

1. O-24%
2. 25-49%
3. 50-74%
4. 75-loo%

KS. Non-governmental (private) source of total household income by percentage.

1. O-24%
2. 25-49%
3. 50-74%
4. 75-loo%

K9. Stability of household earned income.

1. Irregular (piece work, short duration contract, catch-as-catch-can labor, etc.)
2. Erratic income from irregular, seasonal and monthly sources which varies (often from hh composition changes)
3. Seasonal receipts (summer fishing, fish processing, etc. from labor or entrepreneurship)
4. Monthly salary, or profits (draw) from self-employment, entrepreneurship.

K10. Stability of household unearned income.

1. None or irregular (gifts, unemployment compensation of short duration, etc.)
2. Monthly welfare or other transfer payments.
3. Regular shareholders receipts, and/or lease and/or royalty income, and welfare and/or transfer payments.
4. 1, 2 and 3 (above) present.

K1 la. Income distribution, giving, witbin and among households in the village. Do household members pool and share income within the household for daily use, equipment purchases, travel for one or more household members and the like? Do persons in two or more households pool and share income for subsistence purposes, in times of need, or on some regular basis?

1. Each household member's income is personal. It is spent or saved by each person witbout restriction. Pooling or sharing of any parts of incomes from two or more persons is rare.
2. Household members regularly pool income for household

purchases of food, equipment, utility bills, and the like, and/or to sponsor subsistence harvests.

3. Household members occasionally share some of their incomes with relatives or friends in other households witbin the village (in emergencies, in preparation for subsistence harvesta, and so forth).
4. Household members regularly share some of their incomes with relatives or friends within the village.

K1 lb. Income distribution, receiving. Same attributes as 1 la.

K12a. Income distribution, giving, between or among households in different villages. The attributes in Variable 11, above, are to be followed for intervillage sharing of income.

1. No interhousehold intervillage sharing of income.
2. Occasional interhousehold sharing of income.
3. Regular interhousehold sharing of income

K12b. Income distribution, receiving. Same attributes as in 12a.

K13a. Labor practices, giving, within and among households within the village. We wish to know whether labor and skills are restricted to intrahousehold tasks, or whether they are shared between or among members of two or more households for some tasks (e. g., for construction, subsistence pursuits, repairs to equipment and housing, and the like).

1. Labor expended for personal needs only.
2. Labor expended for own household only.
3. Labor expended for relatives or friends in other households within the village on an occasional basis.
4. Labor expended for relatives or friends in other households within the village on a regular basis.

K13b. Labor practices, receiving. Same attributes as in 13a.

K14a. Labor practices, giving, between and among households in distant villages. We seek information similar to Variable 13a above, but the focus is on intervillage interhousehold labor sharing.

1. No labor sharing between households in different villages.
2. Sharing of labor with households in other villages on occasion.
3. Regular sharing of labor with households in other villages.

K14.b Labor practices, receiving. Same attributes as in 14a.

K15a. Sharing or gifting of resources and/or equipment, giving, within and outside the household within the village. The interest here is whether persons within a household share equipment and/or subsistence goods (dried fish, oil, greens, maktak, etc.) within and beyond the household, yet within the village.

1. Equipment and/or subsistence resources are used and consumed solely by the owner.
2. Sharing of equipment and/or subsistence resources with members of the household.
3. Occasional sharing of equipment and/or subsistence resources with relatives or friends in other households.
4. Regular sharing of equipment and/or subsistence

resources with relatives or friends in other households.

K15b. Sharing or gifting of resources and or equipment, receiving. Same as attributes in 15a.

K16a. Sharing of equipment and/or subsistence goods, giving, between or among households in distant villages. We seek the same information for intervillage sharing of equipment and/or subsistence resources that we sought in Variable 15a above.

1. No intervillage household sharing of equipment and/or subsistence goods.
2. Sharing with households in other villages on an occasional basis.
3. Sharing with households in other villages on a regular basis.

K16b. Sharing of equipment and/or subsistence goods, receiving. Same as attributes in 16a.

III Social Organization

This set of questions seeks information on household size and composition, household dynamics, conflict resolution within households, divorce, and sodality membership.

K17. Household size. The number of persons residing under the same roof or residing under adjacent or attached roofs and whose domestic functions are integrated.

1. 1-3
2. 4-6
3. 7-9
4. 10-over

K18. Age of household head. The household head is the adult recognized as the key decision-maker in the household.

1. Under 25
2. 25-40
3. 41-55
4. 56-over

K19. Household composition/dynamics. We seek to learn whether households are fairly stable and rigid in their composition, or whether they are rather fluid. Movement from house to house is irrelevant if household composition is stable.

1. Households are open and fluid, experiencing frequent growth and decline through the movement of members in and out (excluding marriage, death, and relocation for school, three or more persons have joined or left the household in the past two years). [Examples, adoptions, elders moving in, divorcees returning, collateral relatives staying for a brief time].
2. Household compositions change through infrequent addition or loss of members (perhaps one person every two years other than marriage, death, or relocation for school).
3. Household compositions are stable. No changes in personnel over the past two years.

K20. Ruks/expectations for household composition and dynamics.

1. **No set rules or expectations for who can and who cannot join the household. Flexible acceptance of members and the behavior of those persons.**
2. **Blend of 1 and 3.**
3. **Clear expectations for the observation of rules by household members. Set expectations for the behavior of new members.**

K21. **Household conflict resolution.** **We seek to know the manner in which and the places where** (within the household or larger family, or through institutions) conflicts are addressed and resolved.

1. Passive internal (within household or larger family) resolution, such as dialogue and withdrawal.
2. Active internal resolution, such as rewards, punishments, or fights.
3. Informal external resolution, such as advice from relatives, assistance from friends, informal/non-formal resources.
4. Formal external resolution, such as police, helping services in the village or region.
5. Combination of three types.

K22. Divorce/separation.

1. **One or more parties to broken unions reside in the household.**
2. **Intermittent change of partners.**
3. **No broken unions in the household.**

K23. Sodality membership **Modalities, or clubs, are voluntary organizations within villages, regions, or the State of Alaska. Some may be world-wide, but represented by local chapters. "Search and Rescue", auxiliary organizations of churches (e.g., Knights of Columbus), the Native Brotherhood, YMCA groups, Young Republicans, quilting and sewing clubs, all qualify as modalities.**

1. **No memberships in the household.**
2. **1 membership in the household.**
3. **2 or more memberships in the household.**

IV Politics

We are concerned here whether members of the household are politically active, and whether the informant correctly identifies some political issues.

K24. Political participation in the household. **We wish to know whether any (or more than one) person in the household occupies an elected position in the village IRA, corporation, or city government, or in the regional nonprofit corporation, regional profit corporation, or borough government.**

1. **No official capacities**
2. **One official capacity at present**
3. **Two or more official capacities at present**

K25. Identification of political issues. We want to know the number of political issues that are correctly identified by the informant from the following list. (a) ANCSA requires that regional and village corporations "go public" in 1991. What does that mean? (b) What is the "dissenters' rights" argument that pertaina to ANCSA? (c) Who controls the harvests of fish and birds in Alaska? (d) Have the Reagan-Bush Administrations increased or decreased the number of programs and amounts of funds available to Alaska's Natives?

1. **No issue correctly identified**

2. One issue correctly identified
3. Two issues correctly identified
4. Three or more issues correctly identified

V Religious Participation

We want to know whether household members regularly attend religious services, and whether they are active in extracurricular activities associated with their church.

K26. Religious participation in the household.

1. Do not profess any religion or do not attend services
2. Attend religious services occasionally
3. Attend religious services on a regular basis.

K27. Extracurricular religious participation in the household.

We want to know whether members of the household are active inchorus practices, helping services sponsored by their church, church athletic teams, church sewing circles, home missionary activities, and the like.

1. Do not participate in church extracurricular activities
2. Participate in one or two activities on an occasional basis
3. Participate in one or two activities on a regular baais
4. Participate in *more than* two activities on a regular basis.

VI Ethics [Ethical Principles by which Persons Are Organized.

The following questions address some beliefs and practices people think should be followed, beliefs and practices to which significant symbols are assigned. These beliefs maybe held, but not necessarily practiced. Contradictions between beliefs and practices should be noted.

The three variables in this set (K28-K30) may be fraught with construct validity.

I will appreciate a few paragraphs from any or all KIs informing me about how they rated these variables and the problems that they encountered in eliciting and rating the information. The questions are easily *answered* **if a person has several months in a village. They are never easily answered from direct elicitation from the protocol variables and were not intended to be elicited from them. Ethics as we understand them here, are infused in some conversation and beliefs, implicit in some discussions and actions.**

K29 is the sole variable in the set that can be elicited rather easily, that is because all people everywhere attach significant symbols to their spaces and places. K29 is not easily elicited if we also seek to know if 'spiritual' significance is attributed to those symbols. That knowledge must come from many sources, as if we are reading a complex Belgian text, looking at a Belgian tapestry, and finding the significant and underlying relations between the two. Natives often attribute spiritual (or deistic, or naturalistic) significance to their environments and often fail to regard their greater space as a commodity.

K28. Ethical responsibility for attainment. We want to know who is responsible for personal, family, and village attainments of all kinds: success in occupations, education, income, businesses, village affairs and security. Is the individual specified as the person who should be solely responsible for his/her attainments, and are individuals free of obligations to others except, perhaps, one's own nuclear family? Or is the individual recognized as having responsibilities toward others--in the family, a wider network of kinspersons and affines, or the village--and any successes that accrue do so in a group context through the efforts of several persons?

1. A person should strive to make himself/herself a success. Success is earned through individual effort (saving, delaying gratification, hard work).
2. A person should work hard to assist his/her family, save

scarce resources to help his/her family in times of need and for future expectations, such as educations for one's children.

3. A person should work hard with whatever skills and resources he or she possesses to assist ones family, wider circle of kinspersons and affines, and the village. Giving and sharing take precedence *over saving* and assisting self or nuclear family to the exclusion of others.

K29. Ethics and significant symbols attached to environment.

1. The environment, or features of it (rivers, forests, coal seams, oil deposits, fish, sea mammals, etc.) are viewed as commodities, that is, items whose values are established in the marketplace and are available for purchase or sale.
2. Combination of commodity and spiritual views.
3. The environment, or features of it, are viewed as things endowed with spirits, or which possess special relations to natives and to which significant cultural symbols are attached (beauty, spirituality, helpfulness, traditions). The general environment is not conceptualized as a commodity. (Fish, ivory and other by-products maybe sold, but what symbols are attached to those items?)

K30. Ethics of personal coo~enation/competition.

1. A person should compete with others so as to do the best for one's self.
2. 1, 3 or 4 depending on circumstances.
3. A person should do the best one can in developing and employing skills. The fruits of some of those skills --such as hunting, fishing, and food preparation--should be shared widely throughout the family and beyond. Some other skills, such as net hanging or outboard motor repair, should be used for personal gain.
4. A person should develop and employ skills, work in cooperation with others, and share in a communitarian fashion (perhaps principally on the basis of presumed need) the products of those skills.

VII Enculturation

This question pursues the topic: how are children educated at home, traditionally (indulgent, quick to respond to requests, few formal demands, little badgering, traditional gender distinctions); in a Western fashion (directive, attach stipulations to requests, many formal demands, manipulation and encouragement for success, marked gender distinctions in treatment); or some combination of traditional and Western?

K31. Enculturation and gender distinctions.

1. Western enculturation and gender distinctions
2. Western and traditional practices are combined
3. Traditional enculturation practices and gender distinctions dominate

VIII Political and Economic Knowledge

In this set we want to learn whether informants correctly identify loci of ownership and control over economic projects, and loci of power over political decisions, and have reasonable knowledge (that is they are informed) and warranted expectation about the results of economic, social service and education programs, projects, and decisions that affect them.

K32. Expectations for economic developments in region or village.

[f specific economic development projects, such as oil exploration, drilling, and pumping, are scheduled for the region in which the village is located, or if other projects are on-line, ask specifically about those projects. If not, use a hypothetical project, such as oil extraction, to gain a response to your query about native expectations.

-1. The chief benefits of the project will accrue locally (in jobs, income, royalties, profits and economic spin-offs), and control over he project will be exercised locally (within the region, say).
2. Local and distant (e.g., Anchorage, Seattle, New York) companies and persons will benefit about equally and control will be shared.
3. Local job benefits, but external control.
4. Chiefly external benefits and control.

K33. Economic conflicts. Do natives perceive economic conflicts within their village or their region, and if so, who do they recognize as parties to the conflict (native corporations/non-native corporations/governmental units/native persons/non-native persons, or some combinations of the foregoing)?

1. No perceived conflict
2. Conflicts are between corporations and persons
3. Conflicts *are* **between natives and non-natives**
4.2 and 3 above.

K34. Schooling and success

1. Natives perceive a strong association between formal schooling and success, if a person gets a formal education, success most often follows.
2. Occasionally success is associated with formal schooling.
3. No association between schooling and success.

K35. Perceived objectives of helping service programs. Here we are interested in knowing whether informants correctly understand the objectives of helping service programs, such as family counseling, health services, and the like. Choose two within the village and two within the region (but not in the village) and ask the informant the objectives of those programs.

1. Informant's perception is the same or equivalent to the actual goal of the program.
2. Goal incorrectly identified.

K36. Perceived control of program. Of the helping services discussed in the previous question, ask the informant where control over that program is exercised.

1. Control seen as local or regional
2. Control seen as external to the village and region

IX Demography

K37. Residence pattern (ego). Here we seek to know where the adult (ego) in the household was born and reared.

1. Adult in household was neither born nor reared in the village or region in which he/she currently resides.
2. Adult in household was born in. the region, but not the

same subregion in which he/she currently resides.
3. Adult in household was born or reared in the same subregion, but not the same village in which he/she currently resides.
4. Adult was born in the same village in which he/she resides.

K37b. Residence pattern (spouse). Same attributes as in 37. Yet here we seek to learn about the informant's (ego's) spouse,

K38. Village size

1. Very small (less than 150)
2. small (151 to 300)
3. Medium (301 to 500)
4. Large (501 to 800)
5. Very large (801 and over)

X Social Service Utilization

K39. Social services used by informants.

1. Avoid services available to informants in village and region.
2. Use health services
3. Use financial services
4. Use family and social services
5. Use health (2) and financial (3)
6. Use family and social and others.

K40. Use of native healers

1. Native healers employed as necessary
2. Native healers are not used, even if available.
3. No native healers in village, not used.

K41. Utilities in houses. We wish to know whether among all utilities available in the village, any are present and working in the informant's household [electricity, gas, water, sewer, telephone (treated here as a utility)].

1. No utilities present and/or working.
2. One utility present, working.
3. Two or more working, but not all.
4. All utilities present, working.

KI PROTOCOL VARIABLE DEFINITION CODE, 1988-1989

KI PROTOCOL VARIABLE DEFINITION CODE
1988-1989

The version of the AOSIS questionnaire that was administered in Schedule A (1987) failed to yield valid attitudinal assessments of some topics that are central to Native culture, and failed to assess some important life areas altogether. We sought to rectify this problem in the Schedule B (1988) inquiry with some deletions from the questionnaire and some additions to the KI protocol (new items 1-11 under the headings I Attitudes about harvestable resources, and II Cognitive checks on affective questions). The original KIP instrument (K1-K41) received some modest changes. Upon completing the 1988 field research among Schedule B respondents we uncovered several problems that required attention. Changes to variables are noted. Variable labels for coding and rating appear in bold brackets, e.g. [Q1A1] next to the item being measured.

I. Attitudes About Harvestable Resources

It is to be noted that the initial topics in the revised version of the protocol (below) seek cognitive attitudes about the quantity of naturally-occurring resources that are available for subsistence and commercial harvests. These topics are organized as a matrix. It is our experience that Natives prefer to discuss resources as species specific items and are willing to provide information on all key species without specific prompting. The questions will be introduced with "What do you think about the quantity of --------- available to harvest in this area for your needs during the past year?" We seek to determine whether the informants think that there were:

(1) not enough of the species in questions for their needa,
(2) an amount that was adequate for their needs, or
(3) an amount that was more than sufficient for their needs.

Resources that are unavailable in the environment will be recorded with (0). Responses for commercial needs will be sought for resources that are also sold on some market, such as fish, fur-bearers and walrus. Variable labels for these questions are the name of the resource, e.g., Walrus.

1. What do You think about (how do you evaluate) the quantity of...

SEA MAMMALS	RESPONSE
walrus	1 2 3
whales	
Bowhead	1 2 3
Minke	1 2 3
Gray	1 2 3
Beluga	1 2 3
seals	
Bearded	1 2 3
spotted	1 2 3
Ringed	1 2 3
Ribbon	1 2 3

LAND MAMMALS	RESPONSE
Bears	1 2 3
Polar	1 2 3
Brown	1 2 3
Black	1 2 3
Caribou	1 2 3
Moose	1 2 3
Dan Sheep	1 2 3
Hares	
Snowshoe	1 2 3
Arctic	1 2 3
Fox	
Arctic	1 2 3
variant	1 2 3
wolf	1 2 3
Otter	1 2 3
Beaver	1 2 3
Ermine	1 2 3
Other	1 2 3

BIRDS	RESPONSE
Ducks	
List	1 2 3
Spp.	
Geese	
List	1 2 3
Spp.	
cranes	1 2 3
swans	1 2 3
Gulls	1 2 3
Auklets	1 2 3
Terns	1 2 3
Puffins	1 2 3
Murres	1 2 3
Ptarmigan	1 2 3
owl	1 2 3
Grouse	1 2 3
Other	1 2 3

FISH	RESPONSE
Salmon	
Chum	1 2 3
Pink	1 2 3
Red	1 2 3
Silver	1 2 3
King	1 2 3
Char	
Dolly	1 2 3
Arctic	1 2 3
Lake	1 2 3
Whitefish	
Spp.	1 2 3
Spp.	1 2 3
sheefsh	1 2 3
Grayling	1 2 3
Blackfish	1 2 3
Burbot	1 2 3
Pike	1 2 3
Herring	1 2 3
Smelt	1 2 3
Sculpin	1 2 3
Cod	1 2 3
Halibut	1 2 3
Flounder	1 2 3
Other	1 2 3

MARINE INVER.	RESPONSE
clams	1 2 3
Crabs	1 2 3
Red King	1 2 3
Blue King	1 2 3
Snow	1 2 3
Tanner	1 2 3
Mussels	1 2 3
Shrimp	1 2 3
sea worms	1 2 3
scallops	1 2 3
Sea Urch.	1 2 3
Starfish	1 2 3

PLANTS	RESPONSE
Roe-on-kelp	1 2 3
Kelp	1 2 3
Other Marine Plants	1 2 3
Roots	1 2 3
Leaves	1 2 3
Berries	1 2 3
Fruits	1 2 3
Specify Spp. as necessary.	

2. Management of Harvestable Resources. Next we ask questions about the management of resources from which natives gain their subsistence and/or which they extract for sale or for sale of by-products. In the first set we seek to learn whether informants think that naturally-occurring resources, specifically birds, sea mammals, land mammals and fish, *can* be managed. We are referring here to harvest laws, legal seasons for extraction, accurate assessments of available resources by agencies charges with management. [Q2*11

We anticipate that the cognitive attitudinal responses will be:

(1) only God can manage (based on the beliefs Natives hold about naturally-occurring phenomena),
(2) no person can manage,
(3) no institution can manage,
(4) persons (mortals) can manage,
(5) institutions can manage.

Yet we further anticipate that the informants will respond that even if only God can manage, or even if no person *or* institution can manage, that they recognize that agencies are vested with management authority.

The follow up topics seek to know who the informants think *should* manage the resources. We anticipate the responses as: [Q2*2]

(1) Alaska Department of Fish and Game,
(2) Various Federal Agencies,
(3) Combination of Government and Native Organizations or persons,
(4) Native Organizations (such as whale or walrus commission), and

(5) Local Natives.

RESOURCE	CAN IT BE MANAGED	WHO SHOULD MANAGE
walrus	1 2 3 4 5 [Q2A1]	1 2 3 4 [Q2A2]
Bowhead	1 2 3 4 5 [Q2B1]	1 2 3 4 [Q2B2]
Other Whales	1 2 3 4 5 [Q2C1]	1 2 3 4 [Q2C2]
Salmon	1 2 3 4 5 [Q2D1]	1 2 3 4 [Q2D2]
Herring	1 2 3 4 5 [Q2E1]	1 2 3 4 [Q2E2]
Cod	1 2 3 4 5 [Q2F1]	1 2 3 4 [Q2F2]
Halibut	1 2 3 4 5 [Q2G1]	1 2 3 4 [Q2G2]
Other Fish	1 2 3 4 5 [Q2H1]	1 2 3 4 [Q2H2]
King Crabs	1 2 3 4 5 [Q2I1]	1 2 3 4 [Q2I2]
Snow Crabs	1 2 3 4 5 [Q2J1]	1 2 3 4 [Q2J2]
Tanner Crabs	1 2 3 4 5 [Q2K1]	1 2 3 4 [Q2K2]
Other Marine Invertebrates	1 2 3 4 5 [Q2L1]	1 2 3 4 [Q2L2]
Caribou	1 2 3 4 5 [Q2M1]	1 2 3 4 [Q2M2]
Moose	1 2 3 4 5 [Q2N1]	1 2 3 4 [Q2N2]
Dan Sheep	1 2 3 4 5 [Q2O1]	1 2 3 4 [Q2O2]
Other Land Mammals	1 2 3 4 5 [Q2P1]	1 2 3 4 [Q2P2]
Geese	1 2 3 4 5 [Q2Q1]	1 2 3 4 [Q2Q2]
Ducks	1 2 3 4 5 [Q2R1]	1 2 3 4 [Q2R2]
swans	1 2 3 4 5 [Q2S1]	1 2 3 4 [Q2S2]
Cranes	1 2 3 4 5 [Q2T1]	1 2 3 4 [Q2T2]
Other Birds	1 2 3 4 5 [Q2U1]	1 2 3 4 [Q2U2]
Roe-on-kelp	1 2 3 4 5 [Q2V1]	1 2 3 4 [Q2V2]

3. Attitude about State **or Federal wildlife management.** **In this set we seek to learn how informants evaluate the way in which the state or federal government manages the resources which they have asserted or received authority over. The intention is obvious in terms of Native 'wellbeing'. We** anticipate that Natives and non-Natives responses will be expansive (e.g., when we got enough (of some species) we stopped hunting (or fishing), or, the quotas should be --(amount) -- because of factors x, y and z). Discussion **should yield responses that are classifiable as: [Q3*]**

(1) poorer than Natives could do,
(2) as good as Natives could do (equivalent), or
(3) better than Natives could do.

The KIs will ask something like "What do you think about the ways in which the ADF&G (or the Federal agencies) manage..." For commercial resources a second group of responses will be obtained

RESOURCE	EVALUATION OF MANAGEMENT
walrus	1 2 3 [Q3A]
Seals	1 2 3 [Q3B]
Bowhead	1 2 3 [Q3C]
Polar Bear	1 2 3 [Q3D]
Caribou	1 2 3 [Q3E]

Moose	1 2 3 [Q3F]	
Bears	1 2 3	[Q3G]
Salmon	1 2 3 [Q3H]	
Herring	1 2 3 [Q3I]	
Bottom fish	1 2 3 [Q3J]	
Crabs	1 2 3 [Q3K]	
Other resources as necessary	1 2 3 [Q3L]	

4. Attitudes about Political Influence over Wildlife Management . Here we ask questions concerning the informant's cognitive attitudes about political influence (rather than political power as in the preceding). We ask-the informant how they think the residents of their village influence management decisions made by the ADF&G regarding harvests of resources in their local areas, that is, the areas from which local residents extract resources. We anticipate that the responses will be: [Q4*]

(1) not at all,
(2) rarely or seldom, and
(3) frequently.

Informants may wish to separate types of resources by species. They may also say that local residents may influence the ADF&G on rare occasions and perhaps for one species, but that the rare influence is important. Notes should be kept on such a response. The classification, however, should be made on the most general evaluation.

RESOURCE	INFLUENCE ON ADF&G POLICIES
Salmon	1 2 3 [Q4A]
Herring	1 2 3 [Q4B]
Bottom fish	1 2 3 [Q4C]
Marine Invertebrates	1 2 3 [Q4D]
Other fish	1 2 3 [Q4E]
Geese	1 2 3 [Q4F]
Ducks	1 2 3 [Q4G]
swans	1 2 3 [Q4H]
Cranes	1 2 3 [Q4I]
Other birds	1 2 3 [Q4J]
Caribou	1 2 3 [Q4K]
Moose	1 2 3 [Q4L]
Fur bearers	1 2 3 [Q4M]
Other land mammals	1 2 3 [Q4N]

5. Attitudes about Understanding Natural Resources. Several of the following questions seek cognitive attitudes about who understands natural resources and how that understanding is acquired. It is anticipated that there will be a difference between Native and non-Native responses to these questions in large part because Natives extracted resources for millennia without management or supervision. In so doing symbols were assigned to specific places, the behavior of species, the behavior of the elements, and the like. Those symbols are shared and passed through the generations. This question caused special problems for KIs. I seek to know whether there are differences in how Natives, who come to know environments through use, precept and tradition; oil company scientists who get to know an environment through research--conducted by themselves or by others in behalf of oil companies; and either ADF&G or MMS appointees, who get to know areas either by regulating them, or commissioning research on those areas, or both. I did not care to discriminate among various

kinds of scientists. I only wanted to know what they thought about '*oil company* scientists.' Apparently respondents were unwilling to discriminate among kinds of scientists, recognizing no differences among 'pure' scientists, oil company scientists and scientists for regulatory agencies. KIs felt that the respondents were confused by the concept 'science,' but that they had no trouble discriminating between their attitudes about how use of resources *influenced* understanding of resources.

Therefore, I wish to change the original variable definition to two variable definitions. One will measure 'understanding via knowledge' and the other measures 'understanding via use.'

[Q5(1)*] Knowledge in relation to attitudes about understanding natural resources.

E.g., "Who do you think better understands the _____ of your area?"

(1) Natives,
(2) Natives and Some Scientists,
(3) Scientists.

[Q5(2)*] Use in relation to attitudes about understanding natural resources.

E.g, "Who do you think best understands the _____ of your area?"

(1) Natives,
(2) Oil Companies,
(3) Alaska Department of Fish and Game,
(4) the Minerals Management Service (or the Federal Government).

ABIOLOGICAL PHENOMENA	WHO BETTER UNDERSTANDS
Water	1 2 3 4 [Q5A]
Ice	1 2 3 4 [Q5B]
Winds	1 2 3 4 [Q5C]
BIOLOGICAL PHENOMENA	
Plants	1 2 3 4 [Q5D]
Land Mammals	1 2 3 4 [Q5E]
Fish	1 2 3 4 [Q5F]
Sea Mammals	1 2 3 4 [Q5F]
Marine Invertebrates	1 2 3 4 [Q5H]

6. Attitude about Acquisition of Knowledge. Now we ask how long it takes to acquire knowledge about a place. Whereas the question should not be leading, that is so specific about the time and ways in which Natives may have come to understand an area, it is likely that Natives will give several responses before landing on the one that they will accept. On the basis of our 1988 inquiry among Schedule B villages Natives tended to answer this question in one of two ways (1. you never understand an environment but you're always learning more about it, or 2. you learn from the accumulated experiences of several generations of users) (either 1 or 6 in the original version of the protocol). We anticipated that non-Natives will provide a single response.

According to KIs in 1989, it was not possible in some areas to discriminate between "you're always learning" and "accumulation of knowledge from prior generations." The attributes have been changed to reflect the merging of these responses. We continue to anticipate that although Natives are very instrumental in their approach to the environment and learn by careful observation and precept, they also think about the environment in a different way from non-Natives. In asking "How long do you think it takes to become knowledgeable about an area in which a person lives, hunts,

fishes and collects plants?" we seek explicit distinctions among [Q6]

(1) about one year,
(2) one to five years,
(3) 6 to twenty years (a generation),
(4) a lifetime,
(5) a person never gets to know an area completely (they will probably mean something like 'A person never gets to know an area completely, you are always learning'); a person learns from the accumulated experiences of several lifetimes, that is, relying on the advice of previous generations of hunters.

7. Significant Symbols Attached to Places in Native Environments. Do you have special memories about the wildlife or the places, such as springs, promontories, lakes, capes, hills, woods, bays, lagoons, in your area which your family likes to recount? [Q7]

(1) none,
(2) a few,
(3) many,
(4) many which have accumulated over two or more generations.

8. Attitudes about Oil-related Changes. What do you think the effects of oil-related changes (type of oil-related phenomenon is specified) have been on the environment (specified)? Here we seek to know whether informants perceive that changes are [Q8]

(1) deleterious,
(2) no change,
(3) mixed (some harmful and some helpful) or
(4) beneficial.

I had originally intended that a matrix of responses would be generated from these questions such that the effect of drilling on water, fish, plants, land mammals, sea mammals and birds; pumping of oil on those same phenomena and so forth. In 1989 the KIs did not generate matrices, but rather restricted responses to the examples on the protocol. As things stand now, we have a small sample of responses measuring persons opinions about the consequences of oil-related activities to certain natural phenomena. KIs suggest that except in instances in which respondents have special knowledge about an activity, such as pumping of oil on some particular resource, such as marine invertebrates, there is little reason to think that persons discriminate among resources or the oil-related activities that may affect them. Thus, by default (although with reasonable empirical support) we treat Q8 as six variables, each one isolating one oil-related activity with one family of phenomena (such as sea mammals). [A single response summarizing all effects was aggregated for each informant in 1988]

OIL-RELATED PHENOMENON	EFFECT ON	CONSEQUENCE
Drilling	Water	1 2 3 4 [Q8A]
Pumping	Fish	1 2 3 4 [Q8B]
Transporting	Plants	1 2 3 4 [Q8C]
Pipe Line	Land Mammals	1 2 3 4 [Q8D]
Enclave Development	Sea Mammals	1 2 3 4 [Q8E]
Pursuit of Recreation	Birds	1 2 3 4 [Q8F]

H. Cognitive Checks on Affective Questions

The first two of the following three cognitive questions are intended to be specific checks on two affective questions in the AOSIS instrument (A37 and E7). The third seeks information about how

Rs cognize the understandings of Natives held by elected and appointed state officials, specifically those officials whose actions influence Native affairs.

9. Memorv of Sharing. Think about how things were ten years ago. In general, what do you remember about the amount of sharing (goods, fooda, labor, cash and resources--such as boats, snowmachines and tools) that occurred between households and friends then. [Goods, foods, labor, cash and resources may have to be separated and treated in a matrix as above.] We anticipate classification as [Q9]

(1) less than present,
(2) no change,
(3) more than present.

10. Comparison of Treatment of Elders. What do you think about the way in which elders are treated, especially those who have few relatives in the village?
We anticipate classification as [Q1O]

(1) less care is shown than should be,
(2) appropriate care is shown for their needs,
(3) more care and attention is paid than is necessary for their needs.

11. In this set of questions we seek to learn how respondents think that elected and appointed officials in the State of Alaska comprehend Native understandings (use, symbols, etc.) of the areas in which they reside. The question was frought with construct validity problems as interpreted by the K.Is. The new variables should allow KIs to fit responses to the appropriate constructs.

Attitude about how non-Native State Representatives comprehend Native understandings. Do you think that non-Native persons elected to state government (representatives, senators), in general, comprehend how Natives understand the areas in which they reside? [Q11A]

Attitude about how Native State Representatives comprehend Native understandings. Do you think that Native persons elected to state government (representatives, senators), in general comprehend how Natives understand the areas in which they reside? [Q11B]

Attitude about how non-Native appointees to State Agencies, such as the ADF&G, comprehend Native understanding? [Q11C]

Attitude about how Native appointees to State Agencies, such as the ADF&G comprehend Native understandings? [Q11D]

(1) not at all,
(2) they have some limited comprehension,
(3) they understand completely how natives understand their locale areas.

ORIGINAL KI VARIABLE DEFINITION CODE

The variable labels for these topics are the lettered items, e.g. [K1] that precede each question.

I Subsistence Economy

This set comprises questions about what a family harvests and/or consumes; how many resources (tools, cash) are allocated to the harvest; and what percentage of the total proteins in a household diet is derived from subsistence harvests? An activity list and a resource extraction area map focused on subsistence accompanies the genealogy.

K1. Subsistence harvesting expenses as an estimated percentage of total annual income. Expenses include purchase and repair of equipment, purchase of fuel, purchase and repair of clothing, ammunition, purchase of food and incidentals required for travel and camping.

1. **Very Low (0 to 9%)**
2. **Low (lo to 19%)**
3. **Medium (20 to 29%)**
4. **High (30% and over)**

K2. Variety of naturally-occurring resources harvested annually. We seek information as to the number of species of plants, sea mammals, land mammals, birds, shellfish and fish harvested annually by the informant's family household. We want a tally of the total of all species for the aggregate six ca es

1. **No naturally-occurring species harvested.**
2. **Few species harvested, and none harvested in some of the six categories.**
3. **At least one species in each category.**
4. **At least two but no more than three species in each category.**
5. **More than three species in each category (the exception is invertebrates--if ' not available).**

K3. Harvested protein proportion of household diet. The proportion of protein in the aggregate household diet that is obtained from naturally-occurring species. This measure includes items that are harvested by the household as well as those that are received by household members through gifting, sharing, or exchange.

1. Less than 25%
2. **25-49%**
3. **50-75%**
4. **76-100%**

IL Economics

This set comprises questions about household incomes, the sources and stability of incomes, and labor and resource allocation within and among households.

KIs have expressed some confusion about the income variables. Any household can have a total income that is derived from one *or more* members of the household. That income can be totally earned, totally unearned, or something in between, that is, the total is derived from a combination of earned and unearned income. I sought tallies of total household income and the relative

contribution of earned-and unearned income to that total. Thus, if a household's total income is solely earned, 100% of that household's income is earned. If that income is derived from North Slope Borough employment, it is, then, derived from the 'public sector.' If it is derived from Ryan Air, it is, then, derived from the 'private sector.' It is also true that most Ryan Air revenues are themselves derived from the 'public sector' (school teachers, HRAF researchers, ADF&G biologists, and the like flying around), but that is another question.

For an example of how these variables are supposed to work lets look at K1O, 'stability' of household income. If a household has two incomes, one permanent (monthly, weekly, throughout the year), and others impermanent (part-time, bumpy), then that household is stable. The unearned-earned distinction again applies. If the permanent and stable income is unearned, the household has a stable unearned income (this income may be dwarfed by temporary earned income, but temporary income is less predictable than stable income, hence the distinction).

K4. Household annual income. Household income is an estimate provided by the informant of the aggregate income for all members of the household. The household comprises co-residents under a single roof, but includes persons residing in attached housing whose domestic activities are integrated with those of the main residence.

1.$0-10,000
2. 10,001-20,CKKI
3.20,001-30,000
4.30,001-40,000
5.40,001-60,000
6. 60,001-over

K5. Percentage of total household income earned. Income from salary, hourly work, product sales (including fish, shellfish), rents and investments.

1. O-24%
2. 25-49%
3. 50-74%
4. 75-loo%

K6. Percentage of total household income unearned. Income from per capita distributions, welfare, gifts, shareholder receipts, lease royalties and transfer payments.

1. 0-24%
2. 25-49%
3. 50-74%
4.75-100

K7. Governmental (public) source of total household earned income by percentage. Employment with Federal, state, or local government, or through contracts with or sales and services to government agencies or government employees.

1. O-24%
2. 25-49%
3.50-7470
4. 75-loo%

K8. Non-governmental (private) source of total household income by percentage.

1. O-24%

2. 25-49%
3. 50-'74%
4.75-10070

K9. Stability of household earned income.

1. Irregular (piece work, short duration contract, catch-as-catch-can labor, etc.)
2. Erratic income from irregular, seasonal and monthly sources which *varies (often from* hh composition changes)
3. Seasonal receipts (summer fishing, fish processing, etc. from labor or entrepreneurship)
4. Monthly salary, or profits (draw) from self-employment, entrepreneurship.

***K1O.* Stability of household unearned income.**

1. None or irregular (gifts, unemployment compensation of short duration, etc.)
2. Monthly welfare or other transfer payments.
3. Regular shareholders receipts, and/or lease and/or royalty income, and welfare and/or transfer payments.
4. 1, 2 and 3 (above) present.

K11a. Income distribution, giving, within and among households in the village. Do household members pool and share income within the household for daily use, equipment purchases, travel for one or more household members and the like? Do persons in two or more households pool and share income for subsistence purposes, in times of need, or on some regular basis?

1. Each household member's income is personal. It is spent or saved by each person without restriction. Pooling or sharing of any parts of incomes from two or more persons is rare.
2. Household members regularly pool income for household purchases of food, equipment, utility bills, and the like, and/or to sponsor subsistence harvests.
3. Household members occasionally share some of their incomes with relatives or friends in other households within the village (in emergencies, in preparation for subsistence harvests, and so forth).
4. Household members regularly share some of their incomes with relatives or friends within the village.

K11b. Income distribution, receiving. Same attributes as ha.

K12a. Income distribution, giving, between or among households in different villages. The attributes in Variable 11, above, are to be followed for intervillage sharing of income.

1. No interhousehold intervillage sharing of income.
2. Occasional interhousehold sharing of income.
3. Regular interhousehold sharing of income

K12b. Income distribution, receiving. Same attributes as in 12a.

K13a. Labor practices, giving, within and among households within the village. We wish to know whether labor and skills are restricted to intrahousehold tasks, or whether they are shared between or among members of two or more households for some tasks (e.g., for construction, subsistence pursuits, repairs to equipment and housing, and the like).

1. Labor expended for personal needs only.
2. Labor expended for own household only.
3. Labor expended for relatives or friends in other households within the village on an occasional basis.
4. Labor expended for relatives or friends in other households within the village on a regular basis.

K13b. Labor practices, receiving. Same attributes as in 13a.

K14a. Labor practices, giving, between and among households in distant villages. We seek information similar to Variable 13a above, but the focus is on intervillage interhousehold labor sharing.

1. No labor sharing between households in different villages.
2. Sharing of labor with households in other villages on occasion.
3. Regular sharing of labor with households in other villages.

K14.b Labor practices, receiving. Same attributes as in 14a.

K15a. Sharing or gifting of resources and/or equipment, giving, within and outside the household within the village. The interest here is whether persons within a household share equipment and/or subsistence goods (dried fish, oil, greens, maktak, etc.) within and beyond the household, yet within the village.

1. Equipment and/or subsistence resources are used and consumed solely by the owner.
2. Sharing of equipment and/or subsistence resources with members of the household.
3. Occasional sharing of equipment and/or subsistence resources with relatives or friends in other households.
4. Regular sharing of equipment and/or subsistence resources with relatives or friends in other households.

K15b. Sharing or gifting of resources and or equipment, receiving. Same as attributes in 15a.

K16a. Sharing of equipment and/or subsistence goods, giving, between or among households in distant villages. We seek the same information for intervillage sharing of equipment and/or subsistence resources that we sought in Variable 15a above.

1. No intervillage household sharing of equipment and/or subsistence goods.
2. Sharing with households in other villages on an occasional basis.
3. Sharing with households in other villages on a regular basis.

K16b. Sharing of equipment and/or subsistence goods, receiving. Same as attributes in 16a.

III Social Organization

This set of questions seeks information on household size and composition, household dynamics, conflict resolution within households, divorce, and sodality membership.

K17. Household size. The number of persons residing under the same roof or *residing under* adjacent or attached roofs and whose domestic functions are integrated.

1. 1-3
2. 4-6
3. 7-9
4. **10-over**

K18. Age of household head. The household head is the adult recognized as the key decision-maker in the household.

1. **Under 25**
2. **25-40**
3. **41-55**
4. **56-over**

K19. Household composition/dynamics. We seek to learn whether households are fairly stable and rigid in their composition, or whether they are rather fluid. Movement from house to house is irrelevant if household composition is stable.

1. **Households are open and fluid, experiencing frequent growth and decline through the movement of members in and out (excluding marriage, death, and relocation for school, three or *more* persons have joined or left the household in the past two years). [Examples, adoptions, elders moving in, divorcees returning, collateral relatives staying for a brief time].**
2. **Household compositions change through infrequent addition or loss of members (perhaps one person every two years other than marriage, death, or relocation for school).**
3. **Household compositions are stable. No changes in personnel over the past two years.**

K20. Rules/expectations for household composition and dynamics.

1. **No set rules or expectations for who can and who cannot join the household. Flexible acceptance of members and the behavior of those persons.**
2. **Blend of 1 and 3.**
3. **Clear expectations for the observation of rules by household members. Set expectations for the behavior of new members.**

K21. **Household conflict resolution. We seek *to know* the *manner in* which and the places where (within the household or larger family, or through institutions) conflicts are addressed and resolved.**

1. **Passive internal (within household or larger family)**

resolution, such as dialogue and withdrawal.

2. Active internal resolution, such as rewards, punishments, or fights.
3. Informal external resolution, **such as advice from relatives, assistance from friends, informal/non-formal resources.**
4. **Formal external resolution, such as police, helping services in the village or region.**
5. **Combination of three types.**

K22. Divorce/separation.

1. **One or more parties to broken unions reside in the household.**
2. **Intermittent change of partners.**
3. **No broken unions in the household.**

K23. Sodality membership. Modalities, or clubs, are voluntary organizations within villages, regions, or the State of Alaska, Some may be world-wide, but represented by local chapters. "Search and Rescue", auxiliary organizations of churches (e.g., Knights of Columbus), the Native Brotherhood, YMCA groups, Young Republicans, quilting **and sewing clubs, all qualify as modalities.**

1. No **memberships in the household.**
2. **1 membership in the household.**
3. **2 or more memberships in the household.**

IV Politics

We are concerned here whether members of the household are politically active, and whether the informant correctly identifies some political issues.

K24. Political participation in the household. We wish to know whether any (or more than one) person in the household occupies an elected position in the village IRA, corporation, or city government, or in the regional non-profit corporation, regional profit corporation, or borough government.

1. **No official capacities**
2. **One official capacity at present**
3. **Two or more official capacities at present**

K25. Identification of political issues. We want to know the number of political issues that are correctly identified by the informant from the following list. (a) ANCSA requires that regional and village corporations "go public" in 1991. What does that mean? (b) What is the "dissenters' rights" argument that pertains to ANCSA? (c) Who controls the harvests of fish and birds in Alaska? (d) Have the Reagan-Bush Administrations increased or decreased the number of programs and amounts of funds available to Alaska's Natives?

1. **No issue correctly identified**
2. **One issue correctly identified**
3. **Two issues correctly identified**
4. **Three or more issues correctly identified**

V Religious Participation

We want to know whether household members regularly attend religious services, and whether they are active in extracurricular activities associated with their church.

K26. Religious participation in the household.

1. **Do not profess any religion or do not attend services**
2. **Attend religious services occasionally**
3. **Attend religious services on a regular basis.**

K27. Extracurricular religious participation in the household.
We want to know whether members of the household are active inchorus practices, helping services sponsored by their church, church athletic teams, church sewing circles, home missionary activities, and the like.

1. **Do not participate in church extracurricular activities**
2. **Participate in one or two activities on an occasional basis**
3. **Participate in one or two activities on a regular basis**
4. **Participate in more than two activities on a regular basis.**

VI Ethics [Ethical Principles by which Persons Are Organized].

The following questions address some beliefs and practices people think should be followed, beliefs and practices to which significant symbols are assigned. These beliefs may be held, but not necessarily practiced. Contradictions between beliefs and practices should be noted.

The three variables in this set (K28-K30) may be fraught with construct validity.
I will appreciate a few paragraphs from any or all KIs informing me about how they rated these variables and the problems that they encountered in eliciting and rating the information. The questions are easily answered if a person has several months in a village. They are never easily answered from direct elicitation from the protocol variables and were not intended to be elicited from them. Ethics as we understand them here, are infused in some conversation and beliefs, implicit in some discussions and actions.

K29 is the sole variable in the set that can be elicited rather easily, that is because all people everywhere attach significant symbols to their spaces and places. K29 is not easily elicited if we also seek to know if 'spiritual' significance is attributed to those symbols. That knowledge must *come* from many sources, as if we are reading a complex Belgian text, looking at a Belgian tapestry, and finding the significant and underlying relations between the two. Natives often attribute spiritual (or deistic, or naturalistic) significance to their environments and often fail to regard their greater space as a commodity.

K28. Ethical responsibility for attainment. **We want to know who is responsible for personal, family, and village attainments of all kinds: success in occupations, education, income, businesses, village affairs and security. Is the individual specified as the person who should be solely responsible for his/her attainments, and are individuals free of obligations to others except, perhaps, one's own nuclear family? Or is the individual recognized as having responsibilities toward others--in the family, a wider network of kinspersons and affines, or the village--and any successes that accrue do so in a group context through the efforts of several persons?**

1. A person should strive to make himself/herself a success. Success is earned through individual effort (saving, delaying gratification, hard work).

2. A person should work hard to assist his/her family, save scarce resources to help his/her family in times of need and for future expectations, such as educations for one's children.
3. A person should work hard with whatever skills and resources he or she possesses to assist ones family, wider circle of kinspersons and affines, and the village. Giving and sharing take precedence over saving and assisting self or nuclear family to the exclusion of others.

K29. Ethics and significant symbols attached to environment.

1. The environment, or features of it (rivers, forests, coal seams, oil deposits, fish, sea mammals, etc.) are viewed as commodities, that is, items whose values are established in the marketplace and are available for purchase or sale.
2. Combination of commodity and spiritual views.
3. The environment, or features of it, are viewed as things endowed with spirits, or which possess special relations to natives and to which significant cultural symbols are attached (beauty, spirituality, helpfulness, traditions). The general environment is not conceptualized as a commodity. (Fish, ivory and other by-products may be sold, but what symbols are attached to those items?)

K30. Ethics of personal cooperation/com~etition.

1. A person should compete with others so as to do the best for one's self.
2. 1, 3 or 4 depending on circumstances.
3. A person should do the best one can in developing and employing skills. The fruits of some of those skills --such as hunting, fishing, and food preparation--should be shared widely throughout the family and beyond. Some other skills, such as net hanging or outboard motor repair, should be used for personal gain.
4. A person should develop and employ skills, work in cooperation with others, and share in a communitarian fashion (perhaps principally on the basis of presumed need) the products of those skills.

VII Enculturation

This question pursues the topic: how are children educated at home, traditionally (indulgent, quick to respond to requests, few formal demands, little badgering, traditional gender distinctions); in a Western fashion (directive, attach stipulations to requests, many formal demands, manipulation and encouragement for success, marked gender distinctions in treatment); or some combination of traditional and Western?

K31. Enculturation and gender distinctions.

1. Western enculturation and gender distinctions
2. Western and traditional practices are combined
3. Traditional enculturation practices and gender distinctions dominate

VIII Political and Economic Knowledge

In this set we want to learn whether informants correctly identify loci of ownership and control *over* economic projects, and loci of power over political decisions, and have reasonable knowledge (that is they are informed) and warranted expectation about the results of economic, social service and education programs, projects, and decisions that affect them.

K32. Expectations for economic developments in region or village.

If specific economic development projects, such as oil exploration, drilling, and pumping, are scheduled for the region in which the village is located, or if other projects are on-line, ask specifically about those projects. If not, use a hypothetical project, such as oil extraction, to gain a response to your query about native expectations.

1. **The chief benefits of the project will accrue locally (in jobs, income, royalties, profits and economic spin-offs), and control over the project will be exercised locally (within the region, say).**
2. **Local and distant (e.g., Anchorage, Seattle, New York) companies and persons will benefit about equally and control will be shared.**
3. **Local job benefits, but external control.**
4. **Chiefly external benefits and control.**

K33. Economic conflicts. Do natives perceive economic conflicts within their village or their region, and if so, who do they recognize as parties to the conflict (native corporations/non-native corporations/governmental units/native persons/non-native persons, or some combinations of the foregoing)?

Economic conflict, rather than political or 'cultural' conflict is chosen because money is a major concern in Alaskan villages--jobs, welfare and other transfers, economic development, and so forth. We choose here, then, to focus on this major concern, recognizing that there are other kinds of conflicts that can and do emerge in Native villages.

***On* the bases of 1988 and 1989 field research, it is evident that this protocol item poses a problem similar to those posed by K28-K30. It takes time, ethnographic research time, to ferret out appropriate classifications for this topic. I will appreciate a paragraph informing me how this variable was rated.**

It is evident from discussions with KIs following the 1989 field season that 'economic conflict' is an important variable. I don't want to create a new one (or several) until I get some information from you people, but here is how I see it. We wanted to know whether 'economic' conflicts occurred within villages. Those conflicts can be over public sector funds, public sector jobs, private sector developments and so forth. Because villages and regions have become dependent on transfers of various kinds, and because villages and regions are dominated by public sector-stimulated institutions, we wanted to know what goes on in villages and whether we can understand conflicts (predict them) from the contexts in which villages are embedded.

First we ask whether economic conflicts are perceived, yes or no. [K33AI

O. No
1. Yes

Then we might ask if they are personal, that is, between persons in the village. [K33B]

O. No
1. Yes

Then we might ask if they are between Native and non-Native persons. [K33C]

O. No
1. Yes

Then we might ask if they occur between Native profit and Native non-profit corporations. [K33D]

O. No
1. Yes

Then we might ask if they occur between Native corporations (either or both types) and city government. [K33E]

O. No
1. Yes

We could then ask if they occur between village and Native regional organizations. [K33F]

O. No
1. Yes

We could then ask if they occur between non-Native corporations (extra-local, national, multi-national) and Natives (lumping Native persons and Native village organizations). [K33G]

O. No
1. Yes

Finally we could ask if they occur between state and/or federal governments and local Native organizations. [K33H]

O. ***No***
1. Yes

From these dichotomous (yes/no) (+/-) variables I can create indexes from the responses and probably arrive at what I really want to know, i.e., whether and how economic conflicts are perceived, and who *or* what corporations, agencies, units, persons or governments are thought to trigger them.

K34. Schooling and success

1. **Natives perceive a strong association between formal schooling and success, if a person gets a formal education, success most often follows.**
2. **Occasionally success is associated with formal schooling.**
3. **No association** between schooling and success.

K35. Perceived objectives of helping service programs. **Here we are interested in knowing whether informants correctly understand the objectives of helping service programs, such as family counseling, health services, and the like. Choose two within the village and two within the region (but not in the village) and ask the informant the objectives of those programs.**

1. **Informant's perception is the same or equivalent to the actual goal of the program.**
2. **Goal incorrectly identified.**

K36. Perceived control of program. Of the helping services discussed in the previous question, ask the informant where control over that program is exercised.

1. **Control seen as local or regional**
2. **Control seen as external to the village and region**

IX Demography

K37. Residence pattern (ego). **Here we seek to know where the adult (ego) in the household was born and reared.**

1. **Adult in household was neither born nor reared in the village or region in which he/she currently resides.**
2. **Adult in household was born in the region, but not the same subregion in which he/she currently resides.**
3. **Adult in household was born or reared in the same subregion, but not the same village in which he/she currently resides.**
4. **Adult was born in the same village in which he/she resides.**

K37b. Residence pattern (spouse). Same attributes as in 37. Yet here we seek to learn about the informant's (ego's) spouse.

K38. Village size

1. **Very small (less than** 150)
2. Small (151 to 300)
3. Medium (301 to 500)
4. Large (501 to 800)
5. Very large (801 and ***over)***

X Social Service Utilization

K39. Social services used by informants.

1. **Avoid services available to informants in village and region.**
2. **Use health services**
3. **Use financial services**
4. **Use family and social services**
5. **Use health (2) and financial (3)**
6. **Use family and social and others.**

K40. Use of native healers

1. Native healers employed as necessary
2. Native healers are not used, even if available.
3. No native healers in village, not used.

K41. <u>Utilities in houses.</u> We wish to know whether among all utilities available in the village, any are present and working in the informant's household [electricity, gas, water, sewer, telephone (treated here as a utility)].

1. No utilities present and/or working.
2. **One utility present, working.**
3. **Two or more working, but not all.**
4. **AU utilities present, working.**

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