

The Quantification of Social Contacts and Resources

Cathy A. Donald, John E. Ware, Jr.

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PREFACE

This report was prepared for the U.S. Department of Health and Human Services as part of the Rand Health Insurance Experiment (HIE), which was designed to investigate the effects of different health care financing arrangements on the use of personal medical services, quality of care, health status, and satisfaction with care. It is the second of two Rand reports that focus on HIE measures of social well-being. The earlier report (R-1987/4-HEW) presented a review of the literature in an attempt to clarify how social well-being (then called social health) has been defined and measured by others and to identify major issues involved in developing and validating social well-being measures.

The present document describes empirical studies designed to yield a set of scoring rules for HIE questionnaire items measuring social contacts and social resources. Additionally, it examines relationships among these questionnaire items and evaluates multi-item measures of social well-being.

SUMMARY

This report presents the results from empirical tests of strategies for scoring social well-being items fielded by Rand's Health Insurance Experiment (HIE). These measures will be used in the HIE to test hypotheses about how health care financing mechanisms (different coinsurance and deductible rates, and prepaid versus fee-for-service care) affect health status over a three-to-five-year experimental period. They will also be used to test hypotheses about the relationship between social well-being and consumption of medical and mental health services, and about the health status consequences of individual differences in social contacts and resources.

Our analyses focused on several issues: (1) the meaning of social well-being and the conceptual distinction between this concept and the physical and mental dimensions of health status; (2) the most appropriate scoring rules for HIE social well-being items; (3) the appropriate level of aggregation for social well-being items; and (4) the status of social well-being in a model of health. Data for the analyses come from questionnaires that were self-administered at enrollment by 4603 participants (aged 14 and older), who lived in five study sites: Seattle, Washington; Fitchburg, Massachusetts; Franklin County, Massachusetts; Charleston, South Carolina; and Georgetown County, South Carolina.

Social well-being pertains to the social circumstances of the individual with regard to each of two dimensions: social contact or activity, and social ties or resources. The first dimension is

behavioral and the more objective of the two. It pertains to what the individual is doing and particularly to whether other persons are involved. The second dimension requires a more subjective approach to measurement; it pertains to the social resources, reserves, or ties that the individual can enjoy or rely on when needed. Social well-being is conceptually and empirically distinct from the physical and mental components of health status. The latter two components are conceptualized and measured in the HIE in terms of functional status, physiological status, and psychological manifestations of distress and well-being.

HIE health questionnaires include eleven items specifically fielded to measure social well-being. Both open-ended items and those with forced-choice response categories are represented. The items emphasize primarily the objective aspects of social contacts and resources, and include one subjective evaluation of the person's ability to get along with others. Each item was evaluated to determine the level of health and general well-being associated with each item response category. Three criterion measures (Current Health, Positive Well-Being, and Emotional Ties) were included in analyses of variance to determine the magnitude of differences (in quantitative terms) between the levels defined by item response categories. These criterion measures reflect health constructs which, from a theoretical point of view, should be significantly and positively related to social well-being.

Our results support the use of evaluations of personal relationships as criteria for determining scale values for levels of social contacts and resources. The results indicate that social well-being items should not be scored dichotomously. Responses at the low

end of the social well-being continuum are associated with significant increases in health and general well-being and should be quantified accordingly (i.e., differences in responses at the low end of the social well-being continuum should be acknowledged in the scoring system). The results are less clear with regard to the very high end of each scale continuum. In general, it appears that differences between very high social well-being scores are not linked to any of the criterion variables we studied. Thus, it appears that values at the extreme high end of the continuum can be collapsed without loss of information. These conclusions about the ordering of social well-being scale values seem robust across the three criterion variables and the five HIE sites studied. Hence, it is likely that standardized measures and scoring rules can be relied upon.

In addition to a scoring rule for each social item, these analyses produced a number of findings of general interest. All but one (frequency of letters written) of the eleven social items were significantly related to the three criterion variables. The relationship between each social item and Positive Well-Being was strongest, suggesting that social contacts and resources may be more predictive of differences in positive emotional states and of general views about life (e.g., life satisfaction) than of negative emotional states or general health status. The relationships between each social item and the three criterion variables were generally weaker than those between the same criterion variables and measures of physical or mental health. Thus, social contacts and resources do not appear to be as highly related to measures of physical and mental health and general health perceptions as these health status measures are to each other.

Once a scoring rule was finalized for each social item, the items were scored and used to evaluate aggregate measures of social well-being. Because correlations among social items were weak, there was the danger that combining them would not provide a good summary of the information they contain. To address this problem we imposed two criteria for constructing a multi-item measure. First, the measure should be internally consistent (i.e., items combined into a multi-item scale should be conceptually and empirically related). Second, items that are aggregated should be externally consistent (i.e., aggregated items should have roughly the same relationships with external variables).

Criteria associated with the summated ratings method were used to test the internal consistency of item groupings and the discriminant validity of each item in relation to scales defined by simple summated ratings. These criteria were satisfied for five of the HIE social items, which were subsequently combined into two multi-item measures: Social Contacts and Group Participation. An overall summary index using nine of the social items was also scored. Because items used to compute each multi-item measure had different variances, items were standardized before being summed. In addition, five items not included in the Social Contacts or Group Participation scales were scored for separate analysis. These items were also standardized; they include number of neighborhood acquaintances, number of close friends and relatives, telephone contacts, the rating of getting along with others, and attendance at religious services.

Although we found some weak support for construction of an overall summary index, we also encountered evidence about the external consistency of social items which suggests that measures of social contacts perform differently than measures of social resources. Specifically, measures of social resources predict mental health better than do measures of social contacts. Further, these dimensions of social well-being seem to have opposite relationships with age, sex, race, education, and family income. As would be expected when variables having opposite relationships (with external variables) are combined into a multi-item measure, important relationships can be missed completely. This emphasizes the danger of aggregating social well-being variables into an overall summary index without first testing each part of the index.

An additional statistical issue surfaced during our analyses of HIE social well-being measures. We found that group differences in social well-being, while substantial in magnitude, may be complicated by noteworthy nonlinear effects and interactions. Thus, it is not safe to assume simple additive linear effects of sociodemographic variables on measures of social well-being.

All the HIE social well-being measures yielded scores with adequate variability sufficient for HIE hypotheses testing. Studies of reliability for the single-item social well-being measures were problematic because data from repeated administrations over a short time interval were not available. A number of coefficients that probably underestimate the reliability of social items were evaluated. We concluded that group participation was measured reliably and that this

behavior is stable over time, as is attendance at religious services. The remaining social items (except for "getting along") are substantially stable over one-year intervals. The HIE rating of "getting along" performed relatively poorly in these evaluations and may be either unreliable or a reliable measure of an unstable and conceptually distinct social well-being construct.

Studies of reliability for the multi-item measures based on the internal-consistency approach yielded coefficients for all three scales that ranged from 0.66 to 0.86. The Group Participation scale was most homogeneous, while the Social Well-Being Index was least homogeneous. All three multi-item measures were substantially stable over one-year intervals.

The validity of the HIE social well-being measures was evaluated in terms of both manifest content (i.e., face validity) and in relation to the content of published measures (i.e., content validity). These evaluations suggested that the HIE social well-being items are fairly comprehensive and represent those fielded in published studies. Empirical evaluations of construct validity suggested that HIE social well-being measures are distinct from other dimensions of health (e.g., mental health, role functioning) and are significantly and positively related to one another, as would be expected if they measure an underlying social well-being dimension. Although the tendency to respond in a socially desirable manner (SDRS) is correlated with our social well-being measures, analyses indicated that SDRS does not explain the relationship between social well-being and measures of health and general well-being. Nor does it seem to bias estimates of the magnitude of differences between subgroups of the population.

Finally, we suggest that the best model of health may be one that defines individual health status in terms of the physiologic, physical, and mental status of the individual. The concept of social well-being extends measurement beyond the individual to focus on the quantity and quality of social contacts and social resources. We prefer a model of health status that defines these social factors as external to an individual's health. The generally weak relationships between measures of general health and social well-being support this position. The effects of social well-being on personal assessments of health status may be explained by their effects on mental and physical health.

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I. INTRODUCTION

Social well-being has been most frequently measured in terms of the quantity of social activities and the quality of personal social resources. A basic issue underlying the construction of valid social well-being measures is the extent to which differences in reported quantities of social activities and the quality of personal social resources imply differences in health and well-being. This issue is important in translating measures of social contacts, activities, and resources into a measure of social well-being. Little attention has been paid to this issue. Indeed, previous investigators have often assumed that more activity is synonymous with better social well-being. They have frequently collapsed precoded questionnaire responses by assigning a priori the same value to scores within specified ranges. But we shall show that collapsing scores loses useful information in some cases. We shall also show that, in some cases, differences in item responses indicate little or no real difference in a person's social well-being.

We have sought to develop general population measures of social well-being that fulfill a number of criteria. First, measures should be comprehensive with respect to the major dimensions of social well-being about which there is conceptual agreement. Second, questionnaire items should represent state-of-the-art measurement strategies. Third, measures should be defined to contribute unique information about some aspect of social well-being and should be optimally scored to reduce the number of variables as much as possible without substantial loss of

information. Fourth, resulting score distributions should have sufficient variability to be useful in detecting differences in a general population of adults. Fifth, scores should be reliable (i.e., sufficiently free of error for purposes of the intended analysis). Finally, measures should be applicable to general populations.

Although social well-being constructs have received a great deal of attention, there has been little consensus on how they should be measured. Few measures have been shown to satisfy the criteria outlined above. Measurement of the social well-being of individuals has most often concentrated on their contacts and resources in four social role areas: family and home, social life and friendships, community, and work (see Donald et al., 1978). Multi-item measures have focused both on specific aspects of social interaction or participation within these role areas and on more global indices that measure behavior across role areas. Both subjective and objective constructs have been included. Yet little attention has been paid to several important conceptual issues underlying the aggregation of questionnaire items to operationalize social well-being constructs.

Investigators rarely address whether measures should concentrate on behaviors in specific role areas or whether a comprehensive index can be constructed that combines items from all role areas. They often overlook whether subjective data (e.g., a rating of how well one gets along with others) should be combined with more objective data (e.g., a count of the number of friends and relatives). Finally, they are silent about whether equal weights should be assigned to items that make up a score, and if not, how weights should be determined.

A major purpose of this report is to document how social well-being measures were scored so that they can be understood by those reviewing results. To achieve this purpose, this report addresses the issue of optimal scoring of questionnaire response categories, addresses the concerns outlined above, and presents empirical tests designed to clarify these issues. It presents empirical studies designed to determine the most appropriate scoring rules for eleven social well-being items fielded in Rand's Health Insurance Experiment (HIE). These items focus on social contacts and social resources. Specifically, we sought to develop a scoring rule for each item that would rank persons on a continuum of health and social well-being. In addition, we imposed the following constraints: (1) Item scores must be ordinaly consistent across multiple definitions of health and general well-being, and (2) item scores must be consistent across HIE study sites. It was hypothesized that optimal scoring of social well-being measures would reflect increases in health and general well-being for each succeeding level of social well-being.

We reached several conclusions. All but one of the eleven social well-being items were significantly related to other measures of health and general well-being, which served as "criterion" variables in the analysis. The relationship between social well-being and the criterion variable Positive Well-Being was strongest, suggesting that social well-being may be more predictive of general views about life (e.g., life satisfaction) than of health status in particular. Analyses found that small differences in responses at the low end of the social continuum are associated with significant increases in health and general well-

being and should be quantified accordingly, as opposed to collapsing these responses into a single category or level. Analyses also indicated that small differences in responses at high levels of social well-being are not, in some instances, associated with additional increases in health or general well-being (e.g., visits with friends and relatives more than once a week). Thus, some collapsing of questionnaire responses at the extreme high end of the scale appears warranted.

Empirical tests were also conducted to derive reliable and valid measures of social well-being suitable for use in testing HIE hypotheses. As a result of these analyses, eight standardized social well-being variables were derived: two multi-item subscales (Social Contacts, Group Participation), a summary multi-item index (Overall Index), and five single-item measures of neighborhood acquaintances, number of close friends and relatives, telephone contacts, ability to get along with others, and attendance at religious services. For the two multi-item subscales, items pertaining to specific types of behavior (e.g., visitations with others and to homes of others) appeared to be highly interrelated. This was contrary to measures in studies by others that grouped items according to role areas. The one subjective item (ability to get along with others) appeared to stand alone and therefore was not included in the multi-item measures. Although correlations among the social well-being items were weak, empirical analyses provided some support for the construction of an overall index based on all but one social item.

Measures of social contacts seem to have opposite relationships with selected demographic variables from those of measures of social

resources. For this reason, important relationships can be missed or misspecified if the summary index is used. Those scoring social well-being measures should be aware of the dangers involved in aggregating social items into a summary index without first testing hypotheses using each part of the index.

Section II of this report presents background material, a conceptual framework for social well-being measurement, an outline of measurement issues and strategies involved in quantifying questionnaire responses, and a summary of how other investigators have constructed social well-being measures. Section III describes our methodology. Sections IV and V present results of empirical analyses, recommend a scoring rule for each of the eleven HIE social well-being items, and describe the results of scaling analyses including descriptive statistics, interrelationships among measures, the reliability of resulting scores, associations between social well-being measures and selected sociodemographic and health variables, and effects of socially desirable responding on social well-being measures. Section VI discusses our findings and offers suggestions for future research based on our experiences with HIE measures.

II. BACKGROUND

CONCEPTUAL FRAMEWORK FOR MEASURING SOCIAL WELL-BEING

Social well-being is measured at enrollment and annually thereafter in the Health Insurance Experiment (HIE). Its measurement will permit more precise testing of hypotheses regarding the effects of differences in coinsurance and deductibles in a comprehensive health insurance benefits package on the use of medical care services, as well as the effect of varying policies on individual health status. We initially conceptualized social well-being as a distinct component of individual health status along with physical and mental components (Ware et al., 1980b). More recently, we have decided that social well-being is best considered external but related to an individual's health status. We now restrict our definition of personal health to its physical and mental components, and to methods that do not directly measure other people or factors outside the individual. By contrast, the concept of social well-being extends measurement beyond the individual to include both the quantity and quality of social contacts and social resources. A model of health status that defines these social factors as external to an individual's health status explains empirical results better than one that includes social factors as an integral component of individual health. Thus, our model does not define personal health status in terms of social circumstances. Instead, it shows that social circumstances may directly affect health status.

Social well-being has been operationally defined in the HIE in terms of interpersonal interactions (e.g., visits with friends) and

activities indicative of social participation (e.g., membership in clubs). This definition is distinct from that of mental health, which is conceptualized and measured in the HIE in terms of psychological manifestations focusing on psychological symptoms of mood and anxiety disorders. It is also distinct from physical health, which is conceptualized and measured in terms of functional status (e.g., the performance or capacity to perform physical activities that are normal for individuals in good health) and in terms of physiological health status.

Social contacts and resources have been measured in many different ways (see Donald et al., 1978). In terms of their content, they can be divided into two distinct dimensions: social contact or activity and social ties or resources. The first dimension is behavioral and the more objective of the two. It pertains to what the individual is doing, and particularly the extent to which other persons are involved. Because measures of this dimension focus on the occurrence of social events without respect to how these events are perceived, both desirable and undesirable events and contacts might be included. Included are social activities and contacts that are initiated by the individual and those that are directed toward the individual by others. An example of a measure of this first dimension would be a count of the frequency of contacts with friends and relatives during a specified time interval. To the extent that someone initiates contacts with others and is contacted by others, that person would score high on this first social well-being dimension.

The second dimension (e.g., the social resources, reserves, or ties the individual can enjoy or rely on when needed) is not behavioral and

is more subjective than the first because it cannot be directly observed by others. An example of this dimension would be a personal evaluation of the adequacy of interpersonal relationships or of how well one is presently getting along with others. To the extent that resources are evaluated favorably, the individual would score high on this second dimension of social well-being. Measures have been used in the literature to define both social contacts and resources, either as single-item measures or as multi-item scales.

In addition, within each of the two dimensions, social contacts and resources have been measured in four major role areas: family and home, social life, community involvement, and work (or other role if not employed). Measures most commonly used to define social contacts and resources pertain to number of contacts and activities with family and friends and participation in group activities. They focus on interactions within specific role areas as well as behavior evident across roles.

Multi-item measures of social well-being fielded thus far frequently contain some items that are not applicable to all individuals in the population. As a result, these measures present an analytical problem because of missing data and poor measurement standardization. For example, measures containing items related to work performance cannot be computed for individuals out of the work force, such as retired persons or students (e.g., Renne, 1974, and Dohrenwend, Dohrenwend, and Cook, 1973). For policy research in general populations, it seems important to define categories of social well-being so that scores can be estimated for everyone likely to be affected by the policy. Restrictions in the applicability of social well-being scores limit the usefulness of many published measures.

CRITERIA FOR SELECTION OF HIE MEASURES

Social well-being measures will be used in the HIE to test two kinds of hypotheses. First, we will test for any effects of health care financing on social contacts and resources, i.e., we will treat measures of social well-being as dependent measures. Second, we will test for interactions between the social variables and health care financing in relation to medical care consumption and physical and mental health status. To ensure that HIE measures of social well-being would be most useful to test these hypotheses, the measures had to meet the following criteria:

1. Consistency with contemporary conceptualizations of social well-being.
2. Conformity with the state-of-the-art of measurement as defined in the literature.
3. Combination in such a way that the number of variables (or scores) used to define social well-being is reduced as much as possible without substantial loss of information.
4. Sufficient variability in score distributions for each social well-being measure so that they are useful in detecting actual differences in social well-being in a general population of adults for whom repeated measures are available (i.e., should have sufficient power for purposes of testing hypotheses about differences in social well-being as a function of differences in health insurance plans).

5. Substantial freedom from error (i.e., as much reliability as necessary) to allow confident estimation of average levels of social well-being within groups and comparison between plans.
6. Replicability of scaling decisions across sites.

MEASUREMENT ISSUES

Item Scaling

Before survey responses to questionnaire items can be studied in relation to each other or in relation to other variables, numbers or labels must be assigned to the responses to reflect the underlying levels or categories of the variable being measured. For example, our item asking about the number of close friends and relatives generated a wide range of numeric responses (from 0 to 99) that may reflect a person's social circumstance or general well-being. The numbers assigned to these responses reflect one's assumptions regarding how they relate to the underlying construct of interest (e.g., social resources). If we were to plot the relationship between responses to the item and the magnitude of the underlying construct, a number of characteristics of the resulting curve would be important.

First, in this example, we would expect the slope of the curve to be positive (i.e., that increasing numbers of friends is associated with better health and general well-being). This expectation is based on published studies showing a positive relationship between social resources and health and well-being. Although the causal nature of this relationship is still open to question, it appears that social contacts and resources do have a direct beneficial effect on health. Hence, the

direction of scoring for the great majority of social well-being items is not an issue. It has been shown, on average, that having friends is better than not having friends, and participating in community activities is better than not participating (Donald et al., 1978).

Second, although the direction of scoring is not an issue, the magnitude of differences (in quantitative terms) between the levels defined by item responses has not been thoroughly studied. It may be that ranked responses to an item about number of friends indicate different levels of social resources up to some point at which increases diminish. For example, there may be a sharp increase in social resources as one goes from having no friends to having one friend, with additional increases for two, three, four, or five friends. After five friends, the rate of increase in social resources, health, or general well-being may start to diminish and even level off to the extent that further increases in friends are not indicative of better status or prognosis. It is important then to determine, for each questionnaire item, the curve that defines the relationship between item responses and the construct being measured by the item.

Third, an important consideration in this determination is the degree to which the relationship between the item and the underlying construct is monotonic. A monotonic relationship is evident, for example, when an increase in number of friends never indicates a diminished quantity of social resources. We hypothesized only monotonic relationships for HIE measures of social contacts and resources, i.e., we did not expect to find instances where more activity defined poorer social circumstances.

For purposes of illustration, Fig. 1 shows several hypothetical plots of responses for one HIE item asking about the number of close friends and relatives. Each plot assumes a different relationship between item responses and social resources. In the first case (curve A), differences in responses at the low end of the item score range (0 to 4 friends) reflect increases in a person's social resources; after 4 friends and relatives they do not. This curve suggests that different quantities should be assigned to response categories 1 through 4, while response categories of 5 and larger should all be scored the same as 4.

Curve B of Fig. 1 suggests smaller differences in social resources for different numbers of friends at the low end of the range. Curve B also suggests that increases in the number of friends indicate increases in resources up to a response of 10 friends, and thus that different numbers should be assigned to response categories 1 through 10.

Curve C illustrates a completely different relationship; it suggests that differences in responses at the low end of the range have little or no importance to a person's social resources, but that increases in numbers of close friends beyond 5 reflect increases in resources (i.e., a kind of threshold effect). This type of curve suggests that response categories 1 through 5 should be coded the same, while increasing values should be assigned to response categories 6 and larger.

Numbers assigned to response categories for questionnaire items measuring social contacts and resources may reflect any one of the patterns illustrated in Fig. 1. Of course, these are merely examples; a variety of other patterns are possible. It is important to determine

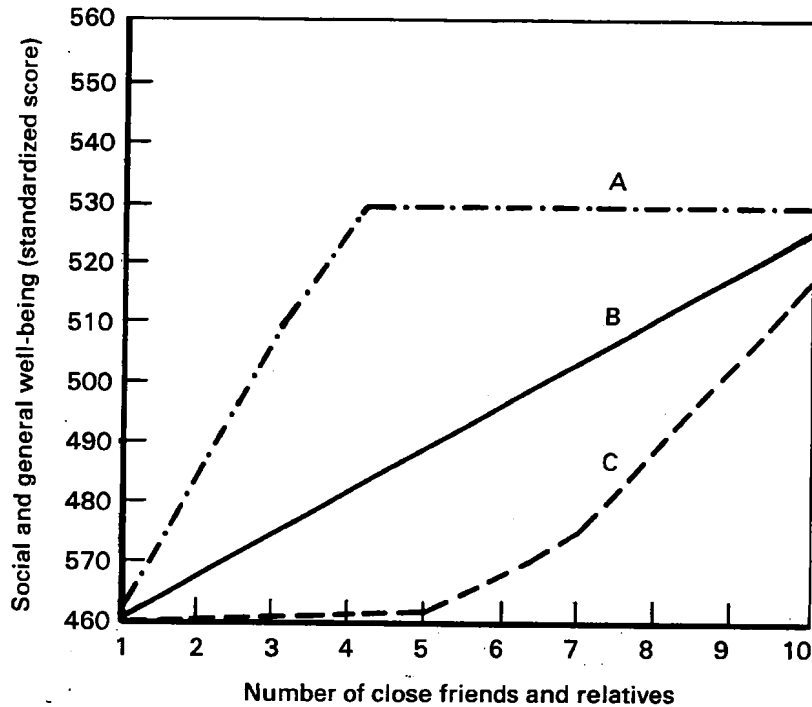


Fig. 1 -- Hypothetical plots of relations between close friends and relatives item and social well-being score

the true nature of the underlying pattern for each item so that the numbers assigned to questionnaire responses place persons appropriately along the continuum of the construct assessed by the item. To assign values to response categories, several problems must be overcome. The point at which different item responses no longer reflect real differences must be determined, as well as how finely differences in responses can be scored (e.g., is there a basis for many distinctions or should the scale be more coarse?).

Item Scaling Strategies

It is standard practice to assign codes to survey responses in advance to facilitate computerized data processing. The use of these preexisting code values for data analysis, however, is unjustified and may distort the underlying health construct assessed by the item. In the case of continuous variables with a large number of response choices (e.g., the HIE question about number of friends), inappropriate category coding (i.e., treating all values within some defined interval as identical) will introduce "noise" with the effect of compromising the validity of the measure. If a continuous scale must be made discrete, values should be assigned to item response categories so as to minimize distortions in quantities of the underlying variable being measured.

Several strategies have been or can be used by investigators to quantify survey responses to define different levels of social contacts and resources: (1) those that base scoring rules on the investigator's own judgment, (2) those that base scoring rules on empirical studies of judgments by others, and (3) those that base scoring rules on empirical studies in which item responses are evaluated in relation to measures of other relevant variables (i.e., the criterion approach).

Investigator Judgment. In the first strategy, which has been used most often, investigators seem to have imposed a social norm as a basis for enumerating different responses to their measures (e.g., Renne, 1974; Greenblatt, 1975; Phillips, 1967; Horowitz, 1977; Meier and Bell, 1959; Hyman and Wright, 1971; Kasarda and Janowitz, 1974). Although the resulting definitions seem logical, at least in part, in view of certain assumptions (e.g., that having more friends is better), the absence of

any empirical support for this assumption makes suspect the validity of the resulting scale. In practice, investigators who used this approach often assigned the same value to scores within specified ranges (e.g., five or more friends was assigned a score of five). This practice assumes that differences between responses within the category have no value. They also generally ignored the size (magnitude) of the interval between adjacent levels. For example, having five or more friends was said to be as much of an improvement over having four as having four friends was over three.

It seems unlikely that investigators using this strategy have enough information upon which to base judgments (see Donald et al., 1978). Empirical tests are needed to confirm published coding rules based on this approach.

Empirical Analysis of Judgments. A second strategy is to analyze judgments by others to determine the degree of consensus. Although we were unable to find any examples of this method in the literature on social contacts and resources, this practice would appear to be some improvement over the first strategy because it would at least use opinions by a variety of judges to make decisions about appropriate item scoring. However, the truth of the combined judgments would still be in doubt.

Several studies (e.g., Andrews, Schonell, and Tennant, 1977; Bergner et al., 1976; Linn et al., 1969) employed multiple judges to determine weights for social items rather than to assign item response codes. These kinds of studies are often confused with those relevant to the issue we are raising here, namely, the issue of determining scale values for each item or measure. They are not relevant to this issue,

but they are relevant to the issue of combining items or scales into more aggregate measures.

Criterion Approach. Another approach is to use empirical comparisons between responses to questionnaire items and measures of other relevant variables. In this approach, the investigator looks beyond the item in question for information about its relationship to the variable the item should measure, a variable it would be used to predict, or some other relevant variable. As discussed by Hensler and Stipak (1979), a criterion variable can be a previously validated measure of the underlying construct or a variable that is causally linked to it. For example, measures of mental health have been shown to be significantly related to items measuring social activities (Donald et al., 1978). Thus, it may be possible to estimate values for social item responses from their association with mental health. In order to place confidence in estimated values, the relationship between the social items and the criterion variables should be significant (in the direction hypothesized) and substantial.

To use this approach, one must decide whether to measure the criterion variables before, after, or at the same time as the social well-being items. If social contacts and resources produce differences in the criterion variable (e.g., mental health), the relationship between the two should be studied using concurrent or subsequent measures of criterion variables. If the criterion variable causes changes in social contacts and resources (e.g., physical mobility limitations limit certain kinds of social contacts), the criterion variable should be measured at a point in time prior to the items being studied.

An example of the criterion approach to quantifying levels of social items is the study of friendships and psychological risks published by Langner and Michael (1963). They reported the relative risk of poor mental health for various categories of social contacts and resources. Mental health was assessed by means of a 22-item screening score, which measured a variety of physical, psychological, and psychosomatic complaints. They reported that having no friends involved considerably greater risk of poor mental health (as defined by the screening score) than having two to fifteen or more friends. Beyond four close friends, they found no decrease in the risk of poor mental health. Persons friendly with no neighbors, or one, or two, or three were close to the average on mental health risk, while persons friendly with ten or more neighbors were significantly healthier than the rest of the sample. For number of organizations attended, the largest difference in mental health screening scores was observed between those who mentioned no organizational activity and those who were involved with one or more organizations. Additional decreases in psychiatric impairment were observed for those belonging to three or more organizations over those belonging to one or two organizations.

We favor the criterion approach over our own guesswork or that by a sample of judges. Judgments are hypothetical and studies that have used them cannot deal adequately with their validity or generalizability. On the other hand, the criterion approach is not hypothetical and bases scoring rules on observations from the population of interest.

However, the criterion approach has crucial assumptions that may lead to difficulties in actual practice. First, and most obviously,

criterion variables must exist and be available. To our knowledge, there are no generally agreed-upon criterion variables. Second, given that criterion variables for social contacts and resources exist, our theory about how social contacts and resources relate to each criterion must be adequate to evaluate various scoring options and measurement validity.

As we will discuss in the methods section, there is nonetheless a strong rationale for our use of the criterion approach. We can employ both cross-sectional and longitudinal measures of variables which, in theory, should be related to social contacts and resources. The actual measures we chose are a good representation of the important constructs specified by theory, at least for directional hypotheses about the ordering of levels of social contacts and resources. However, until other criterion variables are studied, it is best to be tentative about the scoring options we employ.

CONSTRUCTION OF SOCIAL WELL-BEING MEASURES

Once specific social items have been scaled so as to reflect differences in levels of social well-being, one must address the appropriateness of aggregating items into more comprehensive measures. Two basic assumptions underlie the construction of multi-item measures. The first is theoretical. It posits that items to be combined should measure similar constructs (in this case, constructs that define social well-being). The second is empirical. All items used to construct a measure should share common variance (i.e., internal consistency) and should exhibit the same patterns of relationships with external variables (i.e., external consistency).

A variety of techniques have been used by other investigators who have developed multi-item social well-being scales. This section summarizes these techniques and identifies major issues considered when constructing HIE measures of social well-being. A more detailed review of the literature is presented in Donald et al., 1978. The following paragraphs summarize major findings from that report.

How Multi-Item Measures Have Been Constructed

One must address two important issues when constructing scales that measure specific aspects of social well-being as well as when constructing overall indexes (that involve aggregation of measures from two or more major social role areas). These issues are (1) what should be included in the scale or index, and (2) whether equal weights should be assigned to items that make up the score, and, if not, how weights should be determined.

Although many investigators have attempted to aggregate social well-being items into multi-item scales or overall indices that aggregate scales, they have often ignored these issues. Content analyses of published measures revealed a high degree of overlap between the content of measures of social well-being and physical and mental health status. This overlap may be due, in part, to the absence of a complete and explicit conceptual framework and a lack of empirical studies that should underlie the building of reliable and valid scales.

The issue of weighting has also rarely been addressed. Some investigators have simply summed item and scale scores to score an index, ignoring differences in score variability that determine the contribution of each part to the total score (e.g., Katz and Lysterly,

1963; Dinitz et al., 1961; and Lin et al., 1979). Others have assigned different weights (often based on the opinions and values of the investigators or judges) to the component parts before computing a score without reporting studies of the validity of the weighting schemes (e.g., Barrabee, Barrabee, and Finesinger, 1955; Andrews, Schonell, and Tennant, 1977; Renne, 1974; Bergner et al., 1976; and Hay, 1948). Still others have constructed cumulative scales, i.e., Guttman scales (e.g., Key, 1968); a few have standardized item scores before summing them, thereby equating the contribution of each part (e.g., Andrews et al., 1978, and Fischer, 1973). These latter practices have been rarely used. Overall, the validity of each method of aggregation is open to question.

Reliability and Validity of Multi-Item Scales

Few investigators routinely report tests of the reliability of their social well-being measures. Those who do find reliability moderate to high, suggesting sufficient reliability for purposes of group comparisons (e.g., Linn et al., 1969; Dohrenwend, Dohrenwend, and Cook, 1973; Gurland et al., 1972; Lin et al., 1979; Ciarlo and Reihman, 1974; and Fischer, 1973). When both internal-consistency and test-retest coefficients have been reported for the same measure, test-retest coefficients are often substantially higher, suggesting that loss of information due to item heterogeneity is a major problem faced in aggregation of social well-being items and scales (e.g., Ellsworth et al., 1968, and Gilson et al., 1975). It should be noted that published reliability estimates are also moderate to high for single-item social well-being constructs, suggesting that single-item measures of social well-being may be sufficiently reliable for group comparisons.

Few investigators empirically studied which constructs their social well-being measures assess, although many reported information relevant to this type of validity. In general, interrelationships among social well-being measures indicate weak but positive associations among social well-being constructs. Evidence suggests that social well-being constructs are heterogeneous and much less strongly interrelated than either the physical or mental health constructs.

Empirical studies of associations among social measures and physical and mental health measures support distinguishing social well-being from other components of health status. This distinction was less clear, however, when subjective ratings of social well-being were included. Significant associations between subjective ratings of social well-being and mental health measures indicate that perceived social well-being overlaps substantially with mental health. An important unresolved issue is the extent to which subjective and objective measures of social well-being differ in validity. A major challenge for investigators in this field is to develop valid measures of the qualitative aspects of social well-being that are distinct from measures of mental health.

GOALS OF THIS REPORT

This report presents results of empirical studies using criterion measures to determine how to scale survey responses to best indicate different levels of social well-being. For eleven questionnaire items constructed to measure social well-being, the goal was to determine the points at which persons differ meaningfully in terms of social contacts and resources. An important consideration was the point at which any

further increase in contacts and resources is of no value to a person's health and general well-being. In addition, within a group of non-institutionalized people, we considered how the precise differences in level of social well-being could be measured.

Once scoring rules for specific social items were developed, the revised items were used to study the interrelationships among items and the appropriateness of constructing aggregate measures of social well-being. Empirical studies relevant to these issues are presented in the following sections.

III. METHODS

DATA-GATHERING AND SAMPLE CHARACTERISTICS

Data were gathered using a questionnaire that was self-administered at the time of enrollment into the HIE. Data reported here are based on 4603 people between the ages of 14 and 66, from five of the six HIE sites.[1] In addition, retest data were gathered on 4592 people using the same battery of items administered approximately 12 months later.[2] Response rates were high at both administrations of the questionnaire. At enrollment, response rates ranged across sites from 90.1% in Georgetown County to 99.6% in Seattle (median = 99.3%). One year later, response rates across sites ranged from 88% in Seattle to 98% in Georgetown County (median = 93%). For analytic purposes, the two rural and urban sites in Massachusetts and in South Carolina were combined. Thus, in this report reference will be made to only three sites (Seattle, Washington; Fitchburg/Franklin County, Massachusetts; and Charleston/Georgetown County, South Carolina).

A summary of respondent characteristics for enrollees at each of the sites is presented in Table 1. The sites differed (intentionally) from the populations in those areas because eligibility for participation in the HIE was restricted to families with a head of household age 61 or under and with an annual family income of \$25,000 or less (in 1973 dollars); families with an income less than one-and-one-

[1] The Dayton, Ohio HIE site was excluded because items measuring social contacts and resources were not fielded at enrollment.

[2] Retest data for the sixth site, Dayton, Ohio, were included for respondents who completed the Social Activities Battery on the First and Second Annual Health Questionnaires.

Table 1

SUMMARY OF INFORMATION ABOUT FOUR HEALTH INSURANCE EXPERIMENT SAMPLES

Sample	Sex ^a			Race		Age ^b		Number of School Years Completed			Family Income (\$)		Year for Which Reported
	N	% Male	% Female	Nonwhite	%	Range	Mean	Range	Mean	Range	Mean		
Seattle, Washington	2235	47	53	6		14-61	31.8	2-25	12.9	0-27,640	13,251	1974	
Fitchburg/Franklin County, Massachusetts	1068	46	54	2		14-66	32.5	2-22	12.4	0-27,400	12,216	1974	
Charleston/Georgetown County, South Carolina	1300	44	56	45		14-59	31.0	0-27	11.3	0-30,200	11,036	1975	
Dayton, Ohio ^c	373	46	54	10		14-64	35.8	3-24	12.6	0-55,893	14,380	1976	
All sites combined	4976	46	54	16		14-66	32.0	0-27	12.4	0-55,893	12,535	1974-76	

^aMissing values did not enter the numerator or denominator in calculating percentages.

^bPeople over 61 who were eligible families were enrolled but are not themselves eligible for insurance benefits. Although data were collected on these people, they will not be included in experimental analyses.

^cThis sample was analyzed only in the test-retest study.

half the poverty line were oversampled in Massachusetts and South Carolina. (Specifically, they had a $4/3$ greater chance of being in the sample.) Excluded were people in institutions, military personnel, and people who were receiving care for service-connected disabilities in Veterans Administration hospitals.

ITEM DESCRIPTION

Eleven items in the Social Activities Battery of the HIE enrollment and annual questionnaires define social well-being in terms of social participation, interpersonal interaction, and social resources (see App. B for questionnaire items). They focus on the number or frequency of several kinds of participation, interaction, and resources.

The HIE Social Activities Battery does not include items related to the work area of social performance or items that do not necessarily involve interaction with others, such as attending sporting events. While it would be possible to evaluate a more comprehensive battery of social well-being items using data from other HIE batteries (i.e., the HIE functional limitations and physical abilities batteries) and information about naturally occurring sources of social support (e.g., marriage, job status, employment history), the relatively lower priority placed on the measurement of social well-being in the HIE limits present analyses to the eleven items specifically constructed to measure social well-being.

Two kinds of item structure are represented, including those with forced-choice response categories and open-ended items. Table 2 summarizes the content of HIE social items, number of response choices, and definitions of high and low scores. These items can be categorized into two content dimensions: (1) those that define social resources

Table 2

HIE SOCIAL ITEMS

Abbreviated Item Content	Number of Response Choices	Definition of Scores	
		Low	High
Number of neighborhood family acquaintances	26	No family acquaintances in neighborhood	99 or more acquaintances
Number of close friends/relatives	38	No friends/relatives	99 or more close friends/relatives
Visits with friends/relatives	7	Visit less than 5 times a year with friends	Visit every day with friends
Home visits by friends	6	No visits at all by friends in past month	Visits by friends every day
Visits to homes of friends	6	No visits at all to others' homes past month	Visits to others' homes every day
Telephone contacts	6	No calls to friends/relatives in past month	Talk to friends or relatives every day
Letters written	6	No letters written in past month	Write letters to friends or relatives every day
Getting along with others	3	Get along worse than usual	Get along with others better than usual
Attendance at religious services	6	No attendance at religious services past month	Attend religious services every day
Voluntary group membership	13	No memberships in groups or clubs	Belong to 50 groups or clubs
Level of group activity	4	Does not belong to groups or clubs	Very active in group affairs

(e.g., neighborhood family acquaintances, number of close friends, getting along with others, and voluntary group membership) and (b) those that define social contacts (e.g., the three "visits" items, telephone contacts, letters written, attendance at religious services, and level of group activity). The resource dimension pertains to the social resources, reserves, or ties the individual can enjoy or rely on when needed. It requires a more subjective approach to measurement, i.e., it cannot be directly observed by others and depends on subjective ratings. The contacts dimension references behavior and is theoretically more objective, although it still relies on respondents' self-reports. It pertains to what the individual is doing and particularly to whether other persons are involved. Included are social activities that are initiated by the individual and those that are directed toward the individual by others.

These eleven items were adapted from measures used by Myers et al. (1972) and Myers, Lindenthal, and Pepper (1975) in their studies of social activity, life events, and mental status, and by Dohrenwend, Dohrenwend, and Cook (1973) in their studies of role functioning of psychiatric patients.

CRITERION APPROACH

The criterion approach was used to estimate the level of social well-being associated with each response for each HIE social item. This was accomplished by statistically treating responses to each social item as categories of an independent variable, as in the case of a one-way analysis of variance (ANOVA) for each social item and criterion (dependent) measure. Persons giving the same social item response were

placed in the same independent variable category. The groups formed by categories were then compared in terms of selected criterion variables. Group criterion variable means were used to evaluate the order of the category groups.

In using this approach, we imposed three conditions:

1. Item response categories must rank order groups on a continuum of social and general well-being (i.e., define an ordinal scale with respect to the criterion variables),
2. Decisions regarding values assigned to response categories for each item must be consistent across criterion variables (i.e., values assigned to response categories must be ordinally consistent across criterion variables), and
3. Values assigned to item response categories must be ordinally consistent across HIE sites (i.e., scoring algorithms must generalize across populations).

OPERATIONAL DEFINITIONS OF CRITERION VARIABLES

Our conceptual model of health status does not include social well-being as a major component of individual health and well-being. Instead, health is defined in terms of the physiological, physical, and mental status of the individual. Social well-being is seen more as a health-related variable than as a unique dimension of personal health status. Modeling studies indicate that people do not consider information about their social contacts and resources over and above the information they have about their physical and mental health in evaluating general health (Ware, Brook, and Davies-Avery, 1980; Manning,

Newhouse, and Ware, 1981; Ware, Davies, and Brook, forthcoming; Ware et al., 1980; Rose, 1980). The effects of social well-being on personal assessments of health appear to be indirect through mental health. Our reviews of published literature (Donald et al., 1978; Ware et al., 1980) show that social well-being has positive effects on physical, mental health, general health ratings and the quality of life (i.e., life satisfaction). Thus, in theory, a variety of measures that reflect the different dimensions of health and quality of life are appropriate criterion variables for purposes of determining appropriate scoring rules for levels of social contacts and resources.

Table 3 shows fourteen measures of health and general well-being initially considered as criterion variables for use in the study of HIE social items. Each measure reflects one of the dimensions of health considered positively related to social well-being. Decisions regarding values assigned to social response categories should be consistent across these fourteen measures.

Multiple measures of health and life satisfaction were deemed essential to ensure that scores assigned to social levels would be valid for a wide range of purposes. Other investigators concerned with the scoring of levels of social well-being for special kinds of prediction (e.g., to predict changes in a respondent's mental health) may have relied entirely on mental health criterion variables. For HIE purposes, our aim was to score levels of social well-being in a manner consistent with relationships between social and multiple measures of health and life satisfaction.

Three multiple measures of health and life satisfaction were chosen as criterion variables for the intended analyses:

Table 3

DEFINITION OF CRITERION VARIABLES

Variable and Health Dimension	No. of Items	Range of Possible Scores		Reliability Estimates ^a	Meaning of a High Score
		Low	High		
<i>General health</i>					
Current health	9	9	45	.88	Ratings of good current health
Health outlook	4	4	20	.73	Expectation of good health in the future
Health worry/concern	4	4	20	.61	Ratings of worry or concern about health
Health perceptions index	22	22	110	.89	Ratings of good current and prior health, resistance to illness, freedom from health worry, and favorable health outlook
<i>Mental health</i>					
Depression	10	10	60	.89	Feeling depressed, downhearted, blue during past month
Positive well-being	9	9	54	.90	In good spirits, cheerful, interested in life during past month
Self-control	3	3	18	.75	Firm control of behavior, thoughts, and feelings during prior month
Mental health index	38	38	226	.96	No feelings of anxiety or depression and high feelings of well-being, self-control, and being loved
<i>Social health</i>					
Time felt lonely	1	1	6	--	Felt lonely all the time during past month
Time felt loved and wanted	1	1	6	--	Felt loved and wanted all of the time during past month
Love life full	1	1	6	--	Felt love relationships full and complete all of the time during past month
Emotional ties scale	3	3	18	.78	Felt loved with complete love relationships and no feelings of loneliness
<i>Quality of life</i>					
Life satisfaction	1	1	6	--	Satisfied with life as a whole during past month
<i>Physical health</i>					
Physical capacity	5	0	6	.98 ^b	Unable to perform physical tasks (e.g., walk to table for meals or run short distance)

^aInternal-consistency reliability estimates.

^bCoefficient of reproducibility.

1. The Current Health Scale contains nine items pertaining to a personal assessment of health in general, e.g., "My health is now excellent"; "I have been feeling bad lately" (Ware, Davies-Avery, and Donald, 1978).

2. The Emotional Ties scale contains three items pertaining to the frequency and intensity of feeling loved and wanted, loneliness, and whether one's love life is full and complete (Veit, Ware, and Donald, forthcoming).[3]
3. The Positive Well-Being Scale contains nine items pertaining to positive aspects of well-being and the quality of life, e.g., in good spirits, cheerful, interested in life (Veit, Ware, and Donald, forthcoming).

These three measures reflect three of the health dimensions outlined in Table 3. The Current Health Scale is a personal rating of health that provides a good summary of how people rate their physical and mental health status (Ware, Davies-Avery, Donald, 1978; Davies and Ware, 1981). The Emotional Ties Scale is a subjective measure of social well-being (Veit et al., forthcoming), which, from a theoretical point of view, should be closely related to more objective definitions of social contacts and resources (Cobb, 1976). The Positive Well-Being Scale reflects the positive end of a psychologically defined general mental health concept and includes a highly related but broader concept of quality of life (life satisfaction). Direct measures of the physical component of health (e.g., physical limitations, chronic disease, acute limitations) were not chosen, because of their lack of variability and

[3] In Veit, Ware, and Donald (forthcoming), Emotional Ties is referred to as "interpersonal ties" and is scored as a two-item measure omitting the "loneliness" item. For our purposes, we wanted a criterion variable that on the face of it was most conceptually related to social well-being. We were not concerned with distinguishing between items that referred to ties and depression (i.e., a discriminant validity problem). For this reason, we include the "loneliness" item in our Emotional Ties scale.

weak relationships with social contacts and resources. The Life Satisfaction measure (see Table 3) was omitted as a separate measure since it was included as one of the nine items defining Positive Well-Being.

The choice of these three measures was also determined by inspecting the eta coefficients[4] between social well-being categories defined by each item and potential criterion variables. Eta coefficients were highest for the three criterion variables defined above. Thus, without making any assumptions about the functional form of the relationships, these criteria were most related to social well-being.

Plan of Analysis: Item Scaling

Analyses of questionnaire items measuring social contacts and resources were performed independently in three populations (Seattle, Washington; Fitchburg and Franklin County, Massachusetts; and Charleston and Georgetown County, South Carolina) where HIE Medical History questionnaires contained social items at enrollment. These analyses were performed in four steps: (1) inspection of response variability for social items to form groups of sufficient size to achieve precise mean score estimates on criterion variables; (2) for each social item,

[4] Eta indicates the strength of the association between the independent and dependent variables (in this case between each social item and each criterion variable). It is based on analysis of variance; specifically, it is the square root of the between-groups sum of squares divided by the total sum of squares. In a regression framework, eta is the square root of R^2 if the dependent variable is regressed on a set of dummy variables representing the ANOVA classification. Eta ranges from 0 to 1 and when squared indicates the proportion of variance in the dependent variable that is explained by the independent variable. Unlike the product-moment coefficient r , it may refer to nonlinear as well as linear relationships. Eta may be seen as the general case of which r is a special instance.

estimation of the strength of association with each criterion variable (i.e., variance in criterion variables accounted for by categories of each social item); (3) analyses of variance to evaluate ordinality and linearity of group means for each criterion variable; and (4) convergence of results from steps 1-3 to select the best scoring algorithm for each social item. Each of the four steps is explained more fully below.

Response Variability

Frequency distributions of responses to the eleven social items in the enrollment Medical History Questionnaires (MHQ) were inspected to provide a gross assessment of response variability and to determine whether the sample of persons choosing each response category was large enough for the intended analysis. Response categories with very few subjects (i.e., about 20 or less) were combined with the smaller of the two adjacent categories to form groups of sufficient size to estimate the mean score for each criterion variable with tolerable precision. This step was particularly important for the three social items that yielded continuous responses (i.e., number of neighborhood family acquaintances, close friends and relatives, and group memberships). These items yielded a large number of different response values and the number of persons at some levels was very small. The goal at this step, which was not always realized, was to achieve as many response categories (social groups) for each of the three continuous social items as possible with about 30 to 40 respondents in each category.

Analyses of Variance

Following assessment of item variability in each site, and scrutiny of group sizes for each response category, ANOVAs were performed site-by-site and for a combined sample across sites. Means and variances for each criterion variable were contrasted across specific categories of social well-being defined by each item. For example, the social item pertaining to level of group activity defined four response categories: (1) does not belong, (2) belongs but not active, (3) belongs and fairly active, and (4) belongs and very active. A mean score for each of the three criterion variables was computed for the group defined by each activity level.

To facilitate direct comparisons of mean scores across criterion variables, each criterion score was standardized and transformed. The transformation was based on a mean of 500 and a standard deviation of 100. Thus, a difference of 50 between means accounted for one-half a standard deviation unit and differences of 100 between means accounted for one standard deviation unit for all criterion variables.

Two F-ratios were computed for each social item and each criterion variable in all ANOVAs. The first F-ratio pertained to the null hypothesis that the mean criterion scores for levels of social well-being defined by response categories for each item did not differ (i.e., a test for the significance of differences among group means). The second F-ratio pertained to the hypothesis that social groups ordered a priori are linear with respect to mean criterion variable scores.

These analyses were designed to provide information regarding how respondents in various categories of social well-being differ in terms

of health as well as social and general well-being. It was felt that substantial differences between categories constitute support for the distinction between those categories when items are scored and that very small differences indicate categories that can be combined without much loss of information.

Selection of the Best Scoring Algorithms

Graphs depicting the mean criterion scores for each level of social well-being were also prepared for all eleven items in all three sites and for the combined-site sample.[5] These graphs facilitated determination of categories and scoring rules that would be most comparable across sites. Inspection of the graphs proceeded in two steps. First, for items and criterion variables having significant F-ratios for differences among group means (all but one item), each graph was inspected visually to determine the extent to which increases in social well-being were associated with increases in criterion variable scores (i.e., the mean score for each group was greater than the mean score for the group that preceded it). Second, for each item, differences in mean scores were compared across criterion variables. In cases where differences were obviously large and consistent, the a priori ordinal distinctions between categories were retained and scored accordingly. When differences were very small or in the wrong direction, adjacent groups were combined to "smooth" the curve. To aid decisionmaking and reduce the inherent subjectivity of this process, both authors participated and adhered to the following guidelines:

[5] Although graphs were drawn for all social items in all sites to facilitate interpretations, only examples from the combined-site sample are presented in this report. Site-by-site exceptions are mentioned when noteworthy.

1. Categories at the lower end of the social well-being continuum (e.g., 0, 1, or 2 friends) were scored separately to maintain distinctions between the lowest levels of social items unless there was no empirical basis for such distinctions. This guideline was followed because of the theoretical significance of very low levels of social well-being.
2. In instances where a social item and a criterion variable were not related (i.e., the overall (first) F-ratio was not statistically significant) mean scores for that criterion variable were not considered further in the decisionmaking process.
3. Since the Positive Well-Being criterion measure had the strongest relationship with each social item, this measure was given greatest weight in reaching conclusions about how to score levels of social well-being. In practice, this guideline had little impact because conclusions were roughly the same across all three criterion variables,
4. Less importance was given to mean scores for social categories associated with small sample sizes (i.e., N=50, or less),
5. When adjacent groups were collapsed, mean criterion scores for the new group must be ordinaly consistent with adjacent groups (i.e., the new group mean must be higher than that for the preceding group mean and lower than the next group mean to achieve an ordered progression of item response scores).
6. Nonadjacent groups were never combined unless they were combined with all groups in between; thus the a priori ordering of response categories was never violated.

7. Differences between adjacent groups were preserved if they were observed in at least two of the three HIE sites. When mean criterion scores for adjacent groups were equal or in the wrong order in two of the three sites, those groups were combined.
8. Finally, conclusions were not based on any preconceived notion about the optimal number of social categories for each item. To achieve the most precise measures possible, we scored as many categories as were supported by the analyses of criterion variables.

Finally, the last analytic step was to compute product-moment and eta correlations for the social items and criterion variables both before and after response-category revisions. These analyses were designed to provide a check on the goal of ordinality of scales.

CONSTRUCTING MULTI-ITEM MEASURES

Once the 11 social items were quantified to reflect differences in levels of social well-being, the revised items were used to study the interrelationships among them and the construction of multi-item measures. The following paragraphs describe the social well-being constructs and hypothesized scales chosen for measurement, and outline the plan of analysis for performing empirical studies of HIE social well-being measures.

HYPOTHESIZED SCALES

Table 4 summarizes the content of HIE items in terms of major social well-being activity constructs identified in the literature. Four major groupings were initially hypothesized according to the role

Table 4

HYPOTHESIZED ITEM GROUPING FOR SOCIAL ITEMS

Hypothesized Grouping	Abbreviated Item Content
Community	Level of activity in group or club affairs Frequency of attendance at religious services Voluntary group memberships
Social	Number of neighborhood family acquaintances Frequency of home visits by friends Frequency of visits to homes of friends
Family/social	Number of close friends and relatives Frequency of visits with friends/relatives Telephone contacts
Subjective	How well getting along with others

areas discussed in the literature: (1) in the community role area, three items pertaining to attendance at religious services, voluntary group memberships, and level of group activity; (2) in the social role area, three items pertaining to number of neighborhood family acquaintances, frequency of home visits by friends, and frequency of visits to homes of friends; (3) in the combined family/social role area, four items pertaining to number of close friends and relatives, frequency of visits with close friends and relatives, telephone contacts, and letters written to friends and relatives; and (4) one subjective item pertaining to how well the respondent gets along with others that does not specify a particular role area.

Results of the item scaling analyses (see Results section below) showed that the item pertaining to frequency of letters written to

friends and relatives is not a good measure of social well-being. It was not consistently related across sites to measures of health status, i.e., increasing frequency of letter writing did not consistently reflect increases in health and general well-being. This item was therefore excluded from consideration as a measure of social well-being. The hypothesized Family/Social Role area was then revised to include only three items pertaining to number of close friends and relatives, frequency of visits, and telephone contacts with friends and relatives.

Plan of Analysis: Multi-Item Measures

Analyses were performed to evaluate social well-being scoring algorithms and to determine how well the social measures met the measurement criteria outlined previously. Specifically, data were analyzed to test the scalability of items in hypothesized groupings. In this way, items pertaining to the same dimensions of social well-being could be combined into multi-item measures to maximize reliability. The number of variables could also be reduced as much as possible without substantial loss of information. All analyses were performed on enrollment data and replicated across three sites (Seattle, Massachusetts, and South Carolina) to ensure generalizability of findings.

Scaling Social Items

Before the 10 social items were scaled, they were grouped according to the social role areas they were hypothesized to measure (see Table 4). These groupings were based on content analysis of items summarized previously.

The appropriateness of these item groupings (scales) was evaluated using factor analysis and a form of multi-trait scaling (see Ware et al., 1980).

Factor analysis is a technique that identifies factors representing underlying dimensions of measurement (constructs) defined by a given set of items. For our purposes, principal components analysis using the SPSS program PA1 Varimax rotation (Nie et al., 1975) was used as the method of factor analysis. For the social items, factors were extracted from a matrix of product-moment correlations among items with unities in the matrix diagonal; i.e., all of the variance in the items was to be explained by the factors. The initial (unrotated) solution was evaluated prior to rotation to orthogonal simple structure.

Results from the factor analysis were used to test hypothesized item groupings and to identify unhypothesized factors. Tests for hypothesized groupings were conducted for each site to ensure replication of findings. Once factors were identified, hypotheses about dimensions of social well-being were revised (when necessary) on the basis of empirical findings, and revised item groupings were evaluated according to multi-trait scaling criteria.

Multi-trait scaling differs from factor analysis in that it is based on a particular hypothesized structure underlying a given battery of items (i.e., constructs defined by the social items were specified in advance). Social constructs were operationally defined as scale scores and a matrix of product moment correlations was computed where each row of the matrix contained correlations between scores for one item and all hypothesized item groupings; each column contained correlations between

the scores for one scale and all items. Correlations between each scale and items used to score that scale were corrected for overlap so that these estimates of item-construct relationships were not spuriously inflated.

Multi-trait scaling was used to test both the internal consistency of hypothesized summated ratings scales and the discriminant validity of items in those scales. Matrices of item-scale correlations were evaluated according to two criteria: (1) the Likert-type criterion underlying the Method of Summated Ratings (Likert, 1932) required that each item be substantially correlated ($r = 0.40$ or greater) with the sum of other items in the same hypothesized grouping, and (2) the discriminant validity criterion required that the correlation between an item and its hypothesized scale be higher than correlations between that item and other hypothesized scales constructed using the same method. A scaling "success" was counted whenever the correlation between an item and its hypothesized subscale was more than two standard errors higher than the correlation between the item and other subscales.

Once final groupings were identified, item variances were compared to determine whether standardization was required before scoring the scale. If item variances differed considerably, then items were standardized before computing scale scores. In addition, the factor analyses were evaluated to test whether weights (factor loadings) were of comparable magnitude across standardized items in the same scale. If so, each item could be given the same (unit) weight.

Descriptive Statistics: Scales

After construction of social scales, distributions of scale scores were examined. Score distributions should represent the true distribution of social well-being on the particular construct being measured. If this is achieved, the measures can be used to detect differences in social well-being in the specific population being assessed. For scales with skewed score distributions, studies of variability can indicate that populations being studied are generally healthy or unhealthy (depending on the direction of skewness) and may indicate where revisions are necessary in future studies to reduce coarseness and improve the precision of the measures in detecting meaningful differences in social well-being.

RELIABILITY AND STABILITY

Reliability was estimated at a point in time for the social items using three coefficients: (1) the item-total correlation, which is the correlation between the item and the hypothesized overall index, corrected for overlap, (2) the highest r , which is the highest product moment correlation between each item and the remaining items, (3) the multiple correlation coefficient, which is the correlation between each item and a weighted linear combination of the other items. Comparison of these coefficients allows estimation of the extent to which items share common variance with other items.

Reliability was also estimated at a point in time for the social scales within each of the three sites and for a combined sample across sites using an internal-consistency approach based on Cronbach's (1951) Alpha formula. Internal-consistency reliability is a function of scale

length (number of items) and homogeneity (the extent to which the items share common variance). It is a measure of the extent to which measured variance is due to true score rather than random error.

Estimates of item homogeneity (i.e., average inter-item correlations) were also computed for the social scales within and across sites. Estimates of homogeneity indicate the extent to which scale items are reliable measures of the same construct and serve as a basis for directly comparing scales that differ in length, since they are unaffected by the number of items in a scale.

Finally, product moment correlations were computed between social items and scales administered at two points in time approximately 12 months apart. Findings were interpreted as lower bound estimates of reliability, given the possibility of change in the trait (i.e., social well-being) over time. High test-retest coefficients indicate that the social items and scales are both reliable at a point in time and that activity levels tend to be stable over time. Low test-retest coefficients indicate possible problems in measurement reliability or trait instability or both. We examined stability coefficients for both revised scoring rules and the original precoded responses. If no substantial information was lost due to the revised item scoring rules, stability coefficients for items using the revised scoring rules would be comparable to those based on precoded questionnaire responses.

ASSOCIATIONS AMONG MEASURES

A matrix of correlations among social items and scales was computed to evaluate associations among measures of social well-being. Findings yield evidence of the extent to which constructs in the same dimension (i.e., social well-being) share variance and are relevant to the issue

of what should and should not be included in an overall measure of social well-being.

SOCIODEMOGRAPHIC AND HEALTH CORRELATES OF SOCIAL WELL-BEING

Product moment correlations were computed between social well-being items and scales and five sociodemographic variables (age, sex, race, education, income) and three measures of health and well-being (Positive Well-Being, Emotional Ties, and Current Health). Findings were designed to clarify issues involved in the use of a summary index. Associations that differ in direction for different operational definitions of social well-being would yield support for the use of each part of a social well-being index rather than the overall score.

Analyses of variance were also computed between the social well-being measures and sociodemographic and health variables to identify nonlinear associations. Although product-moment correlation coefficients do quite well in detecting nonlinear trends when they are monotonic (e.g., an increase in age always indicates the same or a greater quantity of social resources), sociodemographic differences in social well-being measures may be sufficiently nonmonotonic in some instances that product-moment correlations completely miss significant group differences.

SDRS EFFECTS ON SOCIAL WELL-BEING

A potential threat to the validity of social well-being measures can arise from response set, which can introduce bias or error into studies based on questionnaire data. One type of response set is social desirability, the tendency to respond in a socially desirable manner. Socially desirable response set (SDRS) is related to item content that refers to sensitive or embarrassing subjects.

If response set is present, estimated scale scores may be biased. The bias can lead to erroneous conclusions about the extent and nature of group differences.

SDRS has not been systematically studied for measures of social well-being. Nonetheless, it has been studied for a range of measures and questionnaire administration methods (e.g., measures of mental health and of behaviors that are socially undesirable). The psychometric studies of mental health measures demonstrate the considerable effects of socially desirable responding on such measures (e.g., Edwards, 1970; Phillips and Clancy, 1970; Bradburn et al., 1979). As Edwards (1970) has demonstrated, socially desirable responding increases with items of increasing sensitivity (e.g., those with a very personal content). We would expect to see SDRS effects on social well-being measures because this tendency is more pronounced when items refer to things that are perceived to have social value.

To estimate socially desirable responding, eight items adapted from the Comrey Personality Scales (Comrey, 1970) were interspersed in the mental health battery. (See Veit, Ware, and Donald, forthcoming, for a detailed presentation of scoring details for the SDRS measure.) Scores had the potential to range from 0 (minimal SDRS tendency) to 6 (maximum SDRS tendency). Scoring studies of SDRS (Veit, Ware, and Donald, forthcoming) indicated that this set occurred relatively consistently; the internal-consistency reliability estimate was 0.50, indicating the score was just reliable enough to permit group comparisons.

To estimate the effects of SDRS on our social well-being measures, correlations were computed between SDRS and the social well-being

measures and sociodemographic variables. We would expect favorably scored measures of social well-being to be positively correlated with SDRS.

To the extent that SDRS is correlated with the sociodemographic variables, the potential would exist for SDRS to bias results of group comparisons. To test the effects of SDRS bias, we regressed each of the social well-being measures on the sociodemographic variables (age, income, education, sex, and race) with and without statistical control for SDRS. These regression results should shed light on the direction and magnitude of any bias from SDRS.

IV. RESULTS: QUANTIFICATION OF SOCIAL CONTACTS AND RESOURCES

ITEM VARIABILITY AND CATEGORY DEFINITIONS

Our first inspection of results focused on the distributions of responses to the 11 HIE social items. Frequency distributions of questionnaire items for the combined-site sample are presented in Tables 5 through 7 (see Appendix Tables A.1 through A.3 for site-specific frequency distributions). Eight of the items were printed in the questionnaire with precoded (forced-choice) response categories. Six of these (see Table 7) had a sufficient number of respondents in each precoded category to permit the desired analysis of variance (ANOVA). The remaining two forced-choice items pertained to number of letters written and frequency of attendance at religious services; these items had a small number of respondents in the most frequent ("every day") activity category. For both of the latter items, the underrepresented group was combined with an adjacent group.

For the three open-ended items, which yielded continuous responses, sample sizes were sufficient to compute mean criterion scores for categories defining the lowest but not the highest levels of social well-being. For categories defining high levels of social well-being, groups were combined in the following manner: (1) Table 5--subjects responding 7 or 8 neighborhood family acquaintances were grouped together, as were those responding 9 or 10 and 11 or more; (2) Table 6--subjects responding 8 or 9 close friends and relatives were grouped together as were those responding 11 through 15, 16 through 20, 21 through 25, 26 through 35, and 36 or more; and (3) Table 7--subjects responding 5 or more group memberships were combined into one category.

Table 5

FREQUENCY DISTRIBUTION FOR NUMBER OF NEIGHBORHOOD
FAMILY ACQUAINTANCES, COMBINED SAMPLE (N=4603)

Item/Response Code, Number of Neighborhood Family Acquaintances	Frequency	Percent ^a
0	951	20.9
1	677	14.9
2	771	17.0
3	642	14.1
4	435	9.6
5	344	7.6
6	210	4.6
7	83	1.8
8	96	2.1
9	24	0.5
10	163	3.6
11	7	0.2
12	40	0.9
13-14	8	0.2
15-18	45	1.0
20-high	52	1.2
Mean	3.36	
Standard deviation	(5.34)	

NOTE: Based on enrollment data from the
Seattle, Massachusetts, and South Carolina
sites.

^aMissing data omitted.

Table 6

FREQUENCY DISTRIBUTION FOR NUMBER OF CLOSE FRIENDS
AND RELATIVES, COMBINED SAMPLE (N=4603)

Item/Response Codes:		
No. of Close Friends and Relatives	Frequency	Percent ^a
0	85	1.9
1	204	4.5
2	380	8.4
3	445	9.8
4	486	10.8
5	545	12.1
6	414	9.2
7	182	4.0
8	253	5.6
9	66	1.5
10	527	11.7
11	31	0.7
12	179	4.0
13	12	0.3
14	27	0.6
15	150	3.3
16	30	0.7
17	11	0.2
18	14	0.3
19-20	178	4.0
21-22	6	0.1
23-24	6	0.1
25	96	2.1
26-27	7	0.1
28	5	0.1
29-30	61	1.4
31-35	8	0.2
36-High	110	2.2
Mean	8.90	
Standard deviation	(10.89)	

NOTE: Based on enrollment data from the
Seattle, Massachusetts, and South Carolina
sites.

^aMissing data omitted.

Table 7

FREQUENCY DISTRIBUTIONS FOR 9 SOCIAL ITEMS,
COMBINED SAMPLE (N=4603)

Item/Code/Definition	Frequency	Percent	Mean	Standard Deviation
<i>Visits with friends/relatives</i>				
1. Less than 5 times a year	307	6.7	4.41	1.56
2. 5-10 times a year	347	7.6		
3. About once a month	490	10.7		
4. 2 or 3 times a month	902	19.7		
5. About once a week	1290	28.2		
6. Several days a week	1043	22.8		
7. Every day	199	4.3		
<i>Home visits by friends</i>				
1. Not at all past month	681	14.9	3.25	1.38
2. Once past month	623	13.6		
3. 2 or 3 times past month	1267	27.6		
4. About once a week	1062	23.2		
5. Several days a week	793	17.3		
6. Every day	157	3.4		
<i>Visits to homes of friends</i>				
1. Not at all past month	583	12.7	3.24	1.31
2. Once past month	677	14.8		
3. 2 or 3 times past month	1369	29.9		
4. About once a week	1089	23.8		
5. Several days a week	752	16.4		
6. Every day	112	2.4		
<i>Telephone contacts</i>				
1. Not at all past month	226	4.9	4.41	1.35
2. Once past month	169	3.7		
3. 2 or 3 times past month	733	16.0		
4. About once a week	851	18.5		
5. Several times a week	1599	34.8		
6. Every day	1013	22.1		
<i>Letters written</i>				
1. Not at all past month	2522	54.9	1.86	1.15
2. Once past month	852	18.6		
3. 2 or 3 times past month	701	15.3		
4. About once a week	359	7.8		
5. Several times a week	148	3.2		
6. Every day	8	0.2		

For footnotes, see next page.

Table 7--continued

Item/Code/Definition	Frequency	Percent	Mean	Standard Deviation
<i>Getting along with others</i>				
1. Not as well as usual	165	3.6	2.14	0.44
2. About the same	3587	78.3		
3. Better than usual	828	18.1		
<i>Attendance at religious services</i>				
1. Not at all past month	2443	53.2	2.22	1.48
2. Once past month	416	9.1		
3. 2 or 3 times past month	488	10.6		
4. Once a week	786	17.1		
5. More than once a week	442	9.6		
6. Every day	17	0.4		
<i>Voluntary group membership</i>				
0	2242	49.1	1.09	1.81
1	1023	22.4		
2	644	14.1		
3	363	7.9		
4	153	3.4		
5	60	1.3		
6	39	0.9		
7	17	0.4		
8	13	0.3		
9-10	6	0.2		
11-high	7	0.2		
<i>Level of group activity</i>				
1. Do not belong	2188	48.6	2.12	1.22
2. Not active	500	11.1		
3. Fairly active	883	19.6		
4. Very active	932	20.7		

NOTE: Based on enrollment data from the Seattle, Massachusetts, and South Carolina sites.

Table 8 summarizes the resulting response categories for each of the 11 items used in ANOVA tests of item categories in relation to criterion variables.

ASSOCIATIONS BETWEEN ITEMS AND CRITERION VARIABLES

The second stage of the analysis examined the direction and strength of associations between social items and three criterion variables: Current Health, Positive Well-Being, and Emotional Ties. Response categories as summarized in Table 8 were used to define social well-being categories for each of the 11 items.

Table 9 presents product-moment and eta coefficients and summarizes results of the linearity tests for the social items and three criteria in the combined sites analysis.[5] (See Appendix Tables A.4 through A.6 for site-specific coefficients.) Generally, as indicated by positive and significant coefficients, higher levels of social contacts and resources were associated with more favorable scores on measures of general health, positive well-being and emotional ties.

Eta coefficients for the 11 social items and three criterion variables ranged from 0 to 0.29 and the median of 33 coefficients was 0.13. For the 11 social items and the Current Health criterion, eta coefficients ranged from 0 to 0.14 and the median for 11 coefficients was 0.08. For the 11 social items and the Emotional Ties criterion, eta coefficients ranged from 0 to 0.23 and the median for 11 coefficients was 0.12. For the 11 social items and the Positive Well-Being

[5] Item responses were coded as indicated in Table 8 for purposes of computing these coefficients.

Table 8

RESPONSE CATEGORIES DEFINED IN ANOVA
TESTS OF CRITERION VARIABLES

Item Content	Number of Response Categories	Response Category	
		Lowest	Highest
Neighborhood family acquaintances ^a	10	0	11 or more
Close friends and relatives ^a	15	0	37 or more
Visits with friends/relatives	7	Less than 5 times/year	Every day
Home visits by friends	6	Not at all	Every day
Visits to homes of friends	6	Not at all	Every day
Telephone contacts	6	Not at all	Every day
Letters written	5	Not at all	Several times a week or more
Getting along	3	Not as well	Better than usual
Attendance at religious services	5	Not at all	More than once a week
Voluntary group membership ^a	6	0	5 or more
Activity in groups	4	Does not belong	Very active

^aOpen-ended questionnaire item.

Table 9

PRODUCT MOMENTS, ETA COEFFICIENTS, AND LINEARITY TESTS
FOR SOCIAL ITEMS AND THREE CRITERION VARIABLES,
COMBINED SAMPLE (N=4603)

Social Well-Being Item	Criterion Variable								
	Current Health			Emotional Ties			Positive Well-Being		
	r	eta	Linea- rity Test ^a	r	eta	Linea- rity Test	r	eta	Linea- rity Test
Neighborhood acquaintances	(b)	--		.11	.13	*	.17	.18	*
Close friends and relatives	.08	.13	*	.19	.23	*	.25	.29	*
Visits with friends/relatives	.12	.12		.07	.12	*	.15	.15	
Home visits by friends	.10	.12	*	.06	.13	*	.13	.16	*
Visits to homes of friends	.13	.14	*	.00	.09	*	.13	.15	*
Telephone contacts	.05	.08	*	.07	.09	*	.14	.15	*
Letters written	--	--		--	--		.08	.08	
Getting along with others	.12	.14	*	.10	.17	*	.20	.23	*
Attendance at religious services	--	--		.08	.08		.12	.13	
Voluntary group membership	.04	.06		.13	.13		.20	.20	
Activity in groups	.03	.04		.12	.12		.17	.17	

^aThe test of linearity was calculated using standard one-way analysis of variance procedures. Specifically, the between-groups sum of squares was partitioned into that portion accounted for by a linear trend (regression sum of squares) and that which was the result of nonlinear trends (deviation from linearity sum of squares).

^bCoefficients omitted when between-groups F ratio was not significant (i.e., chance probability greater than 0.05).

* Deviation from linearity was statistically significant ($p < 0.05$); blanks indicate departure from linearity was not significant.

criterion, eta coefficients ranged from 0.08 to 0.29 and the median for 11 coefficients was 0.16.

Product-moment coefficients between the 11 social items and the three criterion variables ranged from 0 to 0.25 and the median for 33 coefficients was 0.11. For the 11 social items and the Current Health criterion, product-moment coefficients ranged from 0 to 0.12 (median = 0.05). For the 11 social items and the Emotional Ties criterion, product-moment coefficients ranged from 0 to 0.19 (median = .08). For

the 11 social items and the Positive Well-Being criterion, product-moment coefficients ranged from 0 to 0.25 (median = 0.15).

Although higher levels of social contacts and resources were associated with more favorable scores on all three criteria, the associations often departed significantly from what would be expected for a linear relationship. The implications of nonlinearity are discussed below. After this stage in the analysis, we concluded that social well-being questionnaire item categories could be defined as ordinally consistent across criterion variables. Associations were strongest for the Positive-Well Being criterion, which was given most weight in determining combinations of social well-being categories.

SCORING OF SOCIAL WELL-BEING ITEMS

The third stage in the analysis involved computation of mean criterion scores for groups differing in level of social contacts and resources according to each of the eleven social items. These scores were used to construct graphs depicting the relationship between the standardized criterion scores and each level of social well-being. Conclusions regarding the optimal scoring of each social item were reached by visual inspection of each graph to determine the extent to which increases in social well-being were associated with increases in criterion variable scores. In addition, results of significance tests for departure from linearity (Table 9) were evaluated across criterion variables as a further check.

In all cases, social items were scored to preserve desired distinctions between groups at the lower ends of the social well-being distributions. Mean criterion scores for seven social items departed significantly from linearity. For four of these seven items

(neighborhood family acquaintances, visits with friends/relatives, home visits by friends and visits to homes of friends) collapsing of categories was necessary at the high end of the scale distributions.[6] For two of the seven items (number of close friends and relatives, and telephone contacts) distinctions between categories were maintained at the high end of the scale distributions while some collapsing was necessary in the middle of the scale ranges. All three response categories for the seventh item, getting along with others, were maintained as precoded in the questionnaire. Significant departures from linearity for this item were due to intervals of different width. Three social items (religious attendance, group membership, and level of group activity) showed a distinct linear trend for all levels of well-being. Thus, response categories for these three items were scored separately. The eleventh social item, letters written, showed no relationship with the criterion variables. Thus, this item was not considered further.

A detailed discussion of scoring options for each social item is presented below along with a summary of the findings that led to each decision. The summaries emphasize the combined-sites sample, which tended to be a good representation of site-specific findings. Noteworthy differences between sites are noted below.

[6] The relationship between item responses and the criterion variables appeared similar to the hypothetical plot (Line A) in Fig. 1. Increases in social well-being categories at the high end of the scale range were no longer associated with increases in criterion variables. For these items, continuing to assign different numbers to high response categories produces a nonlinear relationship. By collapsing these categories, the departure from linearity was eliminated. This logic underlies the collapsing of categories to achieve a linear relationship between the item and criterion.

Neighborhood Family Acquaintances

Figure 2 shows a clear trend of average increases in two of the criterion scores (Emotional Ties and Positive Well-Being) with increases in the number of reported neighborhood family acquaintances. The association was not statistically significant for the Current Health criterion and is strongest for Positive Well-Being. Because of the insignificant association with Current Health, that measure is not considered in how to score the neighborhood family acquaintances item.

Visual inspection of Fig. 2 and the linearity test in Table 9 both confirm that whereas mean scores for groups are ordinally consistent across two criteria, there is a significant departure from linearity. Visual inspection of Fig. 2 suggests that collapsing of categories is necessary at the high end of the scale because increases in neighborhood family acquaintances beyond six were not consistently associated with higher levels of well-being.

Results suggest that categories of 0 to 5 neighborhood family acquaintances should be scored separately. This scoring strategy preserves the desired distinctions between groups at the lower end of the distribution and is supported by the trends in Fig. 2. There appears to be no good basis for differentiating categories 6 through 10. We computed a mean criterion score for the 6 through 10 group and observed that the mean score was the same for the five neighborhood family acquaintances group. Therefore we collapsed the categories into a 5 through 10 grouping. Category 11 through high is clearly higher for both significant criterion variables; therefore, responses of 11 or

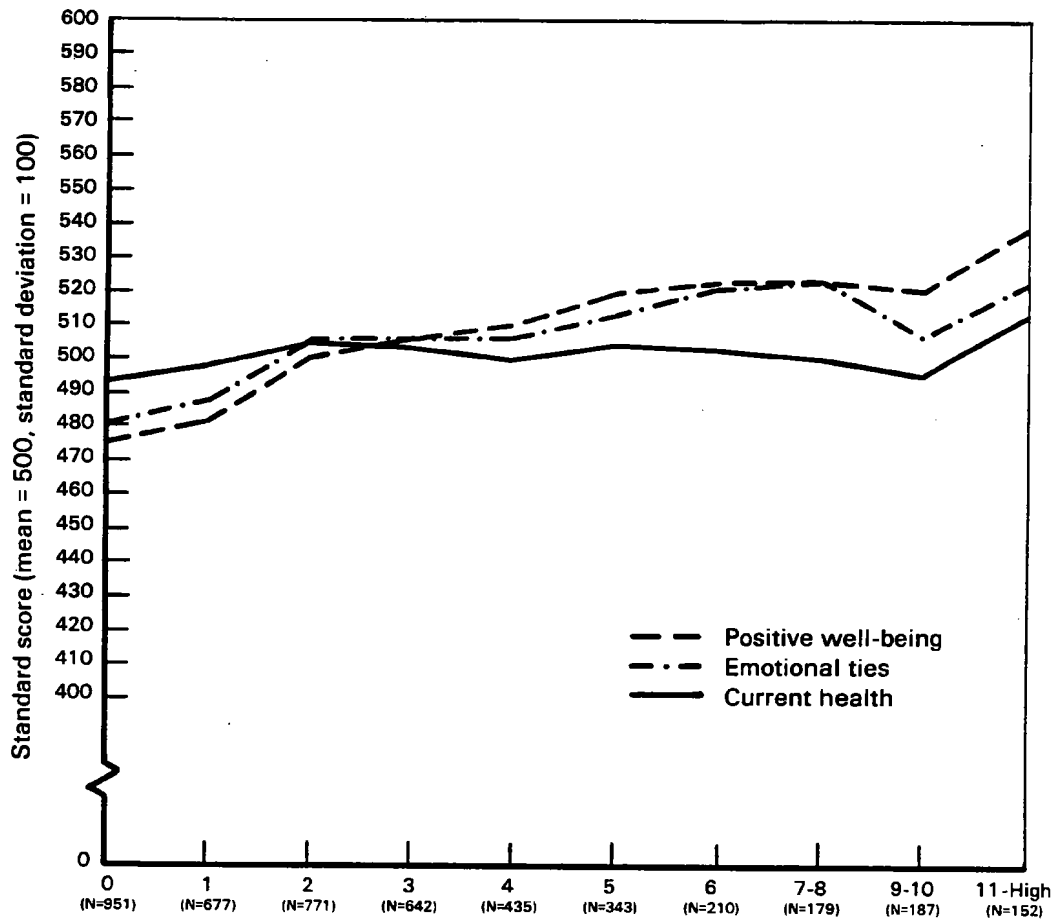


Fig. 2 -- Graph of social item: neighborhood acquaintances

higher were scored separately. In summary, responses to the neighborhood family acquaintances item were grouped into seven distinct categories (0, 1, 2, 3, 4, 5-10, 11-high), which were scored 0 to 6.

Close Friends and Relatives

Figure 3 shows a definite trend of average increases for all criterion variables with increases in the number of close friends and relatives. Of all the social items, this one appears to be most highly related to health status, with strongest associations for Positive Well-Being.

Visual inspection of Fig. 3 and the linearity test in Table 9 both confirm that there is a significant departure from linearity. Some collapsing of scores is desirable in the middle of the scale range. It is interesting to note that the plot of mean scores for Current Health appears to level off at the high end of the distribution. Beyond a certain point, differences in number of friends and relatives are not associated with changes in general health. Thus, it would be possible to reach different conclusions regarding category groupings depending on whether more weight is given to the Current Health or Positive Well-Being criterion variable. The plot of mean Current Health scores flattens out after 4 or 5 categories, while the other criterion variables continue to increase. Since Positive Well-Being appears to have the largest and most consistent relationship with number of close friends and relatives, category groupings from 5 and beyond are based on information provided primarily from this measure.

Results suggest that categories 0 to 4 of close friends and relatives be scored separately. Again, this scoring strategy preserves the desired distinctions between groups at the lower end of the distribution and is supported by the trends in Fig. 3. There appears to be no good basis for differentiating categories 5 through 9. We

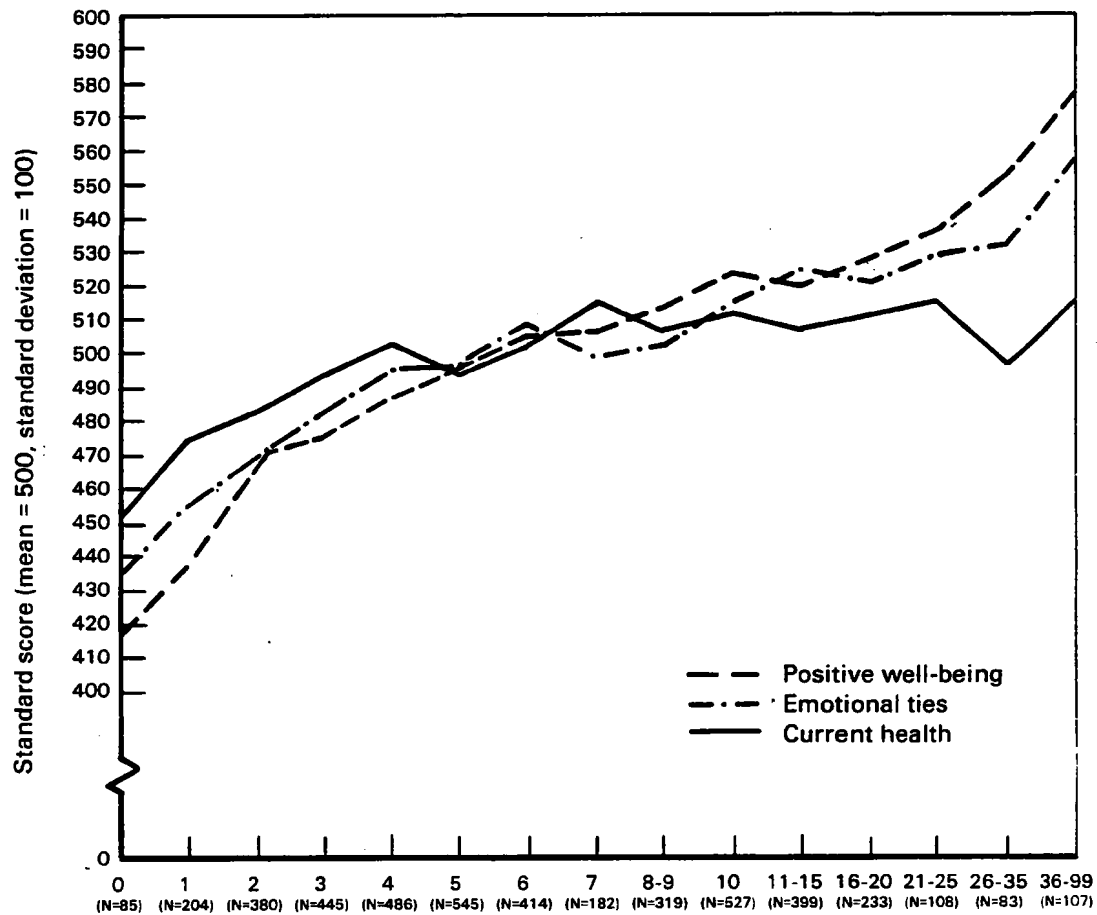


Fig. 3 -- Graph of social item: number of close friends/relatives

computed a mean criterion score for categories 10 through 20, which was higher than the mean criterion score of category 5 through 9. Therefore, these two groups can be scored separately. Beyond category 20, the values of Positive Well-Being clearly increase. Thus categories at the high end of the distribution can be scored separately. In summary, responses to the number of close friends and relatives item were grouped into ten distinct categories (0, 1, 2, 3, 4, 5-9, 10-20, 21-25, 26-35, 36-high), which were scored 0 to 9.

Visits with Friends/Relatives

Figure 4 shows a trend of average increases for all criterion variables with increases in the number of visits with friends and relatives. The associations are significant for all criterion variables and are strongest for Positive Well-Being. Visual inspection of Fig. 4 and the linearity test in Table 9 both confirm that whereas mean scores are ordinally significant across all three criteria, there is a significant departure from linearity for the Emotional Ties criterion at the high end of the scale distribution.

Results suggest that the category "less than five times a year" be scored separately. There appears to be no good basis for differentiating the categories of 5 to 10 times a year and once a month. Therefore, these two categories can be combined. The category 2 to 3 times a month can be scored separately.

Beyond once a week, different conclusions regarding category groupings can be made depending on whether weight is given to the Emotional Ties variable. It appears that persons who visit once a week or less feel less loved, have less complete love relationships, and feel

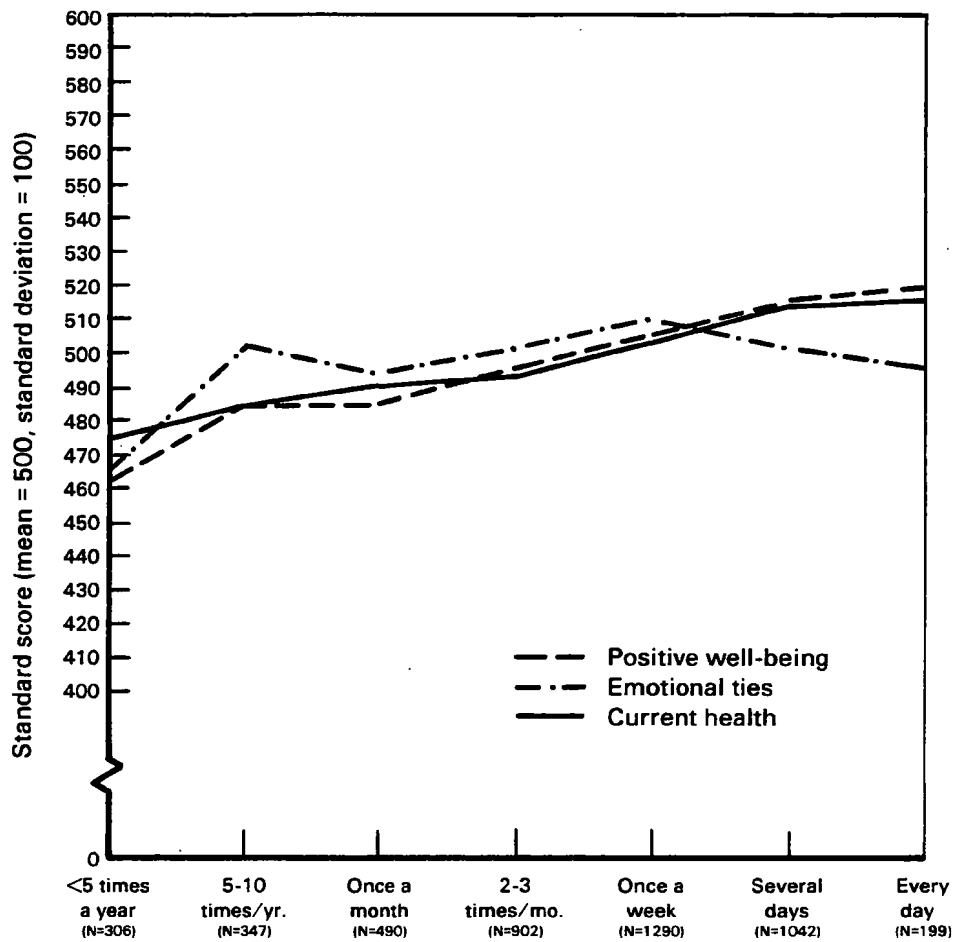


Fig. 4 -- Graph of social item: visits with friends/relatives

more lonely. On the other hand, persons who visit more than once a week have higher feelings of positive well-being and better ratings of general health. Site-specific findings vary. In two of the sites, mean criterion scores for Positive Well-Being increase between once a week and several days a week and then flatten out or decrease. In the third site, the mean criterion score continues to rise. The mean criterion scores for Current Health increase in two sites between once a week and

several days a week and then flatten out, while in the third site, the mean criterion score rises significantly after several days a week. The mean criterion scores for Emotional Ties decrease in all three sites. Because of the inconsistencies across sites, it was decided to combine the categories once a week or more into one grouping. In summary, responses to the visits with friends or relatives item were grouped into four distinct categories (less than five times a year; 5 to 10 times a year or once a month; 2 or 3 times a month; and once a week, several days a week, or every day), which were scored 1 to 4.

Home Visits by Friends

Figure 5 shows a trend of average increases for all criterion variables with increases in the frequency of home visits by friends. The associations are significant for all criterion variables and are strongest for Positive Well-being. Visual inspection of Fig. 5 and the linearity test in Table 9 both confirm a significant departure from linearity for all three criteria. This suggests that collapsing of categories is necessary at the high end of the scale.

Results suggest that the two categories at the low end of the distribution (not at all and once in the past month) be scored separately. There appears to be no good basis for differentiating the three categories of two or three times a month, once a week, or several days a week. Therefore, we can collapse these three categories. Although there is a slight increase in Positive Well-Being and Current Health in two sites between subjects responding that home visits by friends occur several days a week versus every day, Emotional Ties tend to decrease with more frequent home visits by friends in all sites. For this reason, the every day category can be combined with the previous

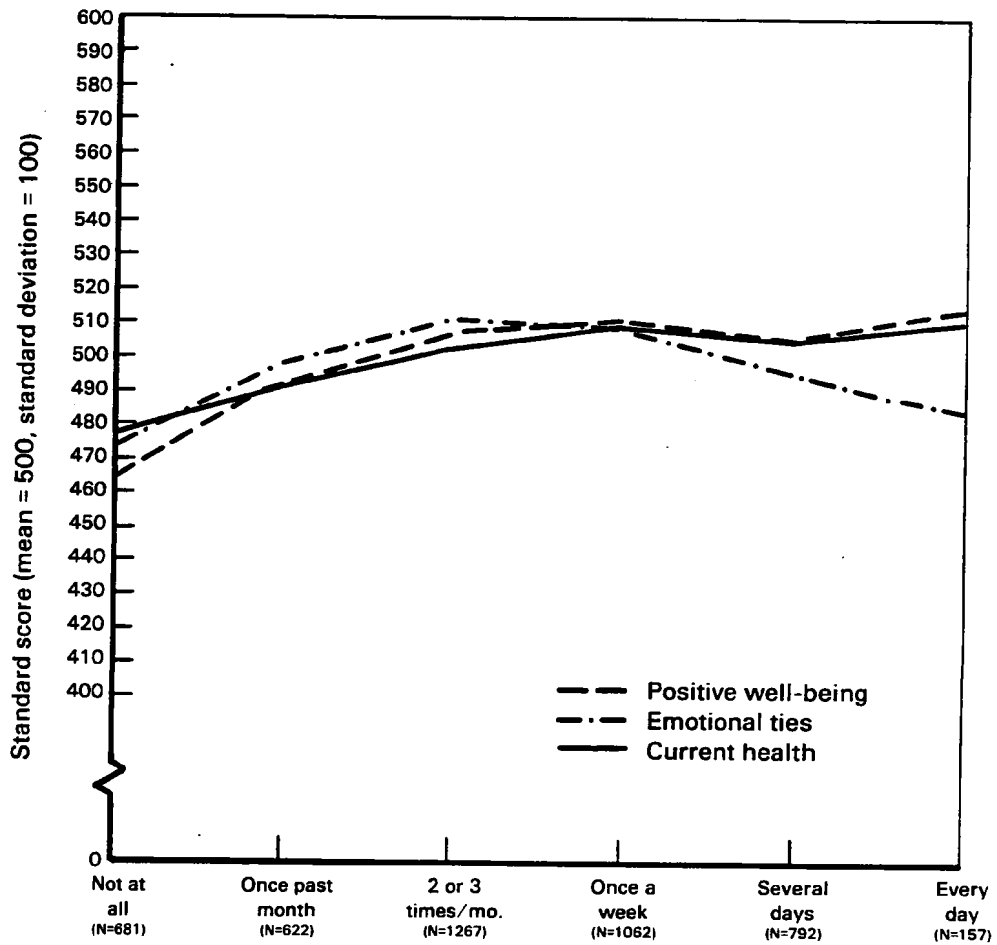


Fig. 5 -- Graph of social item: home visits by friends

three categories. In summary, responses to the home visits by friends item were grouped into three distinct categories (not at all; once past month; and 2 or 3 times a month, or once a week, or several days a week, or every day), which were scored 1 to 3.

Visits to Homes of Friends

Figure 6 shows a slight trend of average increases in all of the criterion scores with increases in the frequency of visits to homes of friends. The associations are strongest for both Current Health and Positive Well-Being. Significant departures from linearity (see Table 9) and inspection of Figure 6 suggest that collapsing of categories is necessary at the high end of the scale.

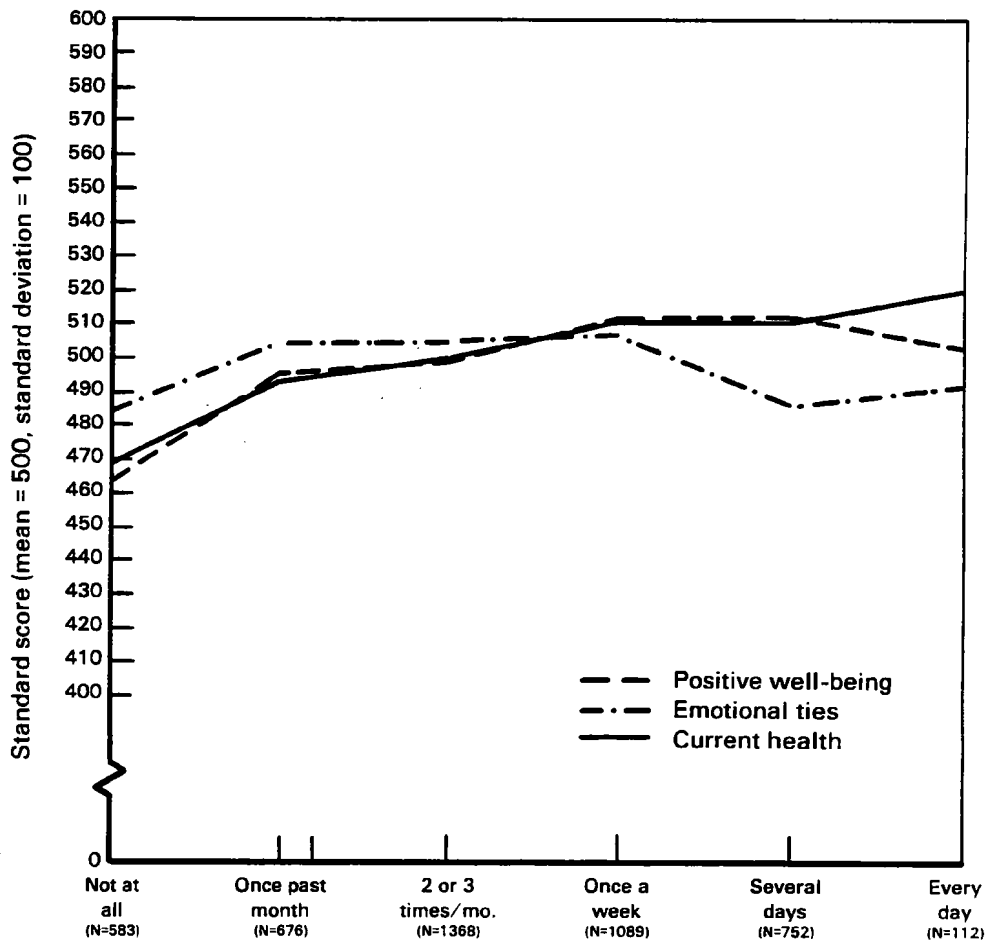


Fig. 6 -- Graph of social item: visits to homes of friends

Results suggest that the first category (not at all) be scored separately, preserving the desired distinctions between groups at the lower end of the distribution. Support for this strategy is seen in Fig. 6. There appears to be no good basis for differentiating the categories of once in the past month and two or three times a month, nor for differentiating the categories of once a week and several days a week. We computed a mean criterion score for each of these two groups and observed that the mean criterion score was higher for the latter group (once a week and several days a week). Therefore these groups can be scored separately. Since the criterion scores for Positive Well-Being and Emotional Ties decrease at the high end of the distribution, the last category (every day) can be combined with the previous category. In summary, responses to the "visits to homes of friends" item were grouped into three categories (not at all, once past month or 2 or 3 times a month; and once a week or several days a week or every day), which were scored 1 to 3.

Telephone Contacts

Figure 7 shows a clear trend of average increases in criterion scores with increases in the frequency of telephone contacts. The associations are significant for all criterion variables and strongest for Positive Well-Being. Table 9 indicates significant departures from linearity for all three criterion variables, while Fig. 7 shows that collapsing is necessary in the middle of the scale range.

Results suggest that the first two categories (not at all and once in the past month) be scored separately. There appears to be no good basis for differentiating the two middle categories (2 or 3 times a

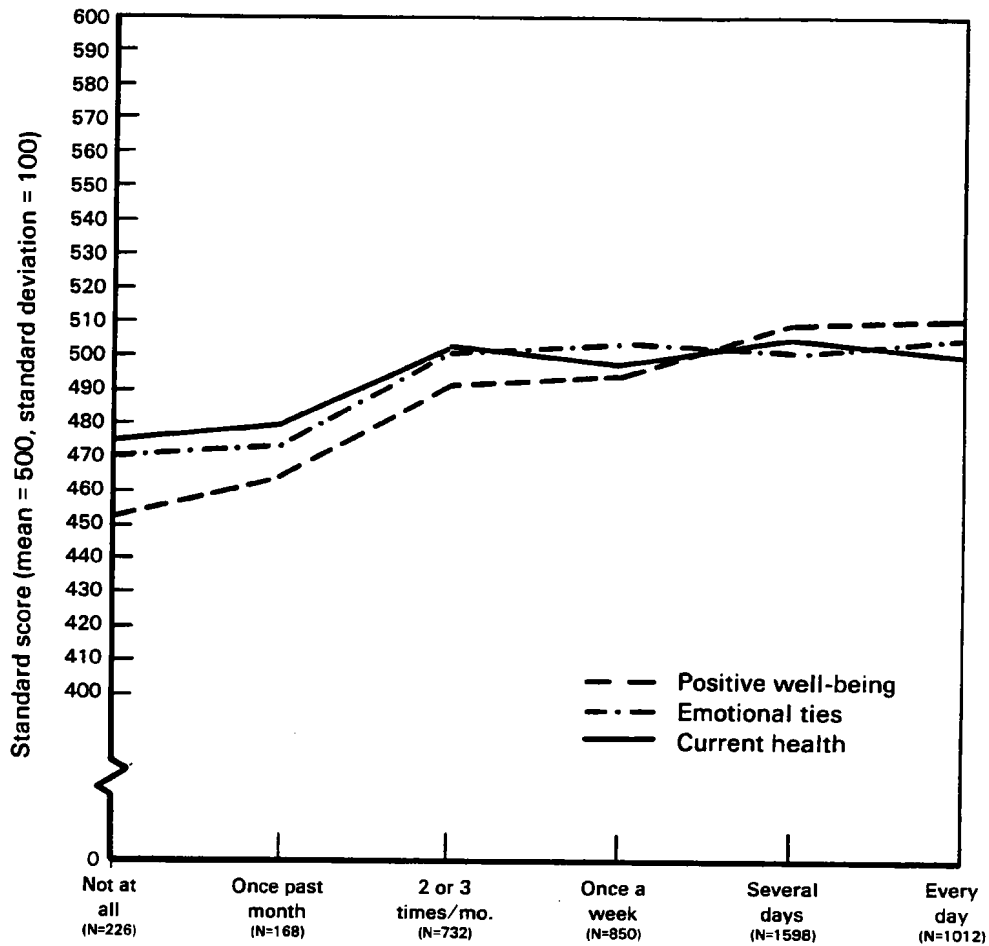


Fig. 7 -- Graph of social item: telephone contacts

month and once a week). Therefore, these two categories can be combined. The mean criterion scores for Positive Well-Being and Current Health show clear increases between the combined 2 or 3 times a month/once a week category and several days a week in two of the three sites, while the mean criterion scores for Positive Well-Being and Emotional Ties show increases between the last two categories (several days a week and every day). Therefore, we can score the last two

categories separately. In summary, responses to the telephone contacts items were grouped into five distinct categories (not at all; once past month; 2 or 3 times a month or once a week; several days a week; and every day), which were scored 1 to 5.

Letters Written

Visual inspection of Fig. 8 shows that the item pertaining to "frequency of letters written" is not a good measure of social well-being. As seen in Table 9, there is no relationship between this item and two of the criteria: Current Health and Emotional Ties. The third criterion, Positive Well-Being, does show increases in well-being as a function of more letter writing, but this relationship is significant in the Seattle site only and is not replicated in the other two sites. Thus, the decision was made to omit this item from further analyses.

Getting Along With Others

Figure 9 shows a definite trend of increases in all three criterion scores with increases in the ability to get along with others. The largest increase in criterion scores appears between the first two categories (not as well and about the same), with a smaller yet definite increase between the last two categories (about the same and better than usual). The associations are significant for all criterion variables and are strongest for Positive Well-Being. Results suggest that all three categories be maintained separately as originally defined (not as well, about the same, and better than usual) and scored 1 to 3.

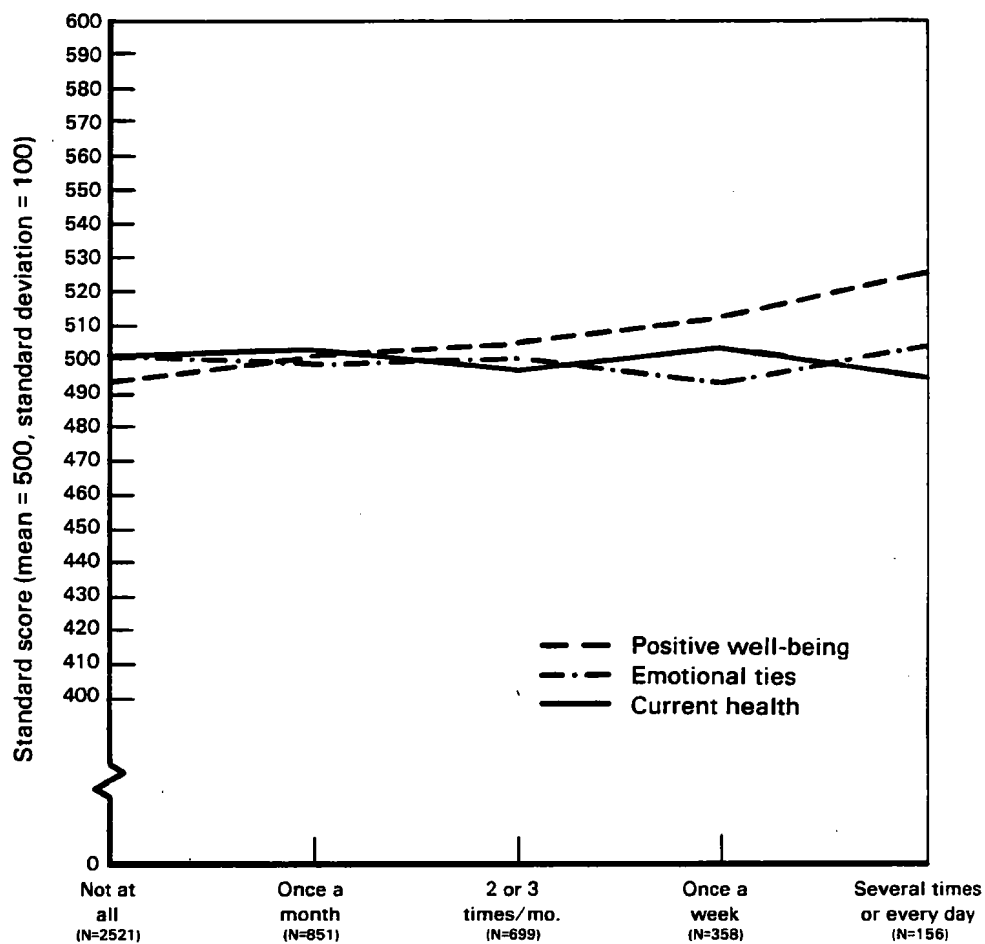


Fig. 8 -- Graph of social item: letters written

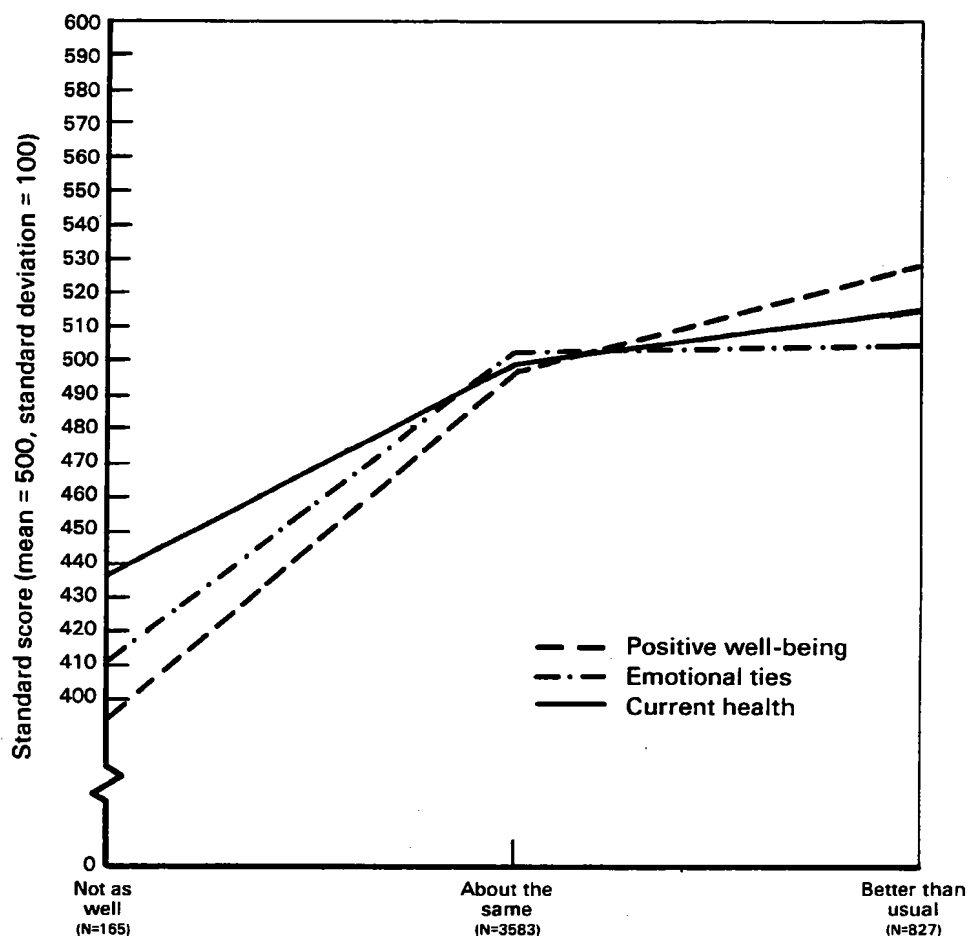


Fig. 9 -- Graph of social item: getting along with others

Attendance at Religious Services

Figure 10 shows a clear trend of average increases in two of the criterion scores (Positive Well-Being and Emotional Ties) with increases in the frequency of attendance at religious services. Visual inspection of Fig. 10 and associations in Table 9 show no relationship between Current Health and attendance at religious services. In fact, the slight negative decrease in Current Health at the high end of the

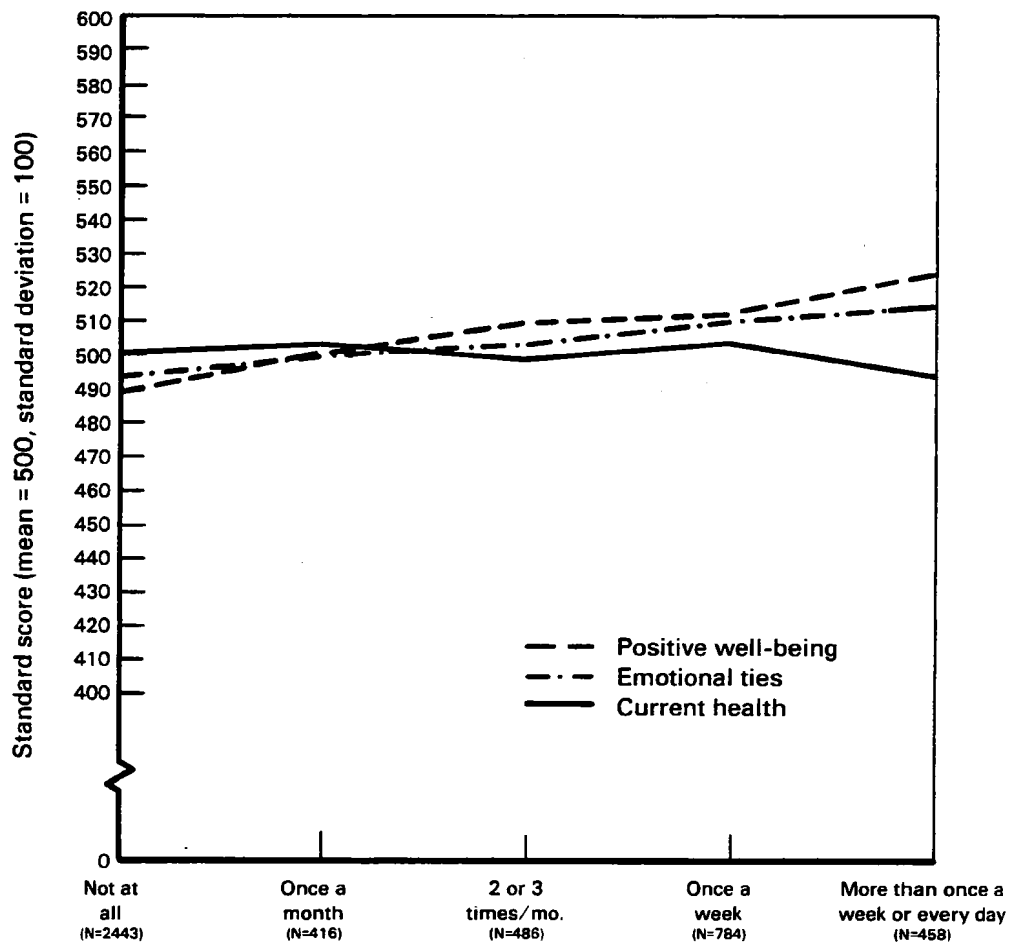


Fig. 10 -- Graph of social item: attendance at religious services

distribution suggests that health may be poorer for persons attending religious services more frequently. This criterion will not be considered further in analysis of this item.

Associations are significant for two criterion variables (Emotional Ties and Positive Well-Being) and do not depart from linearity. For these two criteria, there appears to be a definite linear increase in mean criterion scores for all categories of social well-being.

Therefore, all five categories can be scored separately as originally defined. In summary, response categories for the attendance at religious services item were grouped into five categories (not at all, once a month, 2 or 3 times a month, once a week, and more than once a week or every day) and were scored 1 to 5.

Voluntary Group Membership

Figure 11 shows a clear trend of average increases in all three criterion scores with increases in the number of voluntary group

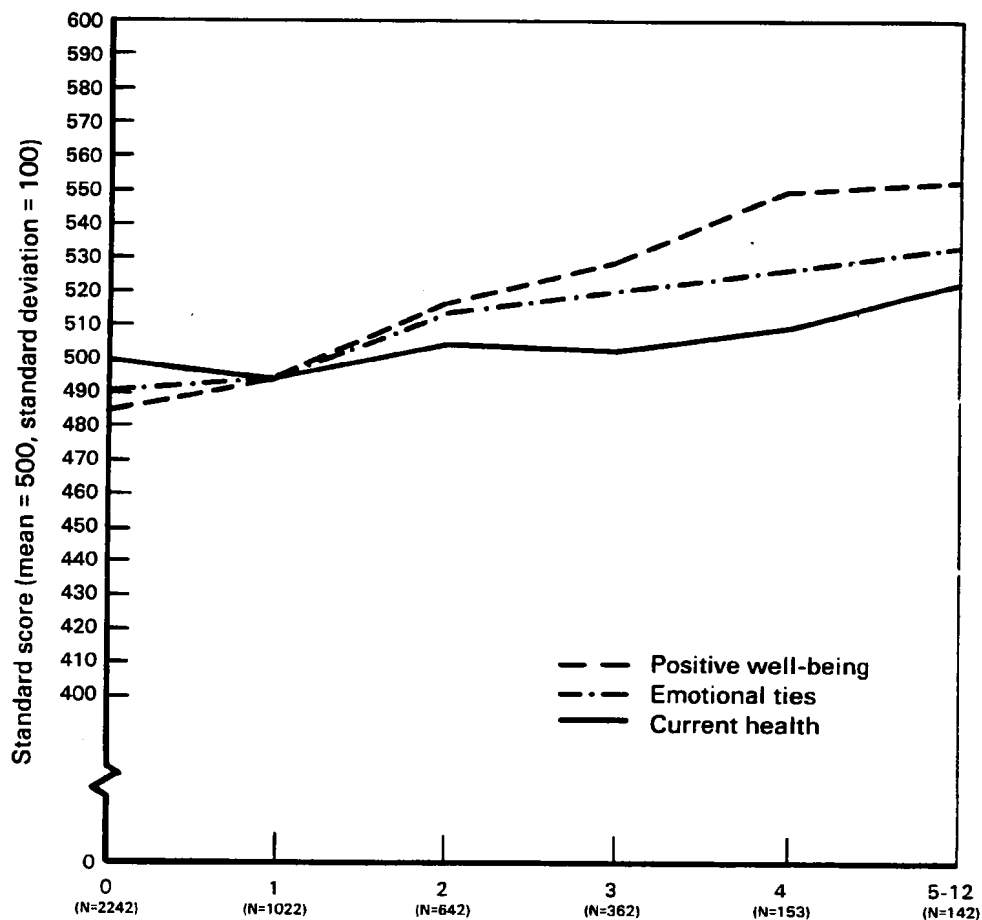


Fig. 11 -- Graph of social item: voluntary group membership

memberships. Associations in Table 9 are significant for all three criterion scores with strongest associations for Positive Well-Being.

Results in Table 9 show that departures from linearity are not significant. Therefore, all six categories can be scored separately as originally defined (0, 1, 2, 3, 4, 5-High) and scored 0 to 5.

Level of Group Activity

Figure 12 shows a clear trend of average increases in all three criterion scores with increases in the level of activity in groups. Associations in Table 9 are significant for all three criterion scores, with strongest associations for Positive Well-Being.

Results in Table 9 show that departures from linearity are not significant. Therefore, all four categories can be scored separately as originally defined (does not belong, not active, fairly active, very active) and scored 1 to 4.

DISCUSSION OF REVISED ITEM SCORES

The results of empirical tests described above were evaluated to determine scoring algorithms for HIE social items. Results of these analyses provided empirical support for a scoring rule that defines a continuum of social contacts or resources for each item. In general, the three goals for scoring of social items were met. (Item response categories rank ordered groups on a continuum of social well-being, and values assigned to response categories were ordinally consistent across criterion variables and across HIE sites). Revised scoring rules for the ten social items are presented in Table 10.

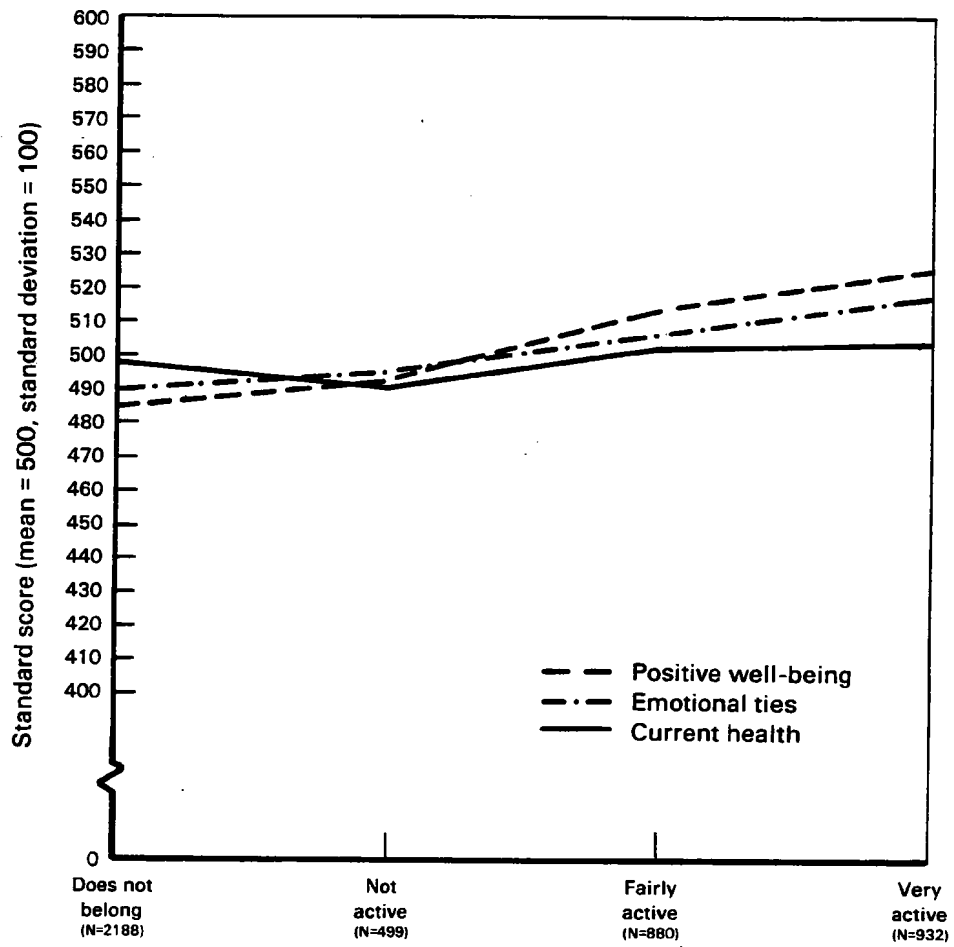


Fig. 12 -- Graph of social item: level of group activity

Table 10

SCORING RULES FOR TEN SOCIAL ITEMS

Questionnaire Number ^a	Abbreviated Item Content	Precoded Value	Revised Value ^b
99	Neighborhood family acquaintances	0	0
		1	1
		2	2
		3	3
		4	4
		5	5
		6	5
		7	5
		8	5
		9	5
		10	5
		11 or higher	6
100	Close friends and relatives	0	0
		1	1
		2	2
		3	3
		4	4
		5	5
		6 through 9	5
		10 through 20	6
101	Visits with friends/relatives	21 through 25	7
		26 through 35	8
		36 or higher	9
		1	4
		2	4
		3	4
		4	3
102	Home visits by friends	5	2
		6	2
		7	1
		1	3
		2	3
		3	3
		4	3
		5	2
		6	1

For footnotes, see next page.

Table 10 -- continued

Questionnaire Number	Abbreviated Item Content	Precoded Value	Revised Value
103	Visits to homes of friends	1	3
		2	3
		3	3
		4	2
		5	2
		6	1
104	Telephone contacts	1	5
		2	4
		3	3
		4	3
		5	2
		6	1
106	Getting along	1	3
		2	2
		3	1
107	Attendance at religious services	1	5
		2	5
		3	4
		4	3
		5	2
		6	1
108	Voluntary group membership	0	0
		1	1
		2	2
		3	3
		4	4
		5 or higher	5
109	Level of group activity	1	4
		2	3
		3	2
		4	1

^aItem number from the Seattle Medical History
Questionnaire, Form A.

^bThis column explains the recoding process, which
involves changing the precoded values printed in the
questionnaire or those written in for continuous
variables.

Mean health criterion scores for revised item groupings are presented in Tables 11 through 20 (see Appendix Tables A.7 through A.36 for site-specific scores). A summary of significant F values and deviations from linearity are presented in Table 21 for the combined-site sample and in Appendix Tables A.37 through A.39 for each site. As can be seen from these tables, resulting scores were in ranked order. The goal of ordinal scales was met even in the few cases where mean scores deviated significantly from linearity. For example, mean scores for the item getting along with others were successively higher at each response level. Significant deviations from linearity for this item were due to intervals of different width which caused the resulting curve to level off. Other items which deviated from linearity had mean scores within 1/5 of a standard deviation of each other and thus were essentially the same, while others were based on small sample sizes in one category at the extreme end of the distribution and are, therefore, questionable.

As a further check on the ordinality of scales, product moment r 's and eta coefficients for the social items and three criterion variables were compared before and after item revisions (see Table 22). In most cases, eta coefficients remained essentially the same while product moment r 's remained the same or increased slightly after revisions. Deviations from linearity decreased approximately 40 percent after revisions. In the remaining cases where coefficients deviated significantly from linearity, a more quantitative approach was used to indicate the extent to which the relationship between the social well-being items and criterion variables was nonlinear.[7] These further

[7] We looked at how much of the explainable variance was accounted for by a scoring rule that assumes a linear relationship. To do this,

Table 11

MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN NUMBER
OF NEIGHBORHOOD FAMILY ACQUAINTANCES, COMBINED SAMPLE (N=4603)

Criterion Variables	Number of Neighborhood Family Acquaintances						
	0 (N=951)	1 (N=677)	2 (N=771)	3 (N=642)	4 (N=435)	5-10 (N=919)	11-High (N=152)
<u>Current Health</u>							
Raw Score	34.27 (7.29)	34.68 (6.85)	35.07 (6.78)	34.98 (6.81)	34.78 (6.86)	34.93 (7.20)	35.73 (6.72)
Standardized Score	492.41 (104.20)	498.32 (97.94)	503.86 (96.93)	502.68 (97.35)	499.75 (98.01)	501.89 (102.94)	513.34 (95.98)
<u>Emotional Ties</u>							
Raw Score	13.49 (3.57)	13.71 (3.50)	14.22 (3.07)	14.23 (3.12)	14.36 (3.02)	14.60 (2.82)	14.80 (3.03)
Standardized Score	480.93 (111.48)	487.77 (109.48)	503.75 (95.87)	503.89 (97.40)	507.98 (94.28)	515.41 (88.07)	521.96 (94.77)
<u>Positive Well-Being</u>							
Raw Score	35.71 (8.12)	36.09 (8.32)	37.62 (7.49)	38.06 (7.60)	38.30 (7.18)	39.24 (7.01)	40.56 (7.90)
Standardized Score	476.10 (105.98)	481.02 (108.56)	500.99 (97.74)	506.66 (99.17)	509.76 (93.72)	522.14 (91.49)	539.24 (103.00)

^aStandard deviation in parentheses.

Table 12
MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN NUMBER OF FRIENDS AND RELATIVES,
COMBINED SAMPLE (N=4603)

Criterion Variables	Number of Friends/Relatives									36-High (N=110)
	0 (N=85)	1 (N=204)	2 (N=380)	3 (N=445)	4 (N=486)	5-9 (N=1460)	10-20 (N=1159)	21-25 (N=108)	26-35 (N=81)	
<u>Current Health</u>										
Raw Score	31.33 (7.98)	32.95 (7.34)	33.57 (7.21)	34.33 (6.84)	34.97 (6.62)	34.96 (6.88)	35.48 (6.98)	36.01 (6.90)	34.64 (7.89)	35.88 (6.65)
Standardized Score	450.45 (114.11)	473.61 (104.86)	482.52 (102.99)	493.35 (97.74)	502.43 (94.65)	502.31 (98.36)	509.78 (99.70)	517.32 (98.68)	497.78 (112.71)	515.50 (95.04)
<u>Emotional Ties</u>										
Raw Score	11.98 (4.22)	12.71 (3.57)	13.06 (3.52)	13.54 (3.37)	13.87 (3.14)	14.15 (3.13)	14.76 (2.87)	15.02 (2.89)	15.12 (2.94)	15.95 (2.24)
Standardized Score	433.57 (131.75)	456.43 (111.61)	467.31 (109.88)	482.28 (105.37)	492.76 (97.94)	501.41 (97.74)	520.55 (89.68)	528.60 (90.20)	531.88 (91.80)	557.70 (70.11)
<u>Positive Well-Being</u>										
Raw Score	31.24 (8.75)	32.72 (9.24)	34.92 (8.22)	35.57 (8.07)	36.57 (7.53)	37.89 (7.28)	39.35 (6.82)	40.40 (7.29)	41.49 (7.50)	43.33 (6.29)
Standardized Score	417.68 (114.10)	437.05 (120.50)	465.72 (107.22)	474.20 (105.31)	487.30 (98.22)	504.46 (95.02)	523.47 (88.99)	537.25 (95.06)	551.48 (97.87)	575.39 (82.05)

^aStandard deviation in parentheses.

Table 13

MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN FREQUENCY OF VISITS WITH FRIENDS AND RELATIVES, COMBINED SAMPLE (N=4603)

Criterion Variables	Number of Visits with Friends/Relatives		
	<5 times a year (N=306)	5-10 times/yr or once a month (N=837)	2 or 3 times/mo (N=902)
			Once a week or several days a week or every day (N=2531)
<u>Current Health</u>			
Raw Score	32.94 (8.01)	33.93 (7.06)	34.34 (6.96)
Standardized Score	473.53 (114.52)	487.62 (100.85)	493.48 (99.54)
			509.33 (97.03)
<u>Emotional Ties</u>			
Raw Score	12.87 (3.95)	13.98 (3.25)	14.13 (3.18)
Standardized Score	461.52 (123.49)	496.30 (101.52)	500.92 (99.29)
			505.18 (97.04)
<u>Positive Well-Being</u>			
Raw Score	34.51 (9.41)	36.40 (8.04)	37.23 (7.79)
Standardized Score	460.41 (122.68)	485.04 (104.81)	495.84 (101.63)
			510.98 (96.02)

^aStandard deviation in parentheses.

Table 14

MEAN HEALTH CRITERION SCORES FOR REVISED GROUPS
DIFFERING IN FREQUENCY OF HOME VISITS BY
FRIENDS, COMBINED SAMPLE (N=4603)

Criterion Variable	Number of Visits by Friends		
	Not at All (N=681)	Once Past Month (N=622)	2 or 3 Times a Month, Once a Week, Several Days a Week, or Every Day (N=3278)
<i>Current health</i>			
Raw score	33.09 (7.26)	34.18 (6.91)	35.25 (6.90)
Standardized score	475.67 (103.74)	491.16 (98.71)	506.52 (98.64)
<i>Emotional Ties</i>			
Raw score	13.22 (3.76)	14.06 (3.26)	14.28 (3.07)
Standardized score	472.47 (117.44)	498.74 (101.74)	505.64 (95.85)
<i>Positive well-being</i>			
Raw score	34.71 (9.01)	36.86 (7.94)	38.25 (7.34)
Standardized score	463.05 (117.48)	491.08 (103.52)	509.14 (95.77)

NOTE: Standard deviation in parentheses.

Table 15

MEAN HEALTH CRITERION SCORES FOR REVISED GROUPS
DIFFERING IN FREQUENCY OF VISITS TO HOMES
OF FRIENDS, COMBINED SAMPLE (N=4603)

Criterion Variable	Number of Visits to Friends		
	Not at All (N=583)	Once Past Month or 2 or 3 Times a Month (N=2044)	Once a Week, Several Days a Week, or Every Day (N=1953)
<i>Current health</i>			
Raw score	32.58 (7.62)	34.65 (6.89)	35.60 (6.78)
Standardized score	468.39 (108.86)	497.97 (98.52)	511.52 (96.82)
<i>Emotional ties</i>			
Raw Score	13.59 (3.55)	14.28 (3.13)	14.06 (3.21)
Standardized score	484.03 (110.82)	505.40 (97.90)	498.54 (100.31)
<i>Positive well-being</i>			
Raw score	34.66 (8.84)	37.49 (7.60)	38.46 (7.46)
Standardized score	462.33 (115.31)	499.25 (99.08)	511.89 (97.33)

NOTE: Standard deviation in parentheses.

Table 16

MEAN HEALTH CRITERION SCORES FOR REVISED GROUPS DIFFERING IN
FREQUENCY OF TELEPHONE CONTACTS: COMBINED SAMPLE (N=4603)

Criterion Variable	Number of Telephone Contacts				
	Not at All (N=226)	Once Past Month (N=168)	2-3 Times/ Month or Once a Week (N=1582)	Several Days a Week (N=1598)	Every Day (N=1012)
<i>Current Health</i>					
Raw score	33.04 (7.48)	33.42 (6.34)	34.76 (6.79)	35.18 (7.03)	34.85 (7.21)
Standardized score	474.95 (106.87)	480.32 (90.57)	499.41 (97.09)	505.48 (100.49)	500.71 (102.97)
<i>Emotional Ties</i>					
Raw score	13.14 (3.66)	13.23 (3.39)	14.16 (3.19)	14.14 (3.24)	14.29 (3.08)
Standardized score	469.76 (114.23)	472.66 (105.98)	501.71 (99.65)	501.11 (101.20)	505.72 (96.21)
<i>Positive Well-Being</i>					
Raw score	33.88 (9.57)	34.84 (7.61)	37.04 (7.65)	38.30 (7.60)	38.37 (7.53)
Standardized score	452.21 (124.84)	464.68 (99.30)	493.45 (99.82)	509.89 (99.14)	510.75 (98.20)

NOTE: Standard deviation in parentheses.

Table 17

MEAN HEALTH CRITERION SCORES FOR GROUPS DIFFERING IN
ABILITY TO GET ALONG WITH OTHERS,
COMBINED SAMPLE (N=4603)

Criterion Variable	Getting Along:		
	Not as Well (N=165)	Same as Usual (N=3583)	Better Than Normal (N=827)
<i>Current health</i>			
Raw score	30.41 (7.73)	34.72 (6.99)	35.94 (6.54)
Standardized score	437.25 (110.48)	498.86 (99.90)	516.29 (93.52)
<i>Emotional ties</i>			
Raw score	11.27 (3.54)	14.18 (3.21)	14.31 (2.99)
Standardized score	411.49 (110.56)	502.29 (100.23)	506.44 (93.41)
<i>Positive well-being</i>			
Raw score	29.45 (7.75)	37.40 (7.70)	39.79 (7.02)
Standardized score	394.37 (101.12)	498.04 (100.49)	529.31 (91.50)

NOTE: Standard deviation in parentheses.

Table 18

MEAN HEALTH CRITERION SCORES FOR REVISED GROUPS DIFFERING
IN FREQUENCY OF ATTENDANCE AT RELIGIOUS SERVICES,
COMBINED SAMPLE (N=4603)

Criterion Variable	Frequency of Attendance				
	Not at All (N=2443)	Once a Month (N=416)	2 or 3 Times a Month (N=486)	Once a Week (N=784)	More Than Once a Week or Every Day (N=458)
<i>Current health</i>					
Raw score	34.82 (7.06)	34.94 (7.05)	34.74 (7.06)	35.02 (6.67)	34.22 (7.18)
Standardized score	500.29 (100.84)	502.07 (100.70)	499.21 (100.81)	503.25 (95.31)	491.74 (102.52)
<i>Emotional ties</i>					
Raw score	13.89 (3.34)	14.11 (3.20)	14.16 (3.10)	14.41 (3.06)	14.59 (2.94)
Standardized score	493.37 (104.42)	500.35 (99.99)	501.80 (96.85)	509.60 (95.65)	515.16 (91.84)
<i>Positive well-being</i>					
Raw score	36.71 (8.14)	37.61 (7.53)	38.35 (7.16)	38.50 (7.16)	39.48 (7.26)
Standardized score	489.12 (106.14)	500.88 (98.21)	510.52 (93.43)	512.47 (93.41)	525.18 (94.67)

NOTE: Standard deviation in parentheses.

Table 19

MEAN HEALTH CRITERION SCORES FOR REVISED GROUPS DIFFERING IN
VOLUNTARY GROUP MEMBERSHIP, COMBINED SAMPLE (N=4603)

Criterion Variable	Number of Groups					
	0 (N=2242)	1 (N=1022)	2 (N=642)	3 (N=362)	4 (N=153)	5-High (N=142)
<i>Current health</i>						
Raw score	34.70 (7.06)	34.42 (7.03)	35.12 (6.79)	34.95 (6.88)	35.48 (6.76)	36.47 (7.10)
Standardized score	498.65 (100.84)	494.63 (100.47)	504.61 (97.06)	502.23 (98.25)	509.81 (96.60)	523.93 (101.52)
<i>Emotional ties</i>						
Raw score	13.78 (3.34)	13.99 (3.25)	14.57 (2.96)	14.77 (2.71)	14.95 (2.88)	15.24 (2.87)
Standardized score	489.79 (104.42)	496.46 (101.47)	514.64 (92.55)	520.82 (84.77)	526.59 (90.04)	535.39 (89.66)
<i>Positive well-being</i>						
Raw score	36.38 (8.09)	37.24 (7.54)	38.96 (6.96)	39.75 (6.92)	41.37 (6.00)	41.61 (7.45)
Standardized score	484.82 (105.50)	496.04 (98.37)	518.49 (90.75)	528.75 (90.28)	549.90 (78.21)	553.03 (97.23)

NOTE: Standard deviation in parentheses.

Table 20

MEAN HEALTH CRITERION SCORES FOR GROUPS DIFFERING IN
LEVEL OF GROUP ACTIVITY: COMBINED SAMPLE (N=4603)

Criterion Variable	Activity Level			
	Does Not Belong (N=2188)	Not Active (N=499)	Fairly Active (N=880)	Very Active (N=932)
<i>Current Health</i>				
Raw score	34.66 (7.06)	34.16 (7.34)	35.11 (6.84)	35.14 (6.82)
Standardized score	498.03 (100.85)	490.90 (104.92)	504.54 (97.82)	504.87 (97.49)
<i>Emotional Ties</i>				
Raw score	13.78 (3.35)	13.95 (3.36)	14.36 (2.99)	14.70 (2.96)
Standardized score	489.85 (104.63)	495.22 (105.11)	508.20 (93.31)	518.64 (92.43)
<i>Positive Well-Being</i>				
Raw score	36.39 (8.14)	37.06 (7.44)	38.72 (7.21)	39.59 (7.01)
Standardized score	484.97 (106.23)	493.64 (97.05)	515.28 (94.03)	526.66 (91.42)

NOTE: Standard deviation in parentheses.

Table 21

SUMMARY OF F RATIOS FOR DIFFERENCES BETWEEN GROUP MEANS (GM) AND NONLINEAR TRENDS (NL), THREE CRITERION VARIABLES, COMBINED SAMPLE (N=4603)

Social Item	Criterion Variables					
	Current Health		Emotional Ties		Positive Well-Being	
	GM	NL	GM	NL	GM	NL
Neighborhood acquaintances	1.72	<1	13.12**	1.02	25.71**	1.19
Close friends and relatives	7.47**	1.59	27.22**	<1	45.19**	<1
Visits with friends/relatives	20.23**	<1	17.72**	8.19**	32.43**	1.12
Home visits by friends	29.85**	<1	30.97**	4.56*	62.20**	1.20
Visits to homes of friends	43.08**	6.22**	10.46**	18.78**	54.61**	13.93**
Telephone contacts	6.42**	4.12**	9.23**	5.00**	26.35**	5.53**
Getting along	44.40**	23.66**	68.06**	90.55**	131.00**	63.83**
Attendance at religious services	1.04	1.21	7.08**	<1	18.54**	<1
Voluntary group membership	2.91**	1.56	16.60**	<1	36.84**	<1
Activity in groups	3.00*	2.24	20.60**	<1	46.08**	<1

*

p < .05

**

p < .01

Note: Tables 11 through 20 show the number of categories for each social item necessary for determining the degrees of freedom for each test.

Table 22

PRODUCT MOMENT R AND ETA COEFFICIENTS^a FOR SOCIAL ITEMS AND THREE CRITERION
VARIABLES BEFORE AND AFTER REVISIONS, COMBINED SAMPLE (N=4603)

Social Item	Before Revisions						After Revisions					
	Current Health			Emotional Ties			Positive Well-Being			Current Health		
	r	eta	r	eta	r	eta	r	eta	r	eta	r	eta
Neighborhood acquaintances	-	-	.11*	.13*	.17*	.18*	-	-	.13	.13	.18	.18
Close friends and relatives	.08*	.13*	.19*	.23*	.25*	.29*	.11	.12	.22	.23	.29	.29
Visits with friends/relatives	.12	.12	.07*	.12*	.15	.15	.11	.11	.09*	.11*	.14	.14
Home visits by friends	.10*	.12*	.06*	.13*	.13*	.16*	.11	.11	.11*	.11*	.16	.16
Visits to homes of friends	.13*	.14*	.00*	.09*	.13*	.15*	.13*	.14*	.02*	.07*	.14*	.15*
Telephone contacts	.05*	.08*	.07*	.09*	.14*	.15*	.05*	.07*	.07*	.09*	.14*	.15*
Getting along	.12*	.14*	.10*	.17*	.20*	.23*	.12*	.14*	.10*	.17*	.20*	.23*
Attendance at religious services	-	-	.08	.08	.12	.13	-	-	.08	.08	.12	.13
Voluntary group membership	.04	.06	.13	.13	.20	.20	.04	.06	.13	.13	.19	.20
Activity in groups	.03	.04	.12	.12	.17	.17	.03	.04	.12	.12	.17	.17

^a Coefficients omitted when between groups F ratio was not significant (i.e. chance probability greater than 0.05).

* Significant deviation from linearity.

analyses supported the goal of ordinality of scales (see Appendix Table A.40).

Significant F values in Table 21 and Appendix Tables A.37 through A.39 generally support the second and third goals of consistent conclusions across competing criterion variables and sites. Significant mean score differences were obtained for all items across sites (except for attendance at religious services in Massachusetts) when Positive Well-Being was used as the criterion variable, supporting the notion that mental health is strongly related to social well-being. Similarly, significant differences across sites were also obtained for all but three items in the Massachusetts site and one item in the Seattle site when Emotional Ties was used as the criterion variable. Current Health appeared to be the least related variable, and in fact appeared to have no relationship in any site with attendance at religious services. Conclusions thus appear consistent across sites and criterion variables (except for Current Health), supporting the validity of resulting scores.

Our method of scoring social well-being levels appeared valid and resulted in several changes in conclusions. Factor analyses among the original unrecoded social items showed one factor which grouped together two items: number of close friends/relatives and number of neighborhood

we computed the ratio of r squared to η squared. If the plot of group means for social well-being categories is linear, η squared should equal r squared. When nonlinear, η squared is substantially larger than r squared. η squared and r squared were used as opposed to η and r , since they define the proportion of variance with and without linearity and can be compared directly on a ratio scale. In 27 out of 30 instances (see Table A.40) the revised scoring was naturally better than or equal to the original item scoring.

family acquaintances. Upon rescoring the social items, the validity of this factor changed and the two items no longer grouped together. The original factor evidently reflected methodological similarities among items (i.e., these two items loaded highly on the same factor because they were both continuous variables). The rescoring of items allowed the true nature of the factors to emerge.

Similarly, factor analyses of the original unrecoded social items suggested that the item pertaining to religious attendance defined the same factor as number of voluntary groups and level of activity in groups. When items were recoded based on the revised scoring rules, a different conclusion was reached. Attendance at religious services no longer loaded as highly with the factor defining group activity in two of the three sites. Given our goal of generalizability across sites, we decided to define a group activity scale that excluded the religious attendance item. This finding points up the importance of the item scoring process.

Table 23 presents summary statistics for the 10 revised social items. Means for items are comparable across sites (see Appendix Table A.41), with South Carolina participants showing slightly more religious attendance, group memberships, and group activity. Items appear to be skewed toward the lower end of the distribution for neighborhood family acquaintances and voluntary group memberships. The different variances between items will need to be taken into account when constructing multi-item scales.

Table 23

SUMMARY STATISTICS FOR TEN HIE SOCIAL ITEMS USING REVISED
CODING RULES: COMBINED SAMPLE (N=4603)

Social Item	Number Possible and Observed		Mean	Standard Deviation	Variance
	Lowest	Highest			
Neighborhood acquaintances	0	6	2.51	1.90	3.61
Close friends and relatives	0	9	4.62	1.79	3.21
Visits with friends/relatives	1	4	3.24	0.97	0.95
Home visits by friends	1	3	2.57	0.74	0.54
Visits to homes of friends	1	3	2.30	0.68	0.46
Telephone contacts	1	5	3.65	1.02	1.04
Getting along with others	1	3	2.14	0.44	0.20
Attendance at religious services	1	5	2.22	1.48	2.18
Voluntary group membership	0	5	1.03	1.32	1.75
Activity in groups	1	4	2.12	1.22	1.50

V. RESULTS: CONSTRUCTION OF MULTI-ITEM SCALES

For purposes of the Health Insurance Experiment, a second major step in the analysis was to look at the possibility that social items could be grouped together to define multi-item scales. If there is a single social well-being dimension underlying the social items, it seems appropriate to construct an overall scale that would provide a basis for testing hypotheses about the effects of different financing arrangements on social well-being. Arguing against the construction of an overall index is the consistent observation that social well-being items are heterogeneous in content and only weakly related empirically (Donald et al., 1978). The tradeoff seems to be between the simplicity of a single indicator of social well-being and the substantial loss of information that may occur when weakly related variables are aggregated or the possibly misleading inferences that might be drawn from an aggregate measure. The results described in the following sections are designed to address the appropriateness of defining multi-item social well-being measures.

Several a priori groupings could be hypothesized in advance. First, item groupings could be hypothesized based on major role areas identified in the literature. Second, groupings could be based on distinctions between social resources and social contacts. Third, groupings could be based on subjective versus quantitative items. We chose to emphasize the first approach since theory was not well-developed on the differences between social resources and contacts. In addition, since our subjective social items are included in the

mental health battery (e.g., feeling loved and wanted), use of the subjective items would confound the definitions of HIE measures of mental health and social well-being. Thus, the following sections proceed with the hypothesized groupings previously discussed and summarized in Table 4.

Empirical studies designed to test the appropriateness of constructing multi-item scales from the HIE revised social items used data from the Seattle, Fitchburg/Franklin County, and Charleston/Georgetown County enrollment questionnaires. These studies concentrated on 10 social items that were shown to be consistently related to the criterion variables. Results of these studies are discussed in the following order: (1) missing responses, (2) factor analytic and Likert-type scaling studies of hypothesized item groupings, (3) descriptive statistics for final scales, (4) reliability and stability of item and scale scores, (5) associations among social measures, and (6) associations between social well-being measures and selected sociodemographic and health variables. Although all analyses were replicated across sites, the findings will focus on the combined sample. Noteworthy differences between sites are noted when appropriate.

MISSING RESPONSES: ITEMS

Missing responses for the 10 social items were very low. All items had at least eleven respondents missing (out of 4603 for the sample combined across sites); however, there were never more than 100 respondents missing on any item (2.2 percent). Of 46,030 possible responses, fewer than one percent were missing. All analyses were conducted on respondents with complete data.

FACTOR ANALYSIS TO TEST HYPOTHESIZED ITEM GROUPINGS

The appropriateness of multi-item social subscales (as hypothesized in Table 4) was first evaluated using factor analysis. The goal of this analysis was to determine whether the number of social variables could be reduced from 10 to a meaningful few without substantial loss of information. Due to the limited number of items in the HIE social battery and their heterogeneity, we were somewhat skeptical about defining well the various dimensions of social well-being discussed in the literature. For example, because only one subjective social well-being rating item was represented, it was not possible at the outset to identify a common subjective social well-being dimension.

Product-moment correlations among the 10 social items were factor analyzed using the Principal Components method (i.e., with unities in the diagonal) to test for unhypothesized item groupings and to test the structure hypothesized in Table 4. Items were scored positively (i.e., a high score indicated a more favorable social score) using the coding rules given in Table 10. The 10-item correlation matrix is presented in Table 24.

Unrotated factor loadings for the social items (all sites combined) are presented in Table 25. Three factors were associated with eigenvalues equal to or greater than unity and accounted for approximately 55 percent of the total measured variance. A general factor (accounting for approximately 26 percent of the total variance) was observed in the unrotated solution. Correlations between this first factor and the 10 items ranged from 0.26 to 0.60 with a median of 0.52. The lowest correlation (0.26) was observed for the single subjective rating item

Table 24
INTER-ITEM CORRELATION MATRIX, SOCIAL
ITEMS, ALL SITES COMBINED

Item Number and Abbreviated Content	Item Number									
	1	2	3	4	5	6	7	8	9	10
1. Neighborhood acquaintances	1.00									
2. Close friends and relatives	.16	1.00								
3. Visits with friends/relatives	.12	.20	1.00							
4. Home visits by friends	.21	.18	.41	1.00						
5. Visits to homes of friends	.23	.15	.46	.51	1.00					
6. Telephone contacts	.10	.20	.27	.24	.25	1.00				
7. Getting along	.06	.13	.08	.08	.12	.08	1.00			
8. Attendance at religious services	.20	.04	-.01	.02	.03	.07	.07	1.00		
9. Voluntary group membership	.23	.15	.02	.04	.03	.11	.06	.36	1.00	
10. Level of group activity	.20	.14	.03	.05	.04	.13	.08	.42	.73	1.00

Table 25

UNROTATED FACTOR LOADINGS FOR SOCIAL ITEMS,
ALL SITES COMBINED

Abbreviated Item Content	Factors		
	I	II	III
Neighborhood acquaintances	.50	.08	-.22
Close friends and relatives	.45	-.09	.45
Visits with friends/relatives	.54	-.50	-.08
Home visits by friends	.58	-.48	-.20
Visits to homes of friends	.60	-.50	-.18
Telephone contacts	.49	-.21	.14
Getting along with others	.26	-.03	.79
Attendance at religious services	.41	.52	-.11
Voluntary group membership	.56	.65	-.04
Level of group activity	.58	.66	-.04
Percent of Variance	25.6	19.2	10.0

pertaining to getting along with others; the highest correlation (0.60) was observed for the item pertaining to visits to homes of friends. (Appendix Table A.42 presents a site-by-site summary of correlations between the 10 social items and the first unrotated component).

The three factors were rotated to orthogonal simple structure to facilitate interpretation. Results for the combined sites analysis are presented in Table 26 (see Appendix Tables A.43 through A.45 for site-specific findings). The items, which are listed in the first column, have been organized (by rows) in terms of the factors they correlated highest with and the absolute magnitude of their correlations with that factor. For example, all items that correlated highest with the first

Table 26
ROTATED FACTOR LOADINGS FOR SOCIAL ITEMS,
ALL SITES COMBINED^a

Abbreviated Item Content	Factors			h ²
	I	II	III	
Visits to homes of friends	.80	.01	.05	.64
Home visits by friends	.78	.02	.04	.61
Visits with friends/relatives	.73	-.05	.13	.55
Telephone contacts	.44	.12	.30	.30
Level of group activity	.01	.87	.12	.77
Voluntary group membership	.00	.85	.11	.74
Attendance at religious service	.00	.67	.00	.46
Neighborhood acquaintances	.38	.40	-.04	.31
Getting along with others	-.03	-.01	.84	.70
Close friends and relatives	.25	.12	.58	.41

^aN's range from 4503 to 4592 due to missing data.

factor are included in the first group. The right-hand column of each table indicates each item's communality, which is the percentage of measured variance explained by a three-factor solution.

The pattern of correlations in each column was inspected in relation to item content as a first basis for interpreting the rotated factors. The first rotated factor correlated very highly (> 0.73) with the three items pertaining to visitations. All other items except for telephone contacts, neighborhood family acquaintances, and number of close friends and relatives had trivial correlations with the first factor. Thus, Factor I could be reasonably interpreted as a "social contacts" dimension of social well-being.

The second factor correlated very highly (> 0.85) with two items pertaining to group membership and level of group activity. Religious attendance and neighborhood family acquaintances correlated substantially with Factor II although notably lower in magnitude than the two group items. Factor II was labeled "group participation."

The third rotated factor correlated very highly (0.84) with the subjective rating of how well one gets along with others and correlated substantially (0.58) with the item measuring number of close friends and relatives. The remaining items (except for telephone contacts) had trivial correlations with this factor. Thus, Factor III appears to define a subjective component of social well-being, which is not well-represented by the 10 items available for analysis.

As would be expected if dimensions of social well-being are not independent, three items correlated with more than one factor. Telephone contacts and the number of close friends and relatives correlated with both the social contacts and qualitative dimensions of social well-being. Neighborhood family acquaintances correlated with both the social contacts and group participation dimensions. These secondary correlations were of moderate magnitude.

The combined-sites factor structure presented in Table 26 was also observed in each of the site-specific analyses (see Tables A.43 through A.45). In all three sites, the three visitations items correlated highly with the same factor as did the two items pertaining to level of group activity and group membership. The one subjective rating item defined a third factor in all sites. The neighborhood family acquaintances and close friends and relatives items correlated with more

than one factor in all sites, while the telephone contacts item correlated with more than one factor in all sites but Seattle. The attendance at religious services item correlated with both the group participation factor and the subjective factor in the Fitchburg/Franklin County site. Thus, the factor structure of these items was generally consistent across sites with the exception of the anomaly for the religious attendance item in the Massachusetts site.

These empirical findings generally confirmed the community participation and subjective social well-being item groupings hypothesized in Table 4. Our hypothesized distinction between the Social and Family/Social item groupings was not supported empirically. This hypothesis was based on the literature, which suggests that social activities with friends should be distinguished from those with relatives. In retrospect, evaluation of the content of HIE items, and particularly the confounding of activities with friends and relatives in some items, suggests this battery does not permit a good test of this hypothesis. Given the consistency of our empirical findings across sites, we revised our item groupings to define two multi-item subscales (based on the similarity of activities rather than by role areas) and adopted one overall index, as follows: (1) a Social Contacts Scale containing the three visitations items which correlated highly with one another (item numbers 3, 4 and 5 from Table 24), (2) a Group Participation Scale containing the two items pertaining to group memberships and level of group activity (item numbers 9 and 10), and (3) an overall Social Well-Being Index containing nine items, omitting the "getting along with others" item that correlated lowest with the first unrotated component (item numbers 1-6 and 8-10). These three measures

were then evaluated according to multitrait scaling criteria to determine the appropriateness of a more simple summated ratings method of scale scoring. Results are presented below.

TESTS OF SUMMATED RATINGS SCALES

The summated ratings method was used to test both the internal consistency of our revised item groupings and the discriminant validity of each item in relation to scales defined by summated item scores. The internal consistency criterion requires that each item be substantially correlated (0.40 for the subscales and 0.30 for the overall index) with the sum of the other items in the same hypothesized grouping. The discriminant validity criterion requires that the correlation between an item and its hypothesized subscale be higher than correlations between that item and other subscales constructed using the same method. We used this method of summated ratings rather than one which puts different weights on each item (i.e., a more complicated factor scoring method) to reduce the complexity of the scoring process. The summated ratings method allows subscales to be statistically correlated and we feel more confident in the interpretation of subscales scored using this method, as opposed to factor scores.

Table 27 presents the combined sites matrix of correlations between each of the 10 social items and two subscales and an overall index scored using the method of summated ratings (see Appendix Tables A.46 through A.48 for site-specific matrices). These matrices were used to evaluate the internal consistency of the three multi-item scales and the discriminant validity of items used to score the two subscales. Item-scale correlations, which were corrected for overlap to achieve more stringent tests, are indicated by asterisks. These asterisks also

Table 27

CORRELATION BETWEEN SOCIAL ITEMS AND THREE HYPOTHESIZED
SCALES, ALL SITES COMBINED

Abbreviated Content	Group Participation	Social Contacts	Social Well-Being Index
Neighborhood acquaintances	23	22	33*
Close friends and relatives	16	22	26*
Visits with friends/relatives	03	50*	27*
Home visits by friends	05	52*	34*
Visits to homes of friends	04	57*	34*
Telephone contacts	13	32	29*
Getting along with others	08	11	16
Religious attendance	42	01	29*
Voluntary group membership	73*	04	44*
Level of group activity	73*	05	47*

NOTES: Decimals have been omitted. The standard error for each correlation is 0.015.

* Item-scale correlation is corrected for overlap (i.e., correlation between item and the sum of all other items in that scale).

identify items used to score each subscale. Two criteria were applied to these data. First, to satisfy the internal consistency criterion, correlations identified by asterisks should be substantial (0.40 or higher) and positive. Second, to satisfy the discriminant validity criterion, correlations identified by asterisks should be higher than other correlations for subscales in the same row.

Inspection of coefficients identified by asterisks for the Group Participation and Social Contacts subscales indicates that item-scale correlations were greater than 0.50 in all instances across sites and exceeded 0.73 for items in the Group Participation scale. Correlations between items in the Social Contacts subscale and that subscale were

roughly of the same magnitude. Thus, the internal consistency criterion was satisfied for the two subscales. Correlations between nine of the items and the overall Social Well-Being Index defined by their sum should also be substantial because of the general factor they have in common. (The nine items used to score this index are identified by asterisks in the last column in Table 27.) These correlations ranged from 0.26 to 0.47 with a median of 0.33 for the combined sample. The lowest correlation was observed for the item pertaining to number of close friends and relatives (and to religious attendance in the Fitchburg/Franklin County site). All but three of the nine correlations exceeded or were within two points of the 0.30 internal consistency criterion desired as a basis for a summary index. The one item not used in the index ("getting along with others") correlated only 0.16 with the index in the combined sites sample. These results, along with factor analytic findings that found correlations between the nine Social Well-Being Index items and the first unrotated component exceeding 0.30 in all sites and in the combined sites analysis, provide internal consistency evidence supporting use of an overall index for hypothesis testing in the HIE. The fact that the "close friends and relatives" item correlated lowest with the overall index may reflect the fact that this item is a more qualitative dimension of social well-being. It, like the item pertaining to "getting along with others," reflects the social resources the individual can rely on when needed. The remaining items (except for, possibly, neighborhood family acquaintances and group membership) are more objective and refer to the social contacts or activities that are

initiated by the individual or directed toward the individual by others. Thus, although empirical evidence supports the construction of an overall index, the dimensionality of the individual social items suggests that we should be cautious in interpreting the index without first testing each part of the index. Problems associated with the aggregation of social items are discussed in a later section of this report.

The second scaling criterion (item discriminant validity) was applied to the five items used to score the two multi-item subscales. Items in both the Group Participation and Social Contacts subscales satisfied the discriminant validity criterion. As seen in Table 27, the correlation (corrected for overlap) between each item and its hypothesized subscale was more than two standard errors higher than the correlation between the item and the other subscale. In a few cases, items not hypothesized in one of the subscales discriminated between them, but the relative magnitude of the correlation was not as high as others in that subscale. For example, the item pertaining to attendance at religious services discriminated between the Group Participation and Social Contacts subscales, yet its correlation with Group Participation was much lower (0.42) than the correlations between the hypothesized items and that scale (0.73). The internal consistency reliability of the Group Participation subscale was also much lower when the religious attendance item was included in that subscale. Therefore, we decided to score and interpret the religious attendance item separately from this subscale. This decision is also supported by an argument based on face validity and interpretation. Participation in religious services and related group activities may have a different meaning and social value than participation in nonreligious group activities.

HIE SOCIAL WELL-BEING SUBSCALES

The scaling studies discussed above identified enough overlap among the 10 HIE social items to define two multi-item subscales (Group Participation and Social Contacts) using 5 of the 10 items. These subscales differed somewhat from those originally hypothesized from our literature review (see Donald et al., 1978). Our subscales aggregate social items that appear to measure the same type of activity (i.e., visitations, group activity) rather than according to specific role areas (i.e., family, social). We also decided to score an overall summary index using nine of the 10 social items, although its interpretation is problematic because of the heterogeneity of item content and weak inter-item correlations.

Because items used to compute each subscale had different variances, items were standardized to a mean of zero and a standard deviation of one after coding questionnaire responses so that high scores defined more social activities and resources (see Appendix Table A.49 for coding rules and method of scoring). Standardized items were then summed to score one or more of the three multi-item scales. For purposes of the HIE, final social measures were transformed to a 0-100 scale to facilitate comparisons of scores across scales.[8] A summary of the meaning of very high and very low scores on each of the social well-being subscales is presented in Table 28. Each subscale is scored positively so that a high score means more of the phenomenon described in the scale label.

[8] The following formula was used to transform scale scores to a 0-100 scale:

$$\text{Transformed score} = \frac{(\text{scale} - \text{minimum value})}{(\text{maximum value} - \text{minimum value})} \times 100.$$

Table 28
MEANING OF HIGH AND LOW SCORES FOR HIE SOCIAL WELL-BEING SCALES

Scale	Meaning of Scores	
	High	Low
Social contacts	Home visits by friends two or three times a month or more; visits with friends and relatives and visits to homes of friends once a week or more	No visits with friends and relatives or visits to homes of friends or home visits by friends
Group Participation	Five or more group memberships and very active in group activities	Does not belong to any groups
Social Well-Being Index	Eleven or more neighborhood acquaintances; 36 or more friends and relatives; home visits by friends two or three times a month or more; visits with friends and relatives and visits to homes of friends once a week or more; telephone contacts every day; attends religious services more than once a week; five or more group memberships; and very active in group activities	No neighborhood acquaintances that you visit with, no close friends and relatives to talk to, no visitations with friends or relatives, no telephone contacts, no attendance at religious services in past month, no group memberships

In addition to the two multi-item subscales and the nine-item summary score, we recommend separate scoring and interpretation of five single-item social measures, including: number of neighborhood family acquaintances, number of close friends and relatives, telephone contacts, the rating of getting along with others, and attendance at religious services. One of these items, the subjective rating of getting along with others, was not included in the overall index or either of the multi-item subscales. The other four items were included in the overall index, but not in either multi-item subscale. These items appear to measure unique and important subdimensions of social well-being. Until their validity and that of the overall index is better understood, we recommend that they be scored and interpreted separately.

DESCRIPTIVE STATISTICS: SOCIAL WELL-BEING SUBSCALES

Means, standard deviations, and ranges were computed for the HIE social well-being measures to describe their score distributions across sites and to assess the skewness of scale scores. Table 29 presents descriptive statistics and range of scores for measures in the combined-site sample (see Appendix Table A.50 for site-specific statistics; see Appendix C for frequency distributions for the three multi-item scales both before and after transformation to a 0-100 range). The full range of possible scores was observed on all scales. Mean scores were lower in the Charleston/Georgetown County site for Social Contacts, yet higher for Group Participation and the overall index.

Mean scores were on the favorable side of the midpoint of the possible scale range for two multi-item measures (Social Contacts and

Table 29

DESCRIPTIVE STATISTICS FOR HIE SOCIAL WELL-BEING MEASURES
AND OBSERVED SCORES, ALL SITES COMBINED

Measure	Observed Scores ^a		Mean	Standard Deviation
	Lowest	Highest		
<i>Multi-item scales^b</i>				
Social contacts (3) ^c	0	100	72.45	27.47
Group participation (2) ^c	0	100	27.50	29.90
Social well-being index (9) ^c	0	100	51.59	15.92
<i>Single-item: converted scores^b</i>				
Neighborhood acquaintances	0	100	41.77	31.66
Close friends/relatives	0	100	51.38	19.92
Telephone contacts	0	100	66.38	25.46
Getting along	0	100	57.24	22.13
Religious attendance	0	100	30.41	36.88
<i>Single-item (revised raw scores)^d</i>				
Neighborhood acquaintances	0	6	2.51	1.90
Close friends/relatives	0	9	4.62	1.79
Telephone contacts	1	5	3.65	1.02
Getting along	1	3	2.14	0.44
Religious attendance	1	5	2.22	1.48

^aLowest and highest possible scores were observed.

^bScores transformed to a 0-100 scale.

^cNumber of items in parentheses.

^dUsing item scoring rules as defined in Table 10.

the Social Well-Being Index) and three single-item measures (telephone contacts, getting along, and number of close friends and relatives (except in South Carolina)). Mean scores were on the unfavorable side of the midpoint for the Group Participation scale and the single items pertaining to neighborhood family acquaintances and

religious attendance. Although formal power calculations were not conducted, the fairly substantial amount of score variability observed for the multi-item and single-item measures suggests they will have sufficient precision to test HIE hypotheses about social well-being.

RELIABILITY AND STABILITY OF ITEMS AND MULTI-ITEM MEASURES

Table 30 presents four kinds of reliability estimates for the ten social items. (Site-by-site estimates are given in Appendix Table A.51.) A variety of estimates are presented because the ones that would provide the most definitive information about these heterogeneous single-item measures could not be calculated. Ideally, test-retest coefficients with repeated administrations over a fairly short time interval (two to six weeks) would be evaluated. Because these are not available, we examine various kinds of internal-consistency reliability estimates, each problematic due to the assumptions it makes.

The first column of Table 30 gives the highest product-moment correlation between each item and the other nine items taken from Table 24. The second column gives correlation coefficients between each item and the overall Social Well-Being index containing nine of the ten social items. (The item pertaining to "getting along" was not included in the overall index.) Coefficients in the second column are corrected for overlap where appropriate. The third column gives multiple correlations between each item and a weighted linear combination of the other items. These correlations are lower-bound estimates of reliability based on a common variance model. The last column gives stability coefficients for each item estimated from repeated administrations of the battery over an approximately one-year interval.

Table 30
RELIABILITY ESTIMATES FOR SOCIAL ITEMS,
ALL SITES COMBINED^a

Item	Internal Consistency			Stability Coefficients ^e
	Highest r^b	Item-total Correlation ^c	R^d	
1. Neighborhood acquaintances	.23	.33	.36	.57
2. Close friends and relatives	.20	.26	.32	.50
3. Visits with friends/relatives	.46	.27	.53	.44
4. Home visits by friends	.51	.34	.57	.41
5. Visits to homes of friends	.46	.34	.60	.46
6. Telephone contacts	.27	.29	.36	.52
7. Getting along ^f	.13	.16	.17	.23
8. Religious attendance	.42	.29	.45	.80
9. Voluntary group membership	.73	.44	.73	.66
10. Level of group activity	.73	.47	.75	.64

^aN's range from 3098 to 4588 due to missing data and omission of the Dayton site.

^bHighest correlation between the item and the remaining nine social items.

^cCorrelation between item and the Social Well-Being Index. Note that the item-scale correlation is corrected for overlap (i.e., correlation between item and the sum of all other items in that scale).

^dMultiple correlation coefficient. These estimates were achieved by regressing each item on the remaining social items to find R (the correlation between each item and a weighted linear combination of the other items).

^eCoefficients computed between enrollment and the First Annual Health Questionnaire.

^fNot included in the overall index score used to estimate correlations in the second column.

As noted above, all of the coefficients in Table 30 are problematic from the point of view of reliability estimation. Coefficients in the first three columns are based on a common variance assumption, which is certain to be unjustified. These items were selected to have little or no overlap so that a range of social constructs could be covered by a short questionnaire battery. Hence, it is likely that the first three columns of coefficients underestimate the reliability of these items because the estimation models treat unique reliable variance as error. Interpretation of coefficients in the last column with reliability in mind assumes that social contacts and resources do not change over a one-year interval. This assumption is likely to be false. Hence, it is likely that the last column of coefficients underestimate the reliability of these questionnaire items. Ideally, test-retest estimates based on a short time interval between administrations would be evaluated for our purpose here.

The correlations in the first three columns are consistently lower than the stability coefficients for five of the items. This pattern of results confirms our suspicion that these items do not share much common variance due to the heterogeneity of underlying constructs being measured. Item-total and multiple correlation coefficients are highest for the two items pertaining to group membership and group activity. These two items also appear to be most similar in content. The three visitations items also appear to share a noteworthy amount of variance beyond that shared by the remaining five items in Table 30. The item pertaining to the ability to get along with others appears to share little common variance with the other items. Its reliability is suspect on two grounds (relatively low commonality and stability).

Product-moment correlations are higher than item-total correlations for the three visitations items and the group membership and activity items. This pattern of results suggests that these items share variance due to an underlying social construct assessed by one or two other items but not by all items in this battery. These results are consistent with our scaling studies which confirmed two multi-item subscales formed by these subsets of items.

The one-year stability coefficients are moderate to low (less than 0.66) in magnitude and are generally similar across sites. The highest coefficient (0.80) appears for the single item pertaining to attendance at religious services. If we assume the items are equally reliable, this coefficient suggests that religious attendance is least likely to change over time. The lowest stability coefficient is for the item pertaining to the ability to get along with others, the most subjective social item. From the first three columns of Table 30, it appears that ratings of "getting along" may also be less reliable at a point in time than the other measures. Hence, it is difficult to draw conclusions about the stability (over time) of the underlying construct measured by this item.

One way to view the coefficients in Table 30 is as lower-bound estimates of the reliability of the HIE single-item social measures. If we keep in mind the reasons for suspecting that each coefficient is a lower-bound estimate and synthesize these reasons and our results, we conclude that the items are sufficiently reliable for some group-level statistical analyses. As would be expected for the five items used to compute multi-item social subscales, multiple R's yielded the highest

coefficients for the three visitations items (items 3-5) and the two group participation items (items 9, 10). Lower-bound reliability estimates for these single-item measures range from 0.53 to 0.75 in the combined sites analysis (if we take the highest estimate in each row for each item). The pattern of results for these items confirms our expectation that estimates based on a common variance model should be highest for those items suspected of having the most conceptual overlap, i.e., the five items used to score multi-item subscales.

Test-retest estimates were highest for the five items that will be scored and interpreted separately for HIE purposes. The lower-bound reliability estimates for four of these items (all but "getting along") range from 0.50 to 0.80, again satisfactory for purposes of our intended group-level analysis. The highest coefficient for "getting along" was 0.23.

What are the reliabilities of these single-item measures and how stable (over time) are their underlying constructs? It is very difficult to answer these questions directly with any degree of confidence. However, we can draw some conclusions with reasonable confidence, and it is possible to anticipate the direction of estimation bias in those instances where we are likely to be off. First, we can be confident that the group participation items are very reliable (as single-item measures go) and that group participation is quite stable over time. Second, we can be confident that the religious attendance item has good reliability and that its underlying construct is highly stable over time. The relatively high stability coefficient (0.80) for this item confirms these conclusions. (With our large sample size the standard error around this coefficient is very small.) This item does

not overlap much empirically with other items in the battery because it is conceptually distinct. It is the only item that asks about religious attendance or involvement. Third, we can be confident that the remaining social constructs (except for "getting along") are substantially stable over one-year intervals. Even if we accept the reliability of our single-item measures of these constructs as perfect (an assumption that is certain to be wrong), our estimates of stability are in the substantial range (i.e., 0.40-0.60 range). With a correction for lack of perfect measurement, these stability estimates would be increased. Hence, it is safe to conclude that these social constructs have at least substantial stability over one-year intervals. Finally, from the pattern of results in Table 30 we can draw no conclusion about the reliability of the HIE rating of "getting along." This item may be: (1) unreliable, or (2) a reliable measure of an unstable and conceptually distinct social construct. We cannot choose with any confidence between these explanations of our results.

Table 31 presents estimates of the internal-consistency reliability and homogeneity (average inter-item correlation) for the two multi-item social well-being subscales and the overall index both within sites and for a combined sample across sites. The internal-consistency reliability is a measure of the extent to which measured variance is due to true score rather than random error. Estimates of homogeneity indicate the extent to which scale items are reliable measures of the same construct and serve as a basis for directly comparing scales that differ in length.

Internal-consistency reliability coefficients for all scales were moderate in magnitude, ranging from 0.66 to 0.86. All were well above

Table 31
HOMOGENEITY AND INTERNAL-CONSISTENCY COEFFICIENTS FOR THREE MULTI-ITEM
SCALES, THREE SITES, AND ALL SITES COMBINED

Scale	k	Seattle		Fitchburg/ Franklin County		Charleston/ Georgetown County		Combined Sites					
		r_{ii}	r_{tt}	N	r_{ii}	r_{tt}	N	r_{ii}	r_{tt}	N			
Group participation	2	.73	.84	2173	.75	.86	1038	.72	.83	1267	.73	.84	4478
Social contacts	3	.46	.72	2219	.44	.70	1063	.46	.72	1283	.46	.72	4565
Social well-being index	9	.20	.69	2116	.18	.66	1008	.19	.68	1227	.19	.68	4351

NOTE: k = number of items

r_{ii} = average inter-item correlation

r_{tt} = internal-consistency reliability

N = sample size

0.50, which we set as our minimum standard for group comparisons in the HIE. Highest coefficients were for the Group Participation scale followed by Social Contacts and the Social Well-Being Index in that order.

The Group Participation scale was most homogeneous, while the Social Well-Being Index was least homogeneous, as would be expected because of the diversity of social items (constructs) the Index represents.

Table 32 presents one-year stability coefficients for the three multi-item social well-being measures both within sites and for a combined sample across sites. Coefficients are moderate in magnitude and generally similar across sites. They suggest that the constructs measured are at least substantially stable over one-year intervals.

Unlike reliability findings from the published literature (Donald et al., 1978), stability coefficients are substantially lower than internal-consistency estimates for our two multi-item subscales (i.e., Group Participation and Social Contacts). For the overall index, stability and internal-consistency estimates are essentially the same. We think the most plausible interpretation of this pattern of results is that our two multi-item subscales and summary index are more homogeneous than typical social measures described in the published literature. It appears that items in each of the two multi-item subscales are more homogeneous, while items in the overall index contain a noteworthy amount of unique reliable variance (i.e., tend to reliably measure different things) in addition to the small amount of variance they share. For the index, homogeneity is much lower than we have allowed

Table 32

STABILITY COEFFICIENTS^a FOR THREE SOCIAL WELL-BEING
MEASURES, THREE SITES AND COMBINED SAMPLE

Social Well-Being Measure	Site			
	Seattle	Fitchburg/ Franklin County	Charleston/ Georgetown County	Combined Sample
Group participation	.67 (1840) ^b	.70 (972)	.67 (261)	.68 (3073)
Social contacts	.57 (1899)	.54 (994)	.44 (269)	.55 (3162)
Social well-being index	.70 (1762)	.67 (931)	.67 (249)	.68 (2942)

^aCorrelation computed between enrollment and the
First Annual Health Questionnaire in each site.

^bSample size upon which coefficient is based is
given in parentheses.

for multi-item measures of other health-related concepts. Hence,
interpretation of index scores may be problematic and its
appropriateness for testing hypotheses should be questioned until
further tests of validity are completed for the index and its
components. We return to this issue below. For the multi-item
subscales, homogeneity is relatively high and, hence, interpretation is
not a problem. In general, the social well-being measures are
sufficiently stable that the precision of statistical analysis would be
increased to a noteworthy extent by inclusion of a lagged value.

ASSOCIATIONS AMONG MEASURES

Estimates of associations among social measures provide several kinds of information. Associations between items that employ similar measurement methods to assess different constructs (e.g., Social Contacts and Group Participation) yield information pertaining to item discriminant validity (i.e., whether an item is more sensitive to the specific social construct it was intended to measure than to different constructs measured the same way). These studies, which were conducted at the item level, were reported in the section on multi-item subscales. Items in both the Group Participation and Social Contacts subscales satisfied our discriminant validity criteria; however, when viewed in light of results for HIE measures of physical, mental, and general health status (see Stewart, Ware, and Brook, 1981; Ware et al., 1979; and Davies and Ware, 1981), the items in these two subscales would be judged very heterogeneous. The remaining items were scored and interpreted separately, for purposes of hypothesis testing, because their associations are very weak in relation to our lower-bound estimates of their reliabilities (see Tables 24 and 30).

Studies of associations between different social well-being measures also yield information relevant to the construct validity of each measure. Specifically, measures of distinct components of social well-being should be significantly and positively related to one another. This hypothesis is based on the belief that constructs in the same dimension share variance because of a common underlying well-being factor. Additionally, measures of associations among distinct social constructs should be much lower than the reliability of measurement for

each construct. Our results in support of this hypothesis provide justification for scoring of the social measures as conceptually distinct.

Table 33 presents product-moment correlations used to estimate associations among the eight HIE social well-being measures for the combined site sample (site-specific matrices are presented in Tables A.52 through A.54). Coefficients in parentheses in the diagonal for the five single-item measures are the highest lower-bound reliability estimates observed for each measure. Estimates of reliability based on the internal-consistency method are placed in the diagonal in parentheses for the three multi-item measures. Correlations between measures that overlap (i.e., that are not independent because they contain one or more identical items) have been identified with asterisks; these correlations are inflated because of item overlap. However, they are useful in gauging the relative contribution of each part to the total score.

All measures in Table 33 are significantly and positively related (except for the relationship between social contacts and religious attendance), supporting the construct validity of each measure. The correlations are also substantially lower than our reliability estimates for these measures, supporting the arguments about the distinctness of these constructs. The correlations range from 0.01 to 0.69 with a median of 0.16, while the reliabilities range from 0.23 to 0.84 with a median of 0.62. Thus it appears that there is a substantial amount of reliable variance, presumably due to social well-being, which is unique to each measure. Despite the fact that all measures were scored according to the same criteria (e.g., scored to predict Positive

Table 33
ASSOCIATIONS AMONG SOCIAL WELL-BEING MEASURES,
COMBINED SAMPLE^a

Social Well-Being Measure	1	2	3	4	5	6	7	8
1. Neighborhood Acquaintances	(.57) ^b							
2. Close Friends and Relatives	.16	(.50)						
3. Telephone Contacts	.10	.20	(.52)					
4. Getting Along	.06	.13	.08	(.23)				
5. Religious Attendance	.20	.04	.07	.07	(.80)			
6. Social Contacts	.23	.22	.31	.11	.01	(.72)		
7. Group Participation	.23	.16	.13	.08	.42	.05	(.84)	
8. Social Well-Being Index	.52*	.47*	.50*	.16	.45*	.69*	.62*	(.68)

^a N's range from 4338 to 4563 due to missing data.

^b Coefficients in parentheses are the highest lower-bound reliability estimates taken from Table 30. For the three multi-item measures, coefficients in parentheses are internal-consistency reliability estimates.

Note: All coefficients in the table greater than .01 are statistically significant at $p < .05$ (i.e., all correlations but that between Religious Attendance and Social Contacts are significant).

*Indicates inflated correlation due to overlapping definitions (e.g., the Social Contacts scale was included in the Social Well-Being Index).

Well-Being, Emotional Ties, and Current Health), the measures remain conceptually distinct. Findings are generally similar across sites (see Tables A.52-A.54).

SOCIODEMOGRAPHIC AND HEALTH CORRELATES OF SOCIAL WELL-BEING

Given the observed heterogeneity of social well-being constructs, a major issue is the extent to which social measures can be aggregated into an overall summary index while maintaining a meaningful interpretation and without distorting results. A necessary but not sufficient requirement for such aggregation is homogeneity. As discussed above, our results on this issue are somewhat ambiguous with respect to the summary index. A second requirement is consistency in the direction of associations between parts of an index and external variables it would be used to study. When our items were scaled in relation to health and general well-being criterion variables, we found consistency in the direction of associations although some differences in magnitude were noted. Hence, for studies of these variables, a summary index would be appropriate for some purposes. To address this important issue further, product-moment correlations were computed to evaluate associations between the social measures and selected sociodemographic and health status variables. In addition, eta coefficients between these variables were evaluated to identify nonlinear associations.

Table 34 presents product-moment and eta coefficients between social well-being items and scales and selected sociodemographic and health variables. Significant nonlinear trends are identified by asterisks. Several findings appear noteworthy. First, it appears that

Table 34

PRODUCT MOMENTS, ETA COEFFICIENTS, AND LINEARITY TESTS BETWEEN SOCIAL WELL-BEING ITEMS (SCALES) AND FIVE SOCIODEMOGRAPHIC AND THREE OTHER HEALTH VARIABLES

Combined Sample

Social Well-Being Items and Scales	Age		Sex ^a		Race ^b		Education		Income		Positive Well-Being		Emotional Ties		Current Health	
	r	eta	r	eta	r	eta	r	eta	r	eta	r	eta	r	eta	r	eta
Social Contacts																
A. Visits with friends/relatives	-.20	.22*	.00(ns) ^c	.00(ns)	.08	.08	.04	.04(ns)	-.04	.08*	.14	.14	.09	.11*	.11	.11
B. Home visits by friends	-.15	.18*	.00(ns)	.00(ns)	.04	.04	.00(ns)	.05	-.04	.08*	.16	.16*	.11	.11*	.11	.11
C. Visits to friends' homes	-.25	.28*	.02(ns)	.02(ns)	-.01(ns)	.01(ns)	-.01(ns)	.06*	-.08	.10*	.14	.15*	.02(ns)	.07*	.13	.14*
D. Telephone contacts	-.04	.09*	-.25	.25	.09	.09	.04	.07*	.03	.07	.14	.15*	.07	.09*	.05	.07*
E. Religious attendance	.09	.19*	-.13	.13	-.18	.18	-.04	.07*	.04	.07	.12	.13	.08	.08	-.01(ns)	.04(ns)
F. Level of group activity	.12	.19*	-.09	.09	-.04	.04	.11	.12	.14	.16	.17	.17	.12	.12	.03	.04
Social Resources																
G. Neighborhood Acquaintances	.03	.20*	-.02(ns)	.02(ns)	-.10	.10	-.07	.09*	.05	.09*	.17	.18	.13	.13	.04	.05(ns)
H. Close friends/relatives	.10	.11	.05	.05	.20	.20	.10	.10*	.10	.13	.29	.29	.22	.23	.11	.12
I. Voluntary group memberships	.18	.23*	-.06	.06	-.04	.04	.16	.17	.17	.19	.19	.20	.13	.13	.04	.06
Subjective																
J. Getting along	-.10	.11	.01(ns)	.01(ns)	.00(ns)	.00(ns)	.03	.03(ns)	.00(ns)	.04	.20	.23*	.10	.17*	.12	.14*
Indexes																
K. Group participation scale ^d	.16	.22*	-.08	.08	-.04	.04	.15	.16*	.17	.19	.19	.20*	.13	.14*	.04	.07
L. Social contacts scale ^e	-.25	.28*	.01(ns)	.01(ns)	.04	.04	.01(ns)	.04(ns)	-.07	.10	.19	.19*	.09	.12*	.15	.15*
M. Social Well-Being Index ^f	-.03	.13	-.10	.10	.00(ns)	.00(ns)	.07	.08	.08	.10	.32	.31	.20	.21	.12	.13

^a 1=male, 0=female

^b 1=white, 0=nonwhite

* Significant departure from linearity.

^c ns=not significant at $p < .05$.

^d Group participation is the sum of items F and I.

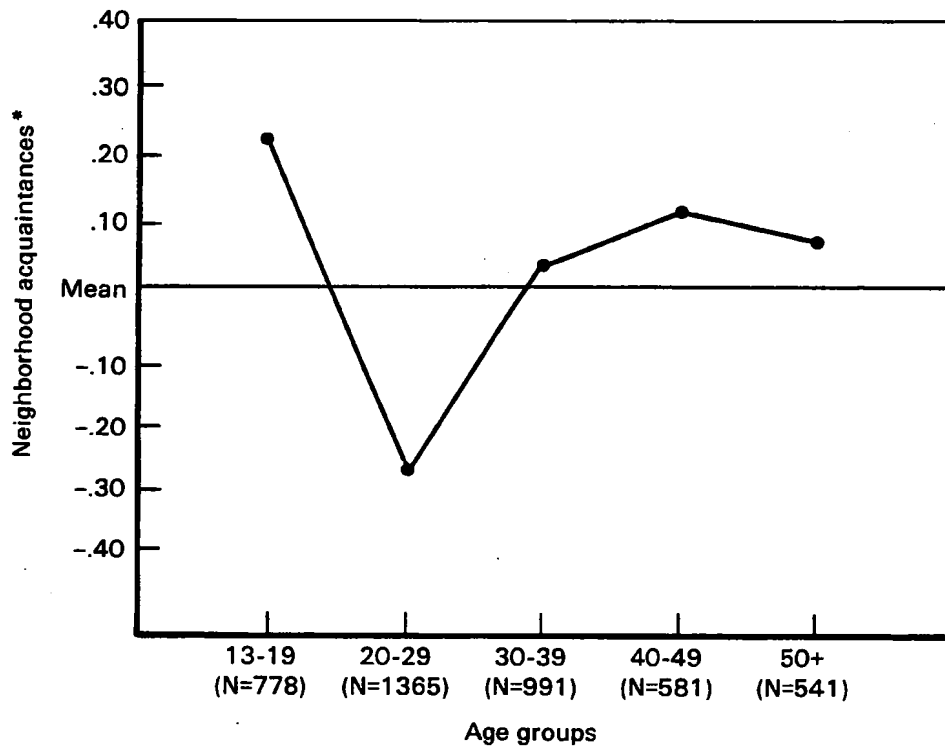
^e Social contacts is the sum of items A, B, and C.

^f Social Well-Being Index is the sum of all items but J.

measures of social resources predict mental health (i.e., Positive Well-Being and Emotional Ties) better than measures of social contacts. Second, items and scales within each dimension seem to have opposite relationships with selected sociodemographic variables. For example, with increases in age, social resources (i.e., neighborhood family acquaintances, number of close friends and voluntary group membership) and the Group Participation scale tend to increase. In contrast, increases in age are associated with decreases in the Social Contacts Scale and its subparts as well as telephone contacts. White respondents tend to report more social contacts, close friends and telephone contacts, whereas nonwhite respondents tend to report more group memberships, neighborhood family acquaintances and religious attendance. The summary Social Well-Being Index shows no association with race. Similarly, the dimensions of social well-being also have opposite relationships with education, income and sex.

In addition, group differences in social well-being appear to be complicated by nonlinear effects. In particular, age differences in social well-being measures seem sufficiently nonmonotonic in some instances that product-moment correlations may miss significant group differences. Education differences in social well-being also appear nonmonotonic in many instances.

Figure 13 shows an example of nonlinear effects. Presented is a plot of mean scores for a measure of neighborhood acquaintances across five age groups. To facilitate interpretation, these scores have been standardized to have a mean of zero and a standard deviation of unity. Scale levels for this measure of social resources averaged about one-half standard deviation lower for persons in the second age group (20-29



*Neighborhood acquaintances standardized with Mean=0, SD=1

Fig. 13 -- Plot of mean neighborhood acquaintance scores for five age groups

years) compared with persons in the first and third through fifth age groups.

Finally, substantial interactions have also been identified. Figure 14 shows an example of the interactive effects of education and family income on social contacts. In this example, which was tested using data from the Seattle sample only, the correlation between education and social contacts is not the same for high and low income groups. The low income groups have more social contacts regardless of their educational level. For high income groups, more highly educated persons have fewer social contacts than do persons with less education. For low income groups, more highly educated persons have more social contacts than do persons with less education. A number of other interactions were identified which warrant further study, yet are beyond the scope of this report.

SDRS EFFECTS ON SOCIAL WELL-BEING

A methodological issue that has not been studied for social well-being measures is the effect of socially desirable responding (SDRS) on measurement validity. To test for the effects of SDRS bias, we computed correlations between SDRS and the social well-being measures and five sociodemographic variables (age, sex, race, education, family income). These correlations are presented in Table 35. As the data show, SDRS correlates significantly with all the social well-being measures but number of close friends/relatives, telephone contacts, and ability to get along with others. SDRS also correlated significantly with all sociodemographics but family income. Thus, the potential exists for socially desirable response set to bias results of group comparisons in

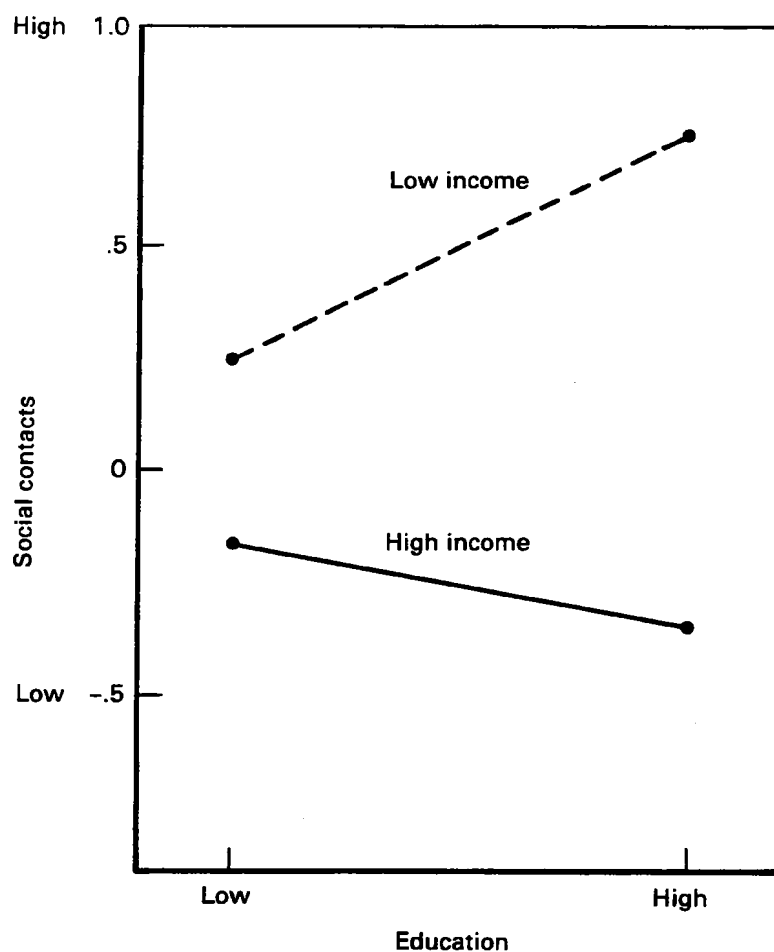


Fig. 14 -- Interactive effects of education and family income on social contacts

some instances: SDRS correlated with all but one variable (income) that define the groups and correlated with all but three social well-being measures on which the groups are to be compared.

Second, we regressed each of the social well-being measures on the sociodemographic variables with and without statistical control for SDRS. Results of these regressions appear in Table 36. Entries in the columns are the standardized regression coefficients from two different

Table 35

CORRELATIONS BETWEEN SOCIAL DESIRABILITY RESPONSE
SET AND SOCIAL WELL-BEING AND SOCIODEMOGRAPHIC
VARIABLES, COMBINED SAMPLE^a

Measure	SDRS
<i>Social well-being</i>	
Neighborhood acquaintances06**
Close friends/relatives03
Telephone contacts	-.02
Getting along03
Religious attendance11**
Group participation07**
Social contacts	-.06**
Social well-being index04*
<i>Sociodemographic variables</i>	
Age15**
Family income02
Education	-.17**
Sex ^b	-.05**
Race ^c	-.09**

^aN's range from 3306 to 4589 because of missing data.

^bScored male = 1, female = 0.

^cScored white = 1, nonwhite = 0.

*Significant at $p < 0.05$.

**Significant at $p < 0.01$.

regressions equations, the first without and the second with statistical control for SDRS. We present standardized coefficients because they can be more readily compared.

The regression results indicate that in all cases SDRS had little biasing effects on estimates of the magnitude of group differences (i.e., the magnitude of the regression coefficient). The magnitude of

Table 36

REGRESSION COEFFICIENTS FOR SOCIODEMOGRAPHIC VARIABLES IN
PREDICTIONS OF SOCIAL WELL-BEING MEASURES, WITHOUT (I)
AND WITH (II) STATISTICAL CONTROL FOR SOCIAL
DESIRABILITY RESPONSE SET, COMBINED SAMPLE

Measure	Age		Sex ^a		Education		Income		Race ^b	
	I ^c	II ^d	I	II	I	II	I	II	I	II
Neighborhood Acquaintances	.06	.05	-.01	-.01	-.09	-.08	.07	.07	-.09	-.09
Close Friends/Relatives	.06	.05	.05	.05	.06	.07	.05	.04	.14	.15
Telephone Contacts	-.05	-.05	-.26	-.26	.02	.02	.03	.03	.10	.10
Getting Along	-.11	-.12	.01	.01	.03	.04	.00	.00	.03	.03
Religious Attendance	.12	.10	-.12	-.12	.01	.03	.04	.04	-.18	-.17
Group Participation	.16	.15	-.09	-.09	.14	.15	.16	.16	-.13	-.12
Social Contacts	-.23	-.23	.01	.01	.00	.00	-.06	-.06	.08	.08
Social Well-Being Index	-.02	-.03	-.10	-.10	.06	.07	.07	.06	-.02	-.01

^aScored male=1, female=0.

^bScored white=1, nonwhite=0.

^cColumn I contains standardized coefficients from regression of measure on age, sex, education, income, and race.

^dColumn II contains standardized coefficients from regression of measure on age, sex, education, income, race, and SDRS.

Note: Coefficients $\geq .04$ are significant at $p < 0.05$.

the coefficient changed little if at all when SDRS was controlled statistically. Thus, estimates of the magnitude of group differences in social well-being will not be biased if SDRS is not taken into account.

It can also be hypothesized that the tendency to respond in a socially desirable manner may inflate the relationship between social well-being and our measures of health (e.g., positive well-being, emotional ties, and current health). Results not shown indicate that although SDRS correlated significantly with our three criterion variables, the relationship between the social well-being items and scales did not change with statistical control for SDRS.

VI. DISCUSSION

We have measured social well-being in the Health Insurance Experiment (HIE) to address three categories of research questions. First, we are interested in whether different health care financing arrangements (i.e., coinsurance, deductibles, and prepaid versus fee-for-service care) produce differences in social well-being. More specifically, we are interested in any main effects of health care financing arrangements on social contacts, social resources, and subjective evaluations of interpersonal relationships as well as whether these social well-being outcomes are the same or different for policy-relevant subgroups of the population (e.g., those who are poor, sick). Second, we are interested in whether persons who began the HIE at different levels of social well-being consume medical care services differently. We are interested both in main effects of social well-being on consumption and in whether social well-being modifies the effects of other factors that have been shown to increase consumption (e.g., insurance coverage, stressful life events, physical and mental illness). Finally, we are interested in the health status consequences of individual differences in social contacts and resources. The second category of research questions addresses the dollar costs of medical care consumption due to differences in social well-being; the third category of questions addresses the health status effects of social well-being.

To test these hypotheses, we need to quantify individual differences in social well-being. This report presents empirical tests

of strategies for scoring social well-being items as measures of health and general well-being and describes a series of analyses undertaken to develop adult measures of social well-being that would be useful for the three purposes described above. In addition, we identified and addressed other issues relating to the measurement of social well-being, including: (1) the meaning of social well-being and the conceptual distinction between this concept and the physical and mental dimensions of health status; (2) how to score precoded questionnaire response choices for HIE social well-being items and the tradeoffs between scoring methods that are more or less complex; (3) the appropriate level of aggregation for social well-being measures; and (4) the status of social well-being in a model of health. Our thoughts about the empirical analysis of HIE social well-being measures as well as our conclusions regarding the major issues are discussed below. We think these conclusions will be applicable to many studies interested in social contacts and resources.

WHAT IS SOCIAL WELL-BEING?

Social well-being pertains to the social circumstances of the individual with regard to each of two distinct dimensions: social contact or activity and social ties or resources. The first dimension is behavioral and the more objective of the two. It pertains to what the individual is doing and particularly to whether other persons are involved. Included are social activities and contacts that are initiated by the individual and those that are directed toward the individual by others. To the extent that the individual initiates contacts with others and is contacted by others, the individual has greater social well-being. The second dimension is not behavioral and

requires a more subjective approach to measurement because it cannot be directly observed by others. This dimension pertains to the social resources, reserves, or ties the individual can enjoy or rely on when needed. An example would be a personal evaluation of the adequacy of interpersonal relationships or of how well one is presently getting along with others. To the extent that interpersonal resources are evaluated favorably, the individual would score high on this second dimension of social well-being.

Social well-being has been operationally defined in the HIE in terms of interpersonal interactions (e.g., visits with friends) and activities indicative of social participation (e.g., memberships in clubs). This definition is distinct from that of mental health, which is conceptualized and measured in the HIE in terms of psychological distress and psychological well-being. It is also distinct from physical health, which is conceptualized and measured in terms of functional status (e.g., the performance or capacity to perform physical activities that are normal for individuals in good health) and in terms of physiological health status (e.g., presence and severity of disease, acute symptoms). Given the range of individual differences in preferences for levels of social well-being (Ware and Young, 1979; Rose, 1980), we also believe social well-being for a given person is what that person thinks it is. To represent this very subjective construct, the HIE also fields a personal evaluation of emotional ties (to be discussed further below).

CONTENTS OF THE HIE SOCIAL BATTERY

The eleven HIE social well-being items discussed in this report, which were adapted from Myers et al. (1972) and Dohrenwend, Dohrenwend, and Cook (1973), covered three aspects of life where differences in social well-being are manifested: family and home, social life and friendships, and community. The items emphasized primarily the objective aspects of social contacts and resources and included one subjective evaluation of the person's ability to get along with others. Included were the most common types of items identified in the literature pertaining to numbers of contacts and activities with family and friends and to participation in group activities. In general, HIE social items appear to be in agreement with contemporary definitions of social well-being. Not represented in the HIE social well-being battery are items measuring performance of major role activities. Major role activities are measured by items currently included in the HIE Functional Status battery (see personal and role functioning in Stewart, Ware, and Brook, 1981). Additional information gathered from other HIE reporting forms pertain to job status and employment history, home environment and number of house occupants, and income history. These variables will be available for subsequent development of more comprehensive measures of social well-being.

Measures of personal assessments of or satisfaction with one's social circumstances are available in the HIE General Well-Being battery, which includes mental health and is administered on all annual health questionnaires. These items--which refer to the frequency and intensity of feeling loved and wanted; loneliness, whether one's love

life is full and complete; and satisfaction with life--were used as criterion variables in current analyses. They can be considered elements of the subjective dimension of social well-being because they measure the individual's personal assessment of social resources and contacts. The present analyses were restricted to eleven items included in the HIE "Social Activities" battery.

ITEM SCORING

Three general goals guided the scoring of questionnaire items: (1) They should scale at least at the ordinal level of measurement, (2) item scores should be ordinally consistent with other conceptually related variables (i.e., criterion variables), and (3) evaluation of item scores should produce consistent results across HIE sites. Each item was evaluated to determine the level of health and general well-being associated with each item response category. It was hypothesized that optimal scoring of social well-being measures would reflect increases in health and general well-being for each succeeding level of social contacts or resources. Three criterion measures (Current Health, Positive Well-Being, and Emotional Ties) were included in analyses of variance to determine the magnitude of differences (in quantitative terms) between the levels defined by item response categories. Significant and often large differences in health status between categories lent support to keeping categories separate, while very small and insignificant differences identified instances in which adjacent categories could be combined.

The level of score refinement resulting from item response scales was an issue of importance. Other investigators who have arbitrarily collapsed scores within specified ranges of social well-being may have

lost potential valuable information. Consider two examples from the literature. Phillips (1967) asked about number of neighbors known well enough to visit with to measure social participation. Responses to this item, which is similar to one of the HIE social items, were arbitrarily coded to define three categories: no neighbors known, 1 to 3 neighbors known, and 4 or more neighbors known. McKinlay (1973) included two items pertaining to frequency of visits to friends and relatives in his study of the role of family, its kin, and friendship networks in the use of health services. For analytic purposes he divided the information on each variable into three categories: daily contact, once or more per week, and less than once per week.

Our results do not support questionnaire item scoring methods that yield measurement scales as coarse as those exemplified above. Responses at the low end of the social well-being continuum should not be collapsed. For example, there appear to be measurable differences in health status and general well-being between respondents claiming 0, 1, 2, 3, 4, and 5 neighborhood family acquaintances. Arbitrarily grouping together 1 to 3 neighbors, as did Phillips, averages significant differences in health and general well-being associated with differences in neighborhood acquaintances. Similarly, our analysis of HIE data indicates that visits with friends and relatives should be more precisely scored than the "less than once a week" grouping of McKinlay (1973). For example, we find significant differences in feelings of psychological well-being between groups responding that visits with others occur less than 5 times a year, 5 to 10 times a year or once a month, 2 or 3 times a month, and once a week or more. Lumping together the first three categories to define "less than once a week" produces an

unnecessary loss of potentially useful information about the frequency of social contacts.

However, our results relevant to the coarseness of social scales differed with regard to the high end of each scale continuum. In part, this was due to small sample sizes at the extreme end of the social well-being continuum defined by each item. Also, the plot of mean levels of well-being at the high end of the continuum were rough (i.e., skipped up and down or leveled off after a certain point), suggesting that very large values should not be distinguished and scored separately, pending further research. In general, it appears that differences between very high social well-being scores are not linked to any of the criterion variables we studied. For example, beyond 11 neighborhood family acquaintances, 36 close friends/relatives, and 5 group memberships, we cannot detect differences in perceived health or general well-being.

An additional finding raised doubt about the common assumption that more activity always reflects increasing levels of social well-being. For the three visitation items (visits with friends and relatives, home visits by friends, and visits to homes of friends), Emotional Ties tended to decrease after a moderate number of visitations. It appeared that subjects who visited most frequently felt unloved, felt that their love life was not full and complete, and felt more lonely. At the extreme end of each visitation scale, the assumption of a monotonic relationship (i.e., that an increase in visits always indicates the same or a greater quantity of social resources) was violated when Emotional Ties was used as the criterion variable. This finding could not be explained by imprecision from small sample sizes at the extreme end of the score continuum. The sample sizes were large enough to estimate differences in Emotional Ties associated with more visitations.

One possible explanation for this finding is that persons having these feelings (i.e., low scores on the Emotional Ties scale) increase their social activity as a coping mechanism. The increased activity may then lead to increased feelings of being loved, wanted, and cared for and decreased feelings of loneliness. This kind of phenomenon could have produced the nonmonotonic associations for social contacts and emotional ties described above. Further investigation of this phenomenon is warranted, but is beyond the scope of this study. It is suggested that future research focus on the possible impact (on behavior) of feeling left out, not cared for, unwanted, unloved.

AGGREGATING SOCIAL WELL-BEING MEASURES

Once HIE social items were scored, we used them to evaluate more comprehensive measures of social well-being. It was intended that these measures meet several criteria. Specifically, they should (1) represent the major dimensions of social well-being about which there is conceptual agreement, (2) represent state-of-the-art measurement strategies, (3) contribute unique information about social well-being, (4) be optimally scored to reduce the number of variables as much as possible without substantial loss of information, (5) contain sufficient variability to be useful in detecting differences in health, and (6) be reliable.

A major concern at this stage of the analysis was the appropriate level of aggregation for our social measures. Because correlations among social items were very weak, there was the danger that combining them would not provide a valid predictor of other variables. With this problem in mind, we imposed two criteria for constructing a multi-item

measure. First, the measure must be internally consistent (i.e., items combined into a multi-item scale must be conceptually and empirically related). Second, items that are aggregated must be externally consistent (i.e., items should have the same relationships with other variables to which they are theoretically linked).

The summated ratings method was used to test the internal consistency of item groupings and the discriminant validity of each item in relation to scales defined by summated item scores. These criteria were satisfied for five of the HIE social items. We were able to construct two construct-specific scales (i.e., Social Contacts and Group Participation). Items in each of these scales were substantially intercorrelated and each item correlated more with other items in the same scale than with items in the other scale. Because items used to compute each scale had different variances, items were standardized before being summed to score one or more of the construct-specific scales.

Unlike many of the social well-being measures reported in the literature, and contrary to original hypotheses, the item groupings that best defined HIE subscales differed somewhat from those originally hypothesized from our literature review. Our measures aggregate social items that appear to define the same type of activity (e.g., visitations, group activity) rather than according to specific role areas (e.g., family, social).

It may be that a more comprehensive battery containing a larger number of items specifically related to each role area would have yielded dimensions of social well-being and measures concentrated in specific roles. The abbreviated nature of the HIE battery, which was

designed to represent a range of social well-being constructs and to be "thin" in each construct, may have contributed to the deviation from original hypotheses regarding role areas.

The external consistency of social well-being items was estimated in relation to selected sociodemographic and health variables. Our findings suggest that measures of social contacts perform differently than measures of social resources. Specifically, measures of social resources may predict mental health better than measures of social contacts. Further, these dimensions of social well-being seem to have opposite relationships with selected sociodemographic variables. For example, analyses indicate that with increases in age, social resources (i.e., group memberships and number of close friends) and religious attendance tend to increase. In contrast, increases in age are associated with decreases in social contacts and telephone contacts. Similarly, white respondents tend to report more social contacts, close friends and telephone contacts, whereas nonwhite respondents tend to report more group memberships, neighborhood family acquaintances, and religious attendance. A summary social well-being index containing these measures shows no association with race. As would be expected when variables having opposite relationships (with other variables) are combined into a summary index, important relationships can be missed completely. This underscores the danger of aggregating social well-being variables into a summary index without first testing each part of the index.

We decided to score an overall summary index using nine of the social items, although its interpretation is problematic and its applications are limited because of the heterogeneity of item content

and inconsistencies in the direction of association between parts of the index and external variables of interest described previously. To compensate for possible loss of information in the overall measure, single items not included in one of the construct-specific measures were retained for use in HIE analyses. These items include: number of neighborhood family acquaintances, number of close friends and relatives, telephone contacts, the rating of getting along with others, and attendance at religious services. One of these items, the subjective rating of getting along with others, was not included in the overall index or either of the multi-item subscales. The other four items were included in the overall index, but not in either multi-item subscale. See Figure 15 for a summary of content and levels of aggregation for HIE social well-being measures.

VARIABILITY IN SCORES

The two construct-specific social well-being scales, the overall measure, and the five single-item measures exhibited substantial score variability. In general, some distributions appeared to be skewed, with most people scoring in the positive health and well-being range for Social Contacts, the Social Well-Being Index, and for the three single-item measures of telephone contacts, getting along, and number of close friends and relatives. Score distributions also tended to be skewed, with most people scoring in the negative health and well-being range for Group Participation, attendance at religious services, and number of neighborhood family acquaintances. Regardless of these problems with asymmetrical score distribution, variability appears sufficient to test HIE hypotheses.

Social item	Construct-specific measure	Overall index
Visits with friends/relatives	Social contacts	Social well-being index
Home visits by friends		
Visits to homes of friends		
Voluntary group membership	Group participation	
Level of group activity		
Number of neighborhood acquaintances*		
Number of close friends/relatives*		
Telephone contacts*		
Attendance at religious services*		
Getting along with others*		

*These items were also retained as single-item social well-being measures for use in HIE analyses.

Fig. 15 -- Summary of HIE social well-being measures

RELIABILITY AND STABILITY OF SCORES

Estimation of reliability for the single-item social well-being measures was problematic because data from repeated administrations over a short time interval were not available. Several kinds of internal-consistency reliability coefficients were evaluated. These coefficients most likely underestimate the reliability of HIE items because the estimation models either treat unique and reliable variance as error or assume that social contacts and resources do not change over a one-year interval. If we keep in mind the reasons for suspecting that the reliability coefficients are lower-bound estimates, we conclude that the items are sufficiently reliable for studies of large differences in

group-level statistical analyses. Specifically, we are confident that the group participation items are very reliable and that group participation is quite stable over time. Also, we are confident that the religious attendance item has good reliability and that the underlying construct it measures is highly stable over time. The remaining social constructs (except for "getting along") are substantially stable over one-year intervals. We can draw no conclusion about the reliability of the HIE rating of "getting along." This item may be either unreliable or a reliable measure of an unstable and conceptually distinct social well-being construct.

The reliability of the two multi-item social well-being subscales and the overall index was estimated by internal-consistency and homogeneity coefficients. Internal-consistency reliability is a measure of the extent to which measured variance is due to true score rather than random error. Estimates of homogeneity indicate the extent to which scale items are reliable measures of the same construct.

Internal-consistency reliability coefficients for all three scales were moderate in magnitude, ranging from 0.66 to 0.86. All were well above 0.50, which we set as our minimum standard for group comparisons in the HIE. The Group Participation scale was most homogeneous, while the Social Well-Being Index was least homogeneous.

One-year stability coefficients for the three multi-item social well-being measures were moderate in magnitude. They suggest that the constructs measured are at least substantially stable over one-year intervals. Contrary to reliability findings from the published literature, stability coefficients are substantially lower than internal-consistency estimates for our two multi-item subscales and the same for

our overall index. This pattern of results suggests that our two subscales and summary index are more homogeneous than typical social measures described in the published literature. In general, the social well-being measures are sufficiently stable that the precision of statistical analysis will be increased to a noteworthy extent by inclusion of a lagged value.

VALIDITY

The validity of the HIE social well-being measures was evaluated in several ways. First, the validity of each item was evaluated in terms of its manifest content (i.e., face validity). From this perspective, validity is supported when the content of the item stem and response choices correspond well with the label we assign to it and the interpretation we give to the scores it yields. For example, the measure of number of close friends and relatives actually asks a person to list the number of close friends and relatives he has. Thus, the mean score for this measure is taken to accurately reflect the label we assigned to it (i.e., number of close friends and relatives) and we can interpret this measure as a quantitative description of number of close friends and relatives. Moreover, there is a qualitative dimension to the measure in that it defines close friends as "people you feel at ease with and can talk with about what is on your mind." Hence, the measure is not only a quantitative report but also a subjective assessment or rating of the quality of the relationships with close friends and relatives, i.e., whether they are close enough to "feel at ease with."

Second, the content validity of the HIE social well-being measures was evaluated with respect to the content of the published literature. From this comparison, we concluded that HIE social items (1) represent

three of four major social role areas (i.e., family, social, community), (2) represent the state-of-the-art of measurement strategies published, (3) represent the major dimensions of social well-being, and (4) measure social well-being rather than the physical and mental dimensions of health status. In addition, content validity was supported by exclusion of items shown to represent other dimensions of health (e.g., mental health). Inclusion of these variables in the definition of social well-being might seriously bias conclusions regarding the association between social well-being and health status. For example, conclusions about direct and interactive effects of life events and social well-being on mental health may be affected when fielding confounded definitions of these variables.

Third, discriminant validity at the item level was supported in our "multitrait" tests of the two summated ratings scales. The five items used to score two multi-item subscales satisfied our discriminant validity criteria. Each item was more sensitive to the specific social construct (i.e., group participation or social contacts) it was intended to measure than it was to other social constructs.

The construct validity of each social measure was supported in tests of associations among the measures. All social measures were significantly and positively related as expected if constructs in the same dimension (i.e., social well-being) share variance because of a common underlying factor. The distinctness of each construct was supported when correlations were substantially lower than the reliabilities of each measure.

Finally, the construct validity of these measures was further supported by predictions of mental health (Williams, Ware, and Donald,

1981). The effects of social well-being on mental health were shown to be positive for both the social contacts and resources dimensions (Williams, 1980). In addition, social well-being produces better mental health in general populations regardless of whether an individual is faced with stressful life events. Thus, we can score levels of social well-being the same regardless of life stress level.

OTHER STATISTICAL ISSUES

Three additional statistical issues surfaced during our analyses of HIE social well-being measures. First, we found that group differences in social well-being, while substantial in magnitude, exhibit noteworthy nonlinear trends. For example, age differences in social well-being measures seem sufficiently nonmonotonic in some instances that product-moment correlations completely miss significant group differences. For example, persons aged 20 to 29 were shown to have lower mean levels of neighborhood acquaintances compared with both younger and older persons. Hence, conclusions about age differences in social well-being should take into account possible nonlinear trends such as these. Substantial interactions, which warrant further analysis, have also been identified. For example, it appears that the correlation between education and social contacts is not the same for high and low income groups. For high income groups, the more highly educated have fewer social contacts than do persons with low education, while for low income groups, the more highly educated have more social contacts. Thus, it is not safe to assume simple additive linear effects of sociodemographic variables on measures of social well-being.

Second, although our findings suggest that differences in quantities of social well-being do reflect differences in health, we

have ruled out one plausible kind of response bias that could have produced these results. It was hypothesized that the tendency to respond in a socially desirable manner inflates the relationship between social well-being and measures of health and sociodemographic variables. Persons who respond in a socially desirable manner will tend to report more friends and more club memberships. To test for the effect of social desirability response set (SDRS) on correlations among health, sociodemographics, and social well-being, partial correlations were estimated controlling statistically for SDRS.

Although it appeared that SDRS was correlated with our social measures, criterion variables, and sociodemographic variables, neither the relationship between HIE social measures and the criterion variables nor that with sociodemographic variables changed much with statistical control for SDRS. Thus, although the tendency to respond in a socially desirable manner remains an analytic concern due to its positive correlation with both social well-being measures and measures of health and general well-being, it does not explain the relationship between social well-being and measures of health and general well-being. Nor does it seem to bias estimates of the magnitude of group differences.

Finally, the scoring rules we recommend for HIE social well-being measures appear applicable to general populations of non-aged adults. We reach this conclusion for two reasons. First, results were similar across HIE sites. These sites were chosen to represent three census regions of the country and are an urban-rural mix. The percent nonwhite ranged from a low of two percent in the Massachusetts site to a high of 45 percent in the South Carolina site. The replication of results across these different regions supports the generalizability of scoring

rules for HIE social measures. The main restrictions to the generalizability of our findings are due to the fact that among persons ineligible for participation in the HIE were families with a head of household 61 years of age and older at the time of enrollment, and with an annual family income of more than \$25,000 (in 1973 dollars). The age restrictions may be more important, as only persons from the upper five percent of the income distribution were excluded from participation in the HIE. In addition, members of the military, people confined to various institutions, and people eligible for Medicare were excluded. Second, activities measured are those that all persons can engage in or respond to regardless of the specific roles they fulfill. Our measures differ from many found in the literature that relate to employability, marriage, job morale, or work history. Investigators using these latter measures cannot compute or have difficulty computing scores for retired persons, students, housewives, or single persons. Our social well-being measures do not concentrate on specific role areas such as these, but instead measure types of behavior engaged in to some extent by all persons.

SOCIAL WELL-BEING IN A MODEL OF HEALTH STATUS

The HIE social well-being items (excluding one item pertaining to frequency of letters written) are clearly associated with health status and general well-being at a point in time. Coefficients for items measuring social well-being (treated as independent variables) and our criterion measures were significant and positive but generally low in magnitude. These trends are consistent with those observed in the literature. Scoring revisions (e.g., collapsing adjacent categories) tended to smooth out plots of item scores in relation to criterion

scores, yet relationships remained weak. In most cases, items measuring social well-being accounted for only one to five percent of the variance in health status measures. These associations are generally much weaker than those between measures of physical and mental health. Thus, studies of HIE measures indicate that social well-being is not as highly related to physical and mental health and general health perceptions as these latter health constructs are to each other (see Donald et al., 1978, and Ware, Brook, and Davies-Avery, 1980).

An important conceptual issue having implications for how social measures should be analyzed and interpreted is the extent to which differences in quantities of social contacts and resources are synonymous with differences in health and general well-being. Our position is that personal health status should be defined in terms of the physiologic, physical, and mental status of the individual. Social well-being adds external factors to any definition of an individual's health or general well-being (Ware, Brook, and Davies-Avery, 1980). The generally weak relationships between measures of social contacts and resources and measures of general health and well-being tend to support this position. The magnitude of these relationships is large enough for the use of health status criterion measures in our analyses, but generally weak enough to suggest that social well-being itself is not a good predictor of an individual's health status or one's subjective assessment of health or general well-being (e.g., general health perceptions and overall quality of life, respectively). A more important issue may be the role that one's level of social well-being plays in relation to one's mental health. Elsewhere (Williams, Ware, and Donald, 1981) we have reported a direct effect of social contacts

and resources on mental health. The effects of social well-being on personal assessments of health status appear to be primarily indirect through mental health (see Ware, Brook, and Davies-Avery, 1980). In other words, persons differing in social contacts and resources evaluate their health status differently only if their social circumstances influence their mental health assessments.

SUGGESTIONS FOR FUTURE RESEARCH

A major challenge for investigators in this field is that of developing valid measures of the qualitative aspects of social well-being. In his 1976 Presidential Address before the sections of Community Health and Psychiatry of the Program in Medicine at Brown University, Sidney Cobb defined social support as information leading a person to believe that he is cared for and loved, esteemed, and a member of a network of mutual obligations. A problem arises in that the qualitative aspects of social well-being such as described in this definition are easily confused with mental health. Our HIE items pertaining to the frequency and intensity of feeling loved and wanted, loneliness, and whether one's love life is full and complete are substantially related to measures of anxiety, depression, and positive well-being (correlations range from 0.36 to 0.60 with a median of 0.47 for nine coefficients).

This pattern of results has led us previously (Donald et al., 1978) to argue in favor of more objective behavioral approaches to the definition and measurement of social well-being. However, we may have made a crucial mistake in overemphasizing objective behavioral approaches. Merely counting social contacts or resources is somewhat analogous to counting the frequency of "feelings"

without regard to whether they are good or bad, to measure mental health. This is, however, what some HIE measures and measures fielded by others may do. Social well-being and mental health are clearly intertwined. Depressed people are likely to find their social circumstances depressing. They are likely to feel lonely and less cared for and to withdraw and to become less socially active. Thus, the need remains to develop measures that assess the feeling state or personal evaluation of circumstances that must be included for a definition of social well-being to be complete. More study on the relationship between ratings of psychological states attributable to a person's social circumstances and social contacts and resources may help to clarify this problem.

The generally weak relationship between social contacts and resources and measures of general health and well-being calls into question the extent to which one's social circumstances play an important role in relation to one's mental and general health. A great deal of attention has been paid in the literature to the role of stressful life events and social factors as they relate to mental health. At issue is the extent to which the effects of these variables are additive (i.e., each has a direct independent effect on mental health) or interactive (i.e., the impact of life events on mental health is less when social factors are favorable as opposed to unfavorable). To test for these effects, it is important to control for other variables of interest. For example, a person limited in physical functioning may not be physically able to engage in certain types of social activities (e.g., to visit the homes of friends). The effect of one's physical health should therefore be controlled for when examining

the relationship between the individual's social well-being, life events, and mental health. Results tend to support the additive model of a direct, negative contribution of life events and positive contribution of social contacts and resources to mental health, controlling for physical health and socially desirable responding (see Williams, Ware, and Donald, 1981). The size of the effect for social contacts and resources remains small though significant. Further development of both theory and measurement is needed in this area of research.

An additional area of concern is the effect of social well-being on medical care consumption. Are people who have more social contacts and resources less likely to enter the medical care system? Alternatively, are people who have few social contacts and resources more likely to use the medical care system as a source of social support? Are these responses good or bad? HIE studies in progress are addressing these questions by examining the relationship between social well-being, use of services in the formal and informal mental health systems and general medical care systems, and health status outcomes.

SUMMARY OF CONCLUSIONS

In summary, we have drawn the following conclusions:

1. Social well-being is conceptually and empirically distinct from the physical and mental components of health status. Although it is not a component of health status and should not be included in an index of health at the individual level, it has an important place in any model of health.

2. Social well-being is a multi-dimensional concept that includes distinct but related categories of social contacts as well as social resources.
3. In contrast to physical and mental components of health status, social well-being is a very heterogeneous concept with relatively weak relationships between and within its major components.
4. Subjective evaluations of personal relationships are useful criteria for determining scale values for levels of social contacts and resources. Conclusions about the ordering of social well-being scale values seem robust across various criteria.
5. Social well-being measures should not be scored dichotomously. Rather, scale values should retain reported differences in numbers of social contacts and social resources with, perhaps, some collapsing of responses at very high levels.
6. Empirically derived scale values for measures of social contacts and social resources seem to be generalizable across diverse populations within the United States. Hence, it is likely that standardized measures and scoring rules can be relied upon.
7. Social well-being constructs may differ in their stability, but they are substantially stable over one-year intervals. Hence, weak associations among social well-being measures cannot be explained in terms of measurement error. Further, the precision of hypothesis testing regarding social well-being

outcomes would be improved with designs that include an initial (e.g., pre-experimental) measure.

8. Given the heterogeneity of the social well-being concept, there is a real danger of reaching inappropriate conclusions when analyses are based on a summary social well-being index. Specifically, measures of social resources predict mental health better than do measures of social contacts. Further, these dimensions of social well-being have opposite relationships with age, sex, race, education, and family income. Therefore, hypotheses should be tested with each part of a social well-being index before relying on a summary score.
9. Population differences in social well-being are substantial and are often complicated by noteworthy interactions and nonlinear effects. Therefore, it is not safe to assume simple additive linear effects of sociodemographic variables on measures of social well-being.
10. Social well-being seems to have a direct positive effect on health status, particularly on the mental component of health. Our work offers no support for the popular hypothesis that life events and social well-being interact.

Appendix A

SITE-SPECIFIC TABLES

Table A.1

FREQUENCY DISTRIBUTION FOR NUMBER OF
NEIGHBORHOOD ACQUAINTANCES, THREE SITES^a

Item/Response Codes	Sites ^b					
	Seattle		Fitchburg/ Franklin Co.		Charleston/ Georgetown Co.	
	Freq	% ^c	Freq	%	Freq	%
<u>Number of Neighborhood Acquaintances</u>						
0	567	25.6	201	19.0	183	14.4
1	361	16.3	160	15.1	156	12.2
2	399	18.0	187	17.7	185	14.5
3	299	13.5	139	13.2	204	16.0
4	189	8.5	110	10.4	136	10.7
5	135	6.1	85	8.0	124	9.7
6	85	3.8	43	4.1	82	6.4
7	35	1.6	23	2.2	25	2.0
8	32	1.4	23	2.2	41	3.2
9	12	0.5	3	0.3	9	0.7
10	62	2.8	43	4.1	58	4.6
11	4	0.2	2	0.2	1	0.1
12	8	0.4	10	0.9	22	1.7
13-14	4	0.2	2	0.2	2	0.2
15-18	11	0.5	13	1.2	21	1.6
20-High	14	0.6	13	1.2	25	2.0
MEAN		2.69		3.42		4.46
STANDARD DEVIATION		(3.41)		(4.70)		(7.82)

^aAll sites based on enrollment Medical History Questionnaires. Urban and rural sites in Massachusetts and South Carolina have been combined.

^bSeattle N = 2235; Fitchburg/Franklin County N = 1068; Charleston/Georgetown County N = 1300.

^cMissing responses omitted: Seattle missing = 18(0.8%); Fitchburg/Franklin County missing = 11(1.0%); Charleston/Georgetown County missing = 26(2.0%). All percentages add to 100 except for those due to rounding error.

Table A.2

FREQUENCY DISTRIBUTION FOR NUMBER OF CLOSE FRIENDS
AND RELATIVES, THREE SITES^a

Item/Response Codes	Sites ^b					
	Seattle		Fitchburg/ Franklin Co.		Charleston/ Georgetown Co.	
	Freq	% ^c	Freq	%	Freq	%
<u>Number of Close Friends/Relatives</u>						
0	29	1.3	20	1.9	36	2.8
1	65	3.0	34	3.2	105	8.2
2	150	6.8	84	8.0	146	11.5
3	196	8.9	96	9.2	153	12.0
4	242	11.0	127	12.1	117	9.2
5	242	11.0	138	13.2	165	13.0
6	221	10.0	94	9.0	99	7.8
7	95	4.3	50	4.8	37	2.9
8	148	6.7	58	5.5	47	3.7
9	39	1.8	11	1.0	16	1.2
10	281	12.8	114	10.9	132	10.4
11	16	0.7	10	0.9	5	0.4
12	92	4.2	52	5.0	35	2.7
13	7	0.3	3	0.3	2	0.2
14	16	0.7	3	0.3	8	0.6
15	77	3.5	35	3.3	38	3.0
16	15	0.7	8	0.8	7	0.5
17	5	0.2	4	0.4	2	0.2
18	10	0.5	2	0.2	2	0.2
19-20	100	4.5	36	3.4	42	3.3
21-22	2	0.1	1	0.0	3	0.2
23-24	1	0.0	2	0.2	3	0.2
25	48	2.2	27	2.6	21	1.6
26-27	4	0.2	2	0.2	1	0.1
28	2	0.1	1	0.0	2	0.2
29-30	39	1.8	12	1.1	10	0.8
31-35	5	0.2	1	0.0	2	0.2
36-High	52	2.4	21	2.0	37	2.9
MEAN		9.50		8.50		8.20
STANDARD DEVIATION		(11.33)		(8.94)		(11.51)

^a All sites based on enrollment Medical History Questionnaires. Urban and rural sites in Massachusetts and South Carolina have been combined.

^b Seattle N = 2235; Fitchburg/Franklin County N = 1068; Charleston/Georgetown County N = 1300.

^c Missing responses omitted: Seattle missing = 36(1.6%), Fitchburg/Franklin County missing = 22(2.0%), Charleston/Georgetown County missing = 27(2.1%). All percentages add to 100 except for those due to rounding error.

Table A.3

FREQUENCY DISTRIBUTIONS FOR 9 SOCIAL ITEMS, THREE SITES^a

Item/Code/Definition	Site ^b					
	Seattle		Fitchburg/ Franklin County		Charleston/ Georgetown County	
	Freq	%	Freq	%	Freq	%
<i>Visits with friends/relatives^c</i>						
1. Less than 5 times a year	110	4.9	56	5.3	141	10.9
2. 5-10 times a year	153	6.9	83	7.8	111	8.6
3. About once a month	237	10.7	124	11.7	129	10.0
4. 2 or 3 times a month	485	21.8	179	16.8	238	18.5
5. About once a week	634	28.5	317	29.8	339	26.3
6. Several days a week	524	23.6	261	24.5	258	20.0
7 Every day	82	3.7	44	4.1	73	5.7
Mean		4.47		4.48		4.23
Standard deviation		(1.47)		(1.52)		(1.72)
<i>Home visits by friends^d</i>						
1. Not at all past month	317	14.2	144	13.5	220	17.1
2. Once past month	307	13.8	143	13.4	173	13.4
3. 2 or 3 times past month	648	29.1	281	26.3	338	26.2
4. About once a week	524	23.5	257	24.1	281	21.8
5. Several days a week	377	16.9	207	19.4	209	16.2
6. Every day	55	2.5	35	3.3	67	5.2
Mean		3.22		3.32		3.22
Standard deviation		(1.34)		(1.37)		(1.45)
<i>Visits to homes of friends^e</i>						
1. Not at all past month	242	10.9	128	12.0	213	16.5
2. Once past month	335	15.0	154	14.4	188	14.6
3. 2 or 3 times past month	707	31.7	323	30.3	339	26.3
4. About once a week	539	24.2	253	23.7	297	23.1
5. Several days a week	362	16.2	178	16.7	212	16.5
6. Every day	43	1.9	30	2.8	39	3.0
Mean		3.26		3.27		3.17
Standard deviation		(1.26)		(1.31)		(1.39)

For footnotes, see end of table.

Table A.3--continued

Item/Code/Definition	Site					
	Seattle		Fitchburg/ Franklin County		Charleston/ Georgetown County	
	Freq	%	Freq	%	Freq	%
<i>Telephone contacts^f</i>						
1. Not at all past month	53	2.4	63	5.9	110	8.5
2. Once past month	83	3.7	25	2.3	61	4.7
3. 2 or 3 times past month	331	14.8	200	18.7	202	15.6
4. About once a week	408	18.3	233	21.8	210	16.3
5. Several times a week	862	38.6	341	31.9	396	30.7
6. Every day	494	22.1	206	19.3	313	24.2
Mean		4.54		4.29		4.28
Standard deviation		(1.22)		(1.35)		(1.52)
<i>Letters written^g</i>						
1. Not at all past month	1108	49.6	659	61.8	755	58.5
2. Once past month	466	20.9	169	15.8	217	16.8
3. 2 or 3 times past month	384	17.2	135	12.7	182	14.1
4. About once a week	194	8.7	77	7.2	88	6.8
5. Several times a week	79	3.5	25	2.3	44	3.4
6. Every day	2	0.1	2	0.2	4	0.3
Mean		1.96		1.73		1.81
Standard deviation		(1.16)		(1.10)		(1.15)
<i>Getting along with others^h</i>						
1. Not as well as usual	73	3.3	33	3.1	59	4.6
2. About the same	1715	77.1	876	82.0	996	77.4
3. Better than usual	437	19.6	159	14.9	232	18.0
Mean		2.16		2.12		2.13
Standard deviation		(0.45)		(0.41)		(0.46)
<i>Attendance at religious servicesⁱ</i>						
1. Not at all past month	1395	62.5	602	56.4	446	34.5
2. Once past month	182	8.2	105	9.8	129	10.0
3. 2 or 3 times past month	188	8.4	83	7.8	217	16.8
4. Once a week	257	11.5	236	22.1	293	22.7
5. More than once a week	201	9.0	39	3.7	202	15.6
6. Every day	9	0.4	2	0.2	6	0.5
Mean		1.98		2.07		2.76
Standard deviation		(1.43)		(1.37)		(1.52)

Table A.3--continued

Item/Code/Definition	Site					
	Seattle		Fitchburg/ Franklin County		Charleston/ Georgetown County	
	Freq	%	Freq	%	Freq	%
<i>Voluntary group membership^j</i>						
0	1108	49.9	589	55.3	545	42.5
1	506	22.8	203	19.1	314	24.5
2	319	14.4	151	14.2	174	13.6
3	170	7.7	63	5.9	130	10.1
4	65	2.9	27	2.5	61	4.8
5	25	1.1	11	1.0	24	1.9
6	14	0.6	15	1.4	10	0.8
7	7	0.3	2	0.2	8	0.6
8	2	0.1	2	0.2	9	0.7
9-10	2	0.1	1	0.1	3	0.3
11-high	3	0.1	1	0.1	3	0.3
Mean		1.01		0.94		1.37
Standard deviation		(1.39)		(1.42)		(2.56)
<i>Level of group activity^k</i>						
1. Do not belong	1055	48.3	567	54.5	566	44.3
2. Not active	273	12.5	119	11.4	108	8.4
3. Fairly active	432	19.8	172	16.5	279	21.8
4. Very active	424	19.4	182	17.5	326	25.5
Mean		2.10		1.97		2.28
Standard deviation		(1.20)		(1.19)		(1.26)

^a All sites based on enrollment Medical History Questionnaires. Urban and rural sites in Massachusetts and South Carolina have been combined.

^b Seattle N = 2235; Fitchburg/Franklin County N = 1068; Charleston/Georgetown County N = 1300.

^c Missing responses omitted: Seattle missing = 10 (0.4%); Fitchburg/Franklin County missing = 4 (0.4%); Charleston/Georgetown County missing = 11 (0.8%). All percentages add to 100 except for those due to rounding error.

^d Missing responses omitted: Seattle missing = 7 (0.3%); Fitchburg/Franklin County missing = 1 (0.1%); Charleston/Georgetown County missing = 12 (0.9%). All percentages add to 100 except for those due to rounding error.

Table A.3--continued

^e Missing responses omitted: Seattle missing = 7 (0.3%); Fitchburg/
Franklin County missing = 2 (0.2%); Charleston/Georgetown County missing
= 12 (0.9%). All percentages add to 100 except for those due to rounding
error.

^f Missing responses omitted: Seattle missing = 4 (0.2%); Fitchburg/
Franklin County missing = 0; Charleston/Georgetown County missing = 8
(0.6%). All percentages add to 100 except for those due to rounding error.

^g Missing responses omitted: Seattle missing = 2 (0.1%); Fitchburg/
Franklin County missing = 1 (0.1%); Charleston/Georgetown County missing
= 10 (0.8%). All percentages add to 100 except for those due to rounding
error.

^h Missing responses omitted: Seattle missing = 10 (0.4%); Fitchburg/
Franklin County missing = 0; Charleston/Georgetown County missing = 13
(1.0%). All percentages add to 100 except for those due to rounding error.

ⁱ Missing responses omitted: Seattle missing = 3 (0.1%); Fitchburg/
Franklin County missing = 1 (0.1%); Charleston/Georgetown County missing
= 7 (0.5%). All percentages add to 100 except for those due to rounding
error.

^j Missing responses omitted: Seattle missing = 14 (0.6%); Fitchburg/
Franklin County missing = 3 (0.3%); Charleston/Georgetown County missing
= 19 (1.5%). All percentages add to 100 except for those due to rounding
error.

^k Missing responses omitted: Seattle missing = 51 (2.3%); Fitchburg/
Franklin County missing = 28 (2.6%); Charleston/Georgetown County missing
= 21 (1.6%). All percentages add to 100 except for those due to rounding
error.

Table A.4

ETA COEFFICIENTS^a FOR SOCIAL ITEMS AND
THREE CRITERION VARIABLES, SEATTLE SITE (N=2235)

Social Well-Being Items	Criterion Variables		
	Current Health	Emotional Ties	Positive Well-Being
Neighborhood acquaintances	.12	.15	.21
Close friends and relatives	.14	.26	.32
Visits with friends/relatives	.12	.12	.16
Home visits by friends	.12	.17	.19
Visits to homes of friends	.15	.09	.16
Telephone contacts	.09	.09	.16
Letters written	-	--	.11
Getting along	.14	.15	.21
Attendance at religious services	--	.09	.12
Voluntary group membership	.10	.14	.22
Activity in groups	.08	.12	.19

^aEta coefficients omitted when between groups. F ratio was not significant (i.e., chance probability greater than 0.05).

Table A.5

ETA COEFFICIENTS^a FOR SOCIAL ITEMS AND THREE
CRITERION VARIABLES, MASSACHUSETTS SITE (N=1068)

Social Well-Being Items	Criterion Variables		
	Current Health	Emotional Ties	Positive Well-Being
Neighborhood acquaintances	.13	.13	.21
Close friends and relatives	.16	.23	.28
Visits with friends/relatives	.12	.15	.16
Home visits by friends	.12	.10	.16
Visits to homes of friends	.14	.11	.13
Telephone contacts	--	--	.12
Letters written	--	--	--
Getting along	.09	.15	.22
Attendance at religious services	--	--	--
Voluntary group memberships	--	.12	.16
Activity in groups	--	.13	.14

^aEta coefficients omitted when between groups F ratio was not significant (i.e., chance probability greater than 0.05).

Table A.6
ETA COEFFICIENTS^a FOR SOCIAL ITEMS AND THREE
CRITERION VARIABLES, SOUTH CAROLINA SITE (N=1300)

Social Well-Being Items	Criterion Variables		
	Current Health	Emotional Ties	Positive Well-Being
Neighborhood acquaintances	--	.13	.16
Close friends and relatives	--	.23	.29
Visits with friends/relatives	.13	.11	.17
Home visits by friends	.11	.13	.16
Visits to homes of friends	.14	.11	.17
Telephone contacts	.10	.16	.21
Letters written	--	--	--
Getting along	.17	.22	.29
Attendance at religious services	--	.13	.18
Voluntary group memberships	--	.15	.20
Activity in groups	--	.11	.19

^aEta coefficients omitted when between groups F ratio was not significant (i.e., chance probability greater than 0.05).

Table A.7

MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN NUMBER OF NEIGHBORHOOD ACQUAINTANCES,
SEATTLE SITE, (N=2235)

Criterion Variables	Number of Neighborhood Acquaintances						
	0 (N=567)	1 (N=361)	2 (N=399)	3 (N=299)	4 (N=189)	5-10 (N=360)	11-High (N=41)
<u>Current Health</u>							
Raw Score	34.06 (7.05)	35.14 (6.52)	35.62 (6.34)	35.17 (6.66)	35.27 (6.51)	36.02 (6.44)	37.78 (5.27)
Standardized Score	483.43 (106.53)	499.71 (98.62)	506.96 (95.84)	500.13 (100.72)	501.68 (98.45)	513.09 (97.42)	539.64 (79.70)
<u>Emotional Ties</u>							
Raw Score	13.36 (3.61)	13.77 (3.50)	14.00 (3.05)	14.13 (3.23)	14.44 (2.94)	14.67 (2.91)	15.41 (3.02)
Standardized Score	480.83 (110.48)	493.34 (106.93)	500.28 (93.28)	504.36 (98.72)	513.84 (90.02)	520.70 (88.94)	543.50 (92.50)
<u>Positive Well-Being</u>							
Raw Score	35.63 (8.04)	36.47 (7.79)	37.62 (7.28)	38.09 (7.47)	38.53 (6.87)	40.01 (6.94)	41.88 (7.72)
Standardized Score	474.70 (107.05)	485.90 (103.64)	501.18 (96.84)	507.40 (99.42)	513.28 (91.42)	532.96 (92.40)	557.89 (102.67)

^aStandard deviation in parentheses.

Table A.8

MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN NUMBER OF NEIGHBORHOOD ACQUAINTANCES,
FITCHBURG/FRANKLIN COUNTY SITE (N=1068)

Criterion Variables	Number of Neighborhood Acquaintances						
	0 (N=201)	1 (N=160)	2 (N=187)	3 (N=139)	4 (N=110)	5-10 (N=220)	11-High (N=40)
<u>Current Health</u>							
Raw Score	36.44 (6.41)	34.94 (7.07)	35.43 (6.81)	36.76 (6.34)	36.28 (6.71)	36.03 (7.42)	37.58 (5.43)
Standardized Score	506.24 (94.38)	484.09 (104.01)	491.46 (100.23)	510.94 (93.31)	503.87 (98.78)	500.12 (109.26)	522.89 (79.89)
<u>Emotional Ties</u>							
Raw Score	14.04 (3.24)	13.57 (3.25)	14.47 (3.06)	14.34 (3.03)	14.58 (2.97)	14.74 (2.63)	14.65 (3.53)
Standardized Score	491.18 (106.38)	475.54 (106.58)	505.15 (100.51)	501.13 (99.49)	508.89 (97.47)	514.11 (86.31)	511.13 (115.78)
<u>Positive Well-Being</u>							
Raw Score	36.33 (8.08)	35.09 (8.25)	37.08 (7.44)	37.29 (7.84)	38.49 (7.26)	39.40 (6.97)	40.39 (8.91)
Standardized Score	485.82 (105.04)	469.82 (107.23)	495.62 (96.69)	498.32 (101.92)	513.95 (94.38)	525.79 (90.62)	538.59 (115.78)

^aStandard deviation in parentheses.

Table A.9
MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN NUMBER OF NEIGHBORHOOD ACQUAINTANCES,
CHARLESTON/GEORGETOWN COUNTY SITE (N=1300)

Criterion Variables	Number of Neighborhood Acquaintances						
	0 (N=183)	1 (N=156)	2 (N=185)	3 (N=204)	4 (N=136)	5-10 (N=339)	11-High (N=71)
<u>Current Health</u>							
Raw Score	32.50 (8.34)	33.32 (7.25)	33.50 (7.45)	33.50 (7.05)	32.88 (7.07)	33.05 (7.45)	33.51 (7.46)
Standardized Score	491.32 (111.76)	502.31 (97.15)	504.73 (99.85)	504.76 (94.46)	496.41 (94.79)	498.66 (99.90)	504.78 (99.94)
<u>Emotional Ties</u>							
Raw Score	13.28 (3.73)	13.71 (3.78)	14.45 (3.10)	14.28 (3.02)	14.06 (3.15)	14.42 (2.84)	14.54 (2.72)
Standardized Score	473.77 (116.66)	487.23 (118.30)	510.35 (96.82)	505.04 (94.47)	497.99 (98.64)	509.44 (88.84)	513.11 (85.01)
<u>Positive Well-Being</u>							
Raw Score	35.21 (8.43)	36.24 (9.49)	38.18 (7.99)	38.54 (7.62)	37.82 (7.57)	38.34 (7.03)	39.89 (7.40)
Standardized Score	469.86 (106.91)	481.64 (120.36)	506.29 (101.38)	510.83 (96.72)	501.62 (96.04)	508.26 (89.22)	527.90 (93.88)

^aStandard deviation in parentheses.

Table A.10
MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN NUMBER OF FRIENDS AND RELATIVES,
SEATTLE SITE (N=2235)

Criterion Variables	Number of Friends/Relatives										36-High (N=52)
	0 (N=29)	1 (N=65)	2 (N=150)	3 (N=196)	4 (N=242)	5-9 (N=745)	10-20 (N=619)	21-25 (N=51)	26-35 (N=50)		
<u>Current Health</u>											
Raw Score	31.93 (8.28)	33.68 (7.18)	33.46 (7.02)	34.46 (6.74)	35.02 (6.47)	35.12 (6.63)	35.92 (6.45)	36.78 (5.52)	35.44 (6.94)	35.67 (6.67)	
Standardized Score	451.19 (125.15)	477.59 (108.59)	474.25 (106.11)	489.49 (101.90)	497.85 (97.90)	499.38 (100.22)	511.47 (97.54)	524.58 (83.50)	504.25 (104.99)	507.78 (100.87)	
<u>Emotional Ties</u>											
Raw Score	10.76 (4.33)	12.28 (3.56)	12.66 (3.58)	13.06 (3.67)	13.78 (3.34)	13.92 (3.24)	14.69 (2.88)	15.53 (2.14)	15.26 (2.82)	15.98 (2.30)	
Standardized Score	401.12 (132.46)	447.79 (108.93)	459.37 (109.58)	471.46 (112.15)	493.42 (102.04)	497.82 (99.09)	521.32 (87.98)	547.02 (65.40)	538.78 (86.23)	560.82 (70.23)	
<u>Positive Well-Being</u>											
Raw Score	30.07 (8.56)	31.90 (8.29)	33.80 (8.38)	35.07 (8.36)	36.28 (7.78)	37.63 (7.22)	39.30 (6.58)	41.56 (5.78)	42.94 (7.37)	42.63 (6.01)	
Standardized Score	400.70 (113.94)	425.08 (110.37)	450.32 (111.57)	467.26 (111.27)	483.36 (103.61)	501.32 (96.12)	523.57 (87.52)	553.64 (76.95)	572.02 (98.16)	567.96 (80.02)	

^aStandard deviation in parentheses.

Table A.11
MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN NUMBER OF FRIENDS AND RELATIVES,
FITCHBURG/FRANKLIN COUNTY SITE (N=1068)

Criterion Variables	Number of Friends/Relatives									
	0 (N=20)	1 (N=34)	2 (N=84)	3 (N=96)	4 (N=127)	5-9 (N=351)	10-20 (N=267)	21-25 (N=30)	26-35 (N=16)	36-High (N=21)
<u>Current Health</u>										
Raw Score	30.30 (7.60)	34.94 (8.07)	34.65 (7.58)	36.11 (6.29)	36.90 (6.09)	36.08 (6.66)	36.94 (6.21)	35.37 (8.92)	32.56 (9.78)	37.19 (6.20)
Standardized Score	415.84 (111.77)	484.14 (118.77)	479.92 (111.47)	501.41 (92.52)	512.93 (89.54)	500.98 (98.11)	513.50 (91.46)	490.40 (131.18)	449.14 (143.97)	517.24 (91.26)
<u>Emotional Ties</u>										
Raw Score	11.60 (3.76)	13.26 (3.39)	13.04 (3.30)	14.24 (3.04)	14.02 (3.06)	14.35 (2.96)	15.00 (2.65)	14.83 (3.40)	15.06 (3.53)	15.17 (2.73)
Standardized Score	410.99 (123.48)	465.65 (111.20)	458.13 (108.40)	497.66 (99.78)	490.44 (100.52)	501.20 (97.17)	522.74 (87.09)	517.15 (111.78)	524.67 (115.90)	528.09 (89.51)
<u>Positive Well-Being</u>										
Raw Score	29.23 (9.39)	33.00 (9.07)	34.12 (7.60)	35.62 (8.26)	36.98 (7.23)	37.82 (7.37)	39.44 (6.98)	39.17 (9.01)	37.38 (8.78)	41.62 (7.66)
Standardized Score	393.58 (121.94)	442.62 (117.81)	457.16 (98.73)	476.72 (107.38)	494.38 (93.89)	505.20 (95.78)	526.28 (90.76)	522.73 (117.09)	499.45 (114.12)	554.59 (99.57)

^aStandard deviation in parentheses.

Table A. 12
MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN NUMBER OF FRIENDS AND RELATIVES,
CHARLESTON/GEORGETOWN COUNTY SITE (N=1300)

Criterion Variables	Number of Friends/Relatives									
	0 (N=36)	1 (N=105)	2 (N=146)	3 (N=153)	4 (N=117)	5-9 (N=364)	10-20 (N=273)	21-25 (N=27)	26-35 (N=15)	36-High (N=37)
<u>Current Health</u>										
Raw Score	31.42 (8.12)	31.84 (7.05)	33.07 (7.17)	33.03 (7.07)	32.77 (6.87)	33.55 (7.37)	33.07 (8.16)	35.26 (6.84)	34.20 (8.76)	35.43 (6.95)
Standardized Score	476.77 (108.90)	482.37 (94.55)	498.91 (96.08)	498.34 (94.78)	494.90 (92.04)	505.32 (98.74)	498.97 (109.34)	528.27 (91.63)	514.07 (117.41)	530.59 (93.10)
<u>Emotional Ties</u>										
Raw Score	13.17 (4.15)	12.79 (3.64)	13.47 (3.54)	13.70 (3.09)	13.91 (2.78)	14.42 (3.02)	14.69 (3.05)	14.26 (3.38)	14.73 (2.81)	16.35 (1.77)
Standardized Score	470.10 (129.79)	458.33 (113.80)	479.66 (110.86)	486.96 (96.72)	493.21 (86.98)	509.34 (94.60)	517.63 (95.43)	504.26 (105.72)	519.08 (88.02)	569.68 (55.26)
<u>Positive Well-Being</u>										
Raw Score	33.29 (8.33)	33.14 (9.88)	36.53 (8.19)	36.17 (7.58)	36.74 (7.35)	38.49 (7.32)	39.36 (7.23)	39.59 (6.66)	41.07 (4.65)	45.27 (5.45)
Standardized Score	444.24 (105.69)	442.29 (125.28)	485.32 (103.89)	480.79 (96.09)	487.91 (93.27)	510.21 (92.79)	521.22 (91.67)	524.16 (97.12)	542.85 (59.00)	596.17 (69.12)

^a Standard deviation in parentheses.

Table A. 13

MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN FREQUENCY OF VISITS WITH FRIENDS AND RELATIVES, SEATTLE SITE (N=2235)

Criterion Variables	Number of Visits with Friends/Relatives		
	<5 times a year (N=109)	5-10 times/yr or once a month (N=390)	2 or 3 times/mo (N=485)
			Once a week or several days a week or every day (N=1239)
<u>Current Health</u>			
Raw Score	33.96 (8.08)	34.24 (6.55)	34.54 (6.76)
Standardized Score	481.92 (122.13)	486.15 (99.10)	490.66 (102.25)
<u>Emotional Ties</u>			
Raw Score	12.55 (4.07)	13.82 (3.29)	14.02 (3.33)
Standardized Score	455.90 (124.53)	494.60 (100.53)	500.84 (101.71)
<u>Positive Well-Being</u>			
Raw Score	34.99 (9.50)	36.02 (7.88)	36.83 (7.84)
Standardized Score	466.22 (126.45)	479.82 (104.85)	490.72 (104.39)
			512.84 (96.32)

^aStandard deviation in parentheses.

Table A.14

MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN FREQUENCY OF VISITS WITH FRIENDS AND RELATIVES, FITCHBURG/FRANKLIN COUNTY SITE (N=1068)

Criterion Variables	Number of Visits with Friends/Relatives		
	<5 times a year (N=56)	5-10 times/yr or once a month (N=207)	2 or 3 times/mo (N=179)
			Once a week or several days a week or every day (N=305)
<u>Current Health</u>			
Raw Score	34.14 (7.08)	35.45 (6.86)	35.68 (6.88)
Standardized Score	472.39 (104.25)	491.62 (100.87)	494.95 (101.38)
<u>Emotional Ties</u>			
Raw Score	12.81 (3.73)	14.16 (3.29)	14.53 (2.86)
Standardized Score	450.80 (122.46)	495.13 (107.96)	507.30 (93.74)
<u>Positive Well-Being</u>			
Raw Score	33.28 (8.97)	36.61 (8.11)	37.96 (7.56)
Standardized Score	446.33 (116.50)	489.53 (105.44)	506.06 (98.18)
			503.64 (96.46)
			507.14 (98.64)
			36.50 (6.70)
			37.92 (7.58)
			506.54 (98.41)

^aStandard deviation in parentheses.

Table A.15

MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN FREQUENCY OF VISITS
WITH FRIENDS AND RELATIVES, CHARLESTON/GEORGETOWN COUNTY SITE (N=1300)

Criterion Variables	Number of Visits with Friends/Relatives		
	<5 times a year (N=141)	5-10 times/yr or once a month (N=240)	2 or 3 times/mo (N=238)
			Once a week or sev- eral days a week or every day (N=670)
<u>Current Health</u>			
Raw Score	31.66 (8.18)	32.11 (7.63)	32.93 (7.21)
Standardized Score	480.09 (109.60)	486.04 (102.32)	497.03 (96.65)
			509.78 (96.94)
<u>Emotional Ties</u>			
Raw Score	13.14 (3.95)	14.11 (3.15)	14.06 (3.09)
Standardized Score	469.43 (123.57)	499.48 (98.60)	498.06 (96.57)
			505.93 (96.90)
<u>Positive Well-Being</u>			
Raw Score	34.63 (9.52)	36.85 (8.22)	37.49 (7.84)
Standardized Score	461.18 (120.82)	489.34 (104.28)	497.43 (99.47)
			511.94 (93.62)

^aStandard deviation in parentheses.

Table A.16
MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN FREQUENCY
OF HOME VISITS BY FRIENDS, SEATTLE SITE (N=2235)

Criterion Variables	Number of Visits by Friends		
	Not at All (N=317)	Once Past Month (N=306)	2 or 3 times/mo, once a week, several days/wk or every day (N=1603)
<u>Current Health</u>			
Raw Score	33.69 (7.09)	34.27 (6.60)	35.60 (6.52)
Standardized Score	477.80 (107.24)	486.53 (99.78)	506.70 (98.52)
<u>Emotional Ties</u>			
Raw Score	12.97 (3.90)	13.69 (3.42)	14.25 (3.10)
Standardized Score	468.65 (119.35)	490.78 (104.51)	507.89 (94.94)
<u>Positive Well-Being</u>			
Raw Score	34.58 (8.71)	35.92 (7.74)	38.42 (7.26)
Standardized Score	460.69 (115.92)	478.56 (103.09)	511.87 (96.64)

^aStandard deviation in parentheses.

Table A.17

MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN FREQUENCY OF HOME VISITS BY FRIENDS, FITCHBURG/FRANKLIN COUNTY SITE (N=1068)

Criterion Variables	Number of Visits by Friends		
	Not at All (N=144)	Once Past Month (N=143)	2 or 3 times/mo, once a week, several days/wk or every day (N=780)
<u>Current Health</u>			
Raw Score	34.18 (6.83)	35.48 (7.09)	36.49 (6.68)
Standardized Score	472.95 (100.52)	492.10 (104.38)	506.94 (98.30)
<u>Emotional Ties</u>			
Raw Score	13.63 (3.44)	14.58 (3.25)	14.38 (2.93)
Standardized Score	477.71 (112.98)	508.96 (106.61)	502.20 (96.32)
<u>Positive Well-Being</u>			
Raw Score	34.71 (8.81)	38.18 (8.49)	37.79 (7.40)
Standardized Score	464.81 (114.45)	509.94 (110.28)	504.89 (96.07)

^aStandard deviation in parentheses.

Table A.18

MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN FREQUENCY OF HOME VISITS BY FRIENDS, CHARLESTON/GEORGETOWN COUNTY SITE (N=1300)

Criterion Variables	Number of Visits by Friends		
	Not at All (N=220)	Once Past Month (N=173)	2 or 3 times/mo, once a week, several days/wk or every day (N=895)
<u>Current Health</u>			
Raw Score	31.52 (7.54)	32.94 (7.11)	33.55 (7.43)
Standardized Score	478.10 (101.05)	497.13 (95.32)	505.32 (99.65)
<u>Emotional Ties</u>			
Raw Score	13.32 (3.74)	14.29 (2.89)	14.26 (3.12)
Standardized Score	474.90 (116.81)	505.28 (90.34)	504.33 (97.51)
<u>Positive Well-Being</u>			
Raw Score	34.92 (9.58)	37.44 (7.63)	38.33 (7.43)
Standardized Score	464.87 (121.47)	496.92 (96.74)	508.18 (94.30)

^aStandard deviation in parentheses.

Table A.19

MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN FREQUENCY
OF VISITS TO HOMES OF FRIENDS, SEATTLE SITE (N=2235)

Criterion Variables	Number of Visits to Friends		
	Not at All (N=242)	Once Past Month or 2-3 Times/mo (N=1040)	Once a Week, Several Days/wk or Every Day (N=944)
<u>Current Health</u>			
Raw Score	33.02 (7.47)	34.88 (6.60)	36.02 (6.33)
Standardized Score	467.67 (112.90)	495.75 (99.76)	512.97 (95.76)
<u>Emotional Ties</u>			
Raw Score	13.55 (3.59)	14.12 (3.30)	13.96 (3.22)
Standardized Score	486.60 (109.78)	503.78 (100.97)	499.14 (98.48)
<u>Positive Well-Being</u>			
Raw Score	34.51 (8.28)	37.28 (7.69)	38.58 (7.30)
Standardized Score	459.88 (110.17)	496.71 (102.44)	513.95 (97.10)

^aStandard deviation in parentheses.

Table A. 20

MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN FREQUENCY OF VISITS TO HOMES OF FRIENDS, FITCHBURG/FRANKLIN COUNTY SITE (N=1068)

Criterion Variables	Number of Visits to Friends		
	Not at All (N=128)	Once Past Month or 2-3 Times/mo (N=477)	Once a Week, Several Days/wk or Every Day (N=461)
<u>Current Health</u>			
Raw Score	33.77 (7.03)	36.08 (6.54)	36.63 (6.88)
Standardized Score	466.96 (103.51)	500.89 (96.32)	508.93 (101.23)
<u>Emotional Ties</u>			
Raw Score	13.90 (3.20)	14.50 (2.98)	14.21 (3.10)
Standardized Score	486.69 (104.92)	506.27 (97.70)	496.59 (101.76)
<u>Positive Well-Being</u>			
Raw Score	34.82 (8.69)	37.42 (7.50)	38.14 (7.76)
Standardized Score	466.27 (112.90)	500.11 (97.39)	509.43 (100.79)

^aStandard deviation in parentheses.

Table A.21

MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN FREQUENCY OF VISITS TO HOMES OF FRIENDS, CHARLESTON/GEORGETOWN COUNTY SITE (N=1300)

Criterion Variables	Number of Visits to Friends	
	Not at All (N=213)	Once Past Month or 2-3 Times/mo Days/wk or Every Day (N=527)
<u>Current Health</u>		
Raw Score	31.37 (7.99)	32.93 (7.41)
Standardized Score	476.18 (107.04)	496.89 (99.34)
<u>Emotional Ties</u>		
Raw Score	13.45 (3.70)	14.39 (2.91)
Standardized Score	478.90 (115.67)	508.26 (91.09)
<u>Positive Well-Being</u>		
Raw Score	34.72 (9.56)	37.96 (7.48)
Standardized Score	462.42 (121.26)	503.40 (94.92)

^a Standard deviation in parentheses.

Table A.22

MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN FREQUENCY OF
TELEPHONE CONTACTS, SEATTLE SITE (N=2235)

Criterion Variables	Number of Telephone Contacts				
	Not at all (N=53)	Once past month (N=82)	2-3 times/mo or once a week (N=738)	Several days a week (N=861)	Every day (N=493)
<u>Current Health</u>					
Raw Score	33.34 (7.21)	33.69 (6.51)	34.67 (6.54)	35.57 (6.68)	35.58 (6.65)
Standardized Score	472.49 (109.04)	477.74 (98.42)	492.67 (98.86)	506.28 (100.96)	506.41 (100.57)
<u>Emotional Ties</u>					
Raw Score	12.78 (3.84)	13.11 (3.55)	13.91 (3.36)	14.05 (3.26)	14.27 (3.13)
Standardized Score	463.03 (117.35)	473.16 (108.60)	497.45 (102.81)	501.82 (99.72)	508.59 (95.74)
<u>Positive Well-Being</u>					
Raw Score	33.45 (9.40)	34.98 (8.42)	36.38 (7.69)	38.36 (7.44)	38.64 (7.31)
Standardized Score	445.74 (125.12)	446.01 (112.03)	484.70 (102.39)	511.09 (99.10)	514.73 (97.30)

^aStandard deviation in parentheses.

Table A. 23
MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN FREQUENCY OF TELEPHONE CONTACTS,
FITCHBURG/FRANKLIN COUNTY SITE (N=1068)

Criterion Variables	Number of Telephone Contacts			
	Not at All (N=63)	Once Past Month (N=25)	2-3 times/mo or Once a Week (N=432)	Several Days a Week (N=341) Every Day (N=206)
<u>Current Health</u>				
Raw Score	36.08 (7.10)	34.52 (6.29)	35.72 (6.46)	36.54 (7.35)
Standardized Score	500.88 (104.49)	477.94 (92.59)	495.54 (95.08)	507.68 (100.68)
<u>Emotional Ties</u>				
Raw Score	14.10 (3.43)	13.68 (3.99)	14.23 (2.94)	14.48 (3.07)
Standardized Score	492.92 (112.76)	479.28 (130.88)	497.41 (96.36)	505.72 (100.81)
<u>Positive Well-Being</u>				
Raw Score	35.21 (9.18)	37.08 (8.16)	36.79 (7.59)	38.55 (7.69)
Standardized Score	471.28 (119.20)	495.62 (106.06)	491.89 (98.64)	514.65 (99.97)

^a Standard deviation in parentheses.

Table A.24
MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN FREQUENCY OF TELEPHONE CONTACTS,
CHARLESTON/GEORGETOWN COUNTY SITE (N=1300)

Criterion Variables	Number of Telephone Contacts				
	Not at All (N=110)	Once Past Month (N=61)	2-3 times/mo or Once a Week (N=412)	Several Days a Week (N=396)	Every Day (N=313)
<u>Current Health</u>					
Raw Score	31.16 (7.28)	32.61 (6.12)	33.88 (7.45)	33.15 (7.52)	32.87 (7.57)
Standardized Score	473.38 (97.61)	492.72 (82.05)	509.85 (99.86)	500.02 (100.78)	496.32 (101.46)
<u>Emotional Ties</u>					
Raw Score	12.75 (3.62)	13.20 (2.92)	14.53 (3.10)	14.03 (3.32)	14.30 (3.02)
Standardized Score	457.21 (113.27)	471.04 (91.31)	512.62 (96.78)	497.06 (103.86)	505.49 (94.46)
<u>Positive Well-Being</u>					
Raw Score	33.33 (9.88)	33.74 (5.97)	38.50 (7.47)	37.97 (7.86)	38.44 (7.68)
Standardized Score	444.75 (125.35)	449.89 (75.78)	510.31 (94.71)	503.62 (99.69)	509.49 (97.45)

^a Standard deviation in parentheses.

Table A.25

MEAN HEALTH CRITERION SCORES^a FOR GROUPS DIFFERING IN ABILITY
TO GET ALONG WITH OTHERS, SEATTLE SITE (N=2235)

Criterion Variables	Getting Along		
	Not as Well (N=73)	Same as Usual (N=1712)	Better than Usual (N=463)
<u>Current Health</u>			
Raw Score	30.41 (7.72)	35.09 (6.63)	36.14 (6.18)
Standardized Score	428.20 (116.69)	498.95 (100.28)	514.90 (93.52)
<u>Emotional Ties</u>			
Raw Score	11.31 (3.60)	14.06 (3.30)	14.13 (3.06)
Standardized Score	417.93 (109.98)	502.14 (101.09)	504.31 (93.74)
<u>Positive Well-Being</u>			
Raw Score	30.07 (7.94)	37.38 (7.64)	39.37 (7.00)
Standardized Score	400.70 (105.72)	497.99 (101.70)	524.51 (93.26)

^aStandard deviation in parentheses.

Table A.26

MEAN HEALTH CRITERION SCORES^a FOR GROUPS DIFFERING IN ABILITY
TO GET ALONG WITH OTHERS, FITCHBURG/FRANKLIN COUNTY SITE (N=1068)

Criterion Variables	Getting Along		
	Not as Well (N=33)	Same as Usual (N=875)	Better than Usual (N=159)
<u>Current Health</u>			
Raw Score	32.73 (7.18)	36.09 (6.73)	36.48 (6.91)
Standardized Score	451.56 (105.61)	501.02 (99.11)	506.75 (101.70)
<u>Emotional Ties</u>			
Raw Score	11.79 (3.50)	14.38 (3.06)	14.43 (2.71)
Standardized Score	417.16 (114.83)	502.19 (100.60)	503.82 (89.02)
<u>Positive Well-Being</u>			
Raw Score	28.73 (8.31)	37.40 (7.69)	39.40 (7.16)
Standardized Score	387.12 (107.97)	499.78 (99.98)	525.71 (92.96)

^aStandard deviation in parentheses.

Table A.27

MEAN HEALTH CRITERION SCORES^a FOR GROUPS DIFFERING IN ABILITY
TO GET ALONG WITH OTHERS, CHARLESTON/GEORGETOWN COUNTY SITE (N=1300)

Criterion Variables	Getting Along		
	Not as Well (N=59)	Same as Usual (N=996)	Better than Usual (N=232)
<u>Current Health</u>			
Raw Score	29.10 (7.87)	32.86 (7.43)	35.18 (6.90)
Standardized Score	445.74 (105.44)	496.18 (99.58)	527.16 (92.46)
<u>Emotional Ties</u>			
Raw Score	10.93 (3.51)	14.20 (3.16)	14.56 (3.02)
Standardized Score	400.22 (109.84)	502.28 (98.69)	513.68 (94.35)
<u>Positive Well-Being</u>			
Raw Score	29.08 (7.25)	37.43 (7.83)	40.86 (6.85)
Standardized Score	390.88 (91.99)	496.68 (99.29)	540.29 (86.88)

^aStandard deviation in parentheses.

Table A.28

MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING
IN FREQUENCY OF ATTENDANCE AT RELIGIOUS
SERVICES, SEATTLE SITE (N=2235)

Criterion Variables	Number of Attendances				
	Not at All (N=1395)	Once a Month (N=182)	2 or 3 Times a Month (N=186)	Once a Week (N=256)	More Than Once a Week or Every Day (N=209)
<i>Current health</i>					
Raw score	35.11 (6.62)	34.80 (7.24)	35.57 (6.55)	35.25 (6.66)	35.25 (6.45)
Standardized score	499.28 (99.94)	494.60 (109.37)	506.26 (98.90)	501.43 (100.67)	501.34 (97.48)
<i>Emotional ties</i>					
Raw score	13.86 (3.32)	13.61 (3.53)	14.04 (3.36)	14.27 (3.30)	14.80 (2.73)
Standardized score	495.97 (101.72)	488.23 (108.00)	501.40 (102.80)	508.64 (100.83)	524.76 (83.64)
<i>Positive well-being</i>					
Raw Score	36.93 (7.82)	37.49 (7.89)	38.18 (7.12)	38.49 (7.33)	39.78 (6.97)
Standardized score	491.78 107.25	499.40 108.22	508.99 (97.74)	513.14 (100.59)	530.90 (95.56)

^aStandard deviation in parentheses.

Table A.29

MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN FREQUENCY
OF ATTENDANCE AT RELIGIOUS SERVICES, FITCHBURG/FRANKLIN COUNTY SITE (N=1068)

Criterion Variables	Number of Attendances			
	Not at All (N=602)	Once a Month (N=105)	2 or 3 Times/Mo. (N=83)	Once a Week (N=235)
				More Than Once A Week or Every Day (N=41)
<u>Current Health</u>				
Raw Score	35.83 (6.93)	36.78 (6.24)	36.31 (6.81)	36.55 (6.19)
Standardized Score	496.70 (102.03)	510.74 (91.77)	503.86 (100.23)	507.29 (91.07)
<u>Emotional Ties</u>				
Raw Score	14.21 (3.17)	14.47 (3.05)	14.12 (3.02)	14.54 (2.77)
Standardized Score	497.00 (103.81)	505.27 (100.00)	493.92 (99.04)	507.82 (90.91)
<u>Positive Well-Being</u>				
Raw Score	36.82 (8.08)	38.05 (7.45)	38.64 (7.94)	38.20 (7.15)
Standardized Score	492.23 (103.32)	507.89 (95.25)	515.44 (101.58)	509.89 (91.51)
				507.28 (100.76)

^aStandard deviation in parentheses.

Table A.30

MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN FREQUENCY
OF ATTENDANCE AT RELIGIOUS SERVICES, CHARLESTON/GEORGETOWN COUNTY SITE (N=1300)

Criterion Variables	Number of Attendances			
	Not at All (N=446)	Once a Month (N=129)	2 or 3 Times/Mo. (N=217)	Once a Week (N=293)
				More Than Once a Week or Every Day (N=208)
<u>Current Health</u>				
Raw Score	32.52 (8.03)	33.62 (7.13)	33.42 (7.36)	33.60 (6.78)
Standardized Score	491.95 (108.14)	506.72 (96.02)	503.99 (99.14)	506.38 (91.26)
				501.66 (99.22)
<u>Emotional Ties</u>				
Raw Score	13.55 (3.59)	14.54 (2.72)	14.28 (2.90)	14.42 (3.07)
Standardized Score	482.23 (111.87)	513.18 (84.71)	505.02 (90.48)	509.40 (95.88)
				510.35 (96.18)
<u>Positive Well-Being</u>				
Raw Score	35.88 (9.12)	37.44 (7.12)	38.39 (6.91)	38.76 (7.03)
Standardized Score	477.18 (116.73)	497.14 (91.11)	509.27 (88.50)	513.96 (90.05)
				523.03 (95.02)

^aStandard deviation in parentheses.

Table A.31

MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN
VOLUNTARY GROUP MEMBERSHIP, SEATTLE SITE (N=2235)

Criterion Variables	Number of Groups					5-High (N=53)
	0 (N=1108)	1 (N=505)	2 (N=318)	3 (N=169)	4 (N=65)	
<u>Current Health</u>						
Raw Score	35.00 (6.70)	34.68 (6.75)	35.83 (6.61)	34.80 (6.28)	36.31 (6.44)	38.66 (4.47)
Standardized Score	497.61 (101.40)	492.83 (102.03)	510.19 (99.97)	494.55 (95.00)	517.37 (97.38)	552.95 (67.62)
<u>Emotional Ties</u>						
Raw Score	13.67 (3.43)	13.84 (3.35)	14.58 (3.02)	14.68 (2.64)	14.58 (3.10)	15.66 (2.35)
Standardized Score	490.06 (104.97)	495.40 (102.57)	517.99 (92.28)	521.14 (80.64)	518.12 (94.70)	551.02 (71.96)
<u>Positive Well-Being</u>						
Raw Score	36.32 (7.94)	37.02 (7.46)	39.59 (6.83)	39.64 (6.78)	41.51 (6.50)	42.98 (5.75)
Standardized Score	483.96 (105.65)	493.17 (99.30)	527.41 (90.86)	528.16 (90.30)	552.96 (86.46)	572.57 (76.54)

^aStandard deviation in parentheses.

Table A.32

MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN VOLUNTARY GROUP MEMBERSHIP,
FITCHBURG/FRANKLIN COUNTY SITE (N=1068)

Criterion Variables	Number of Groups					
	0 (N=589)	1 (N=203)	2 (N=150)	3 (N=63)	4 (N=27)	5-High (N=32)
<u>Current Health</u>						
Raw Score	35.94 (6.86)	36.21 (6.56)	35.72 (6.46)	36.40 (7.82)	38.04 (5.73)	36.25 (7.44)
Standardized Score	498.77 (100.90)	502.76 (96.60)	495.63 (95.03)	505.56 (115.03)	529.69 (84.38)	503.40 (109.41)
<u>Emotional Ties</u>						
Raw Score	13.99 (3.16)	14.53 (2.84)	14.75 (2.87)	14.81 (3.09)	15.22 (2.56)	15.03 (2.94)
Standardized Score	489.46 (103.64)	507.34 (93.22)	514.52 (94.17)	516.37 (101.59)	529.92 (84.11)	523.64 (96.70)
<u>Positive Well-Being</u>						
Raw Score	36.54 (8.04)	37.84 (7.46)	38.19 (6.83)	39.94 (8.21)	40.37 (5.80)	40.91 (7.74)
Standardized Score	488.57 (104.44)	505.49 (96.87)	509.99 (88.74)	532.73 (106.71)	538.36 (75.42)	545.33 (100.53)

^aStandard deviation in parentheses.

Table A.33
MEAN HEALTH CRITERION SCORES^a FOR REVISED GROUPS DIFFERING IN VOLUNTARY GROUP MEMBERSHIP,
CHARLESTON/GEORGETOWN COUNTY SITE (N=1300)

Criterion Variables	Number of Groups				
	0 (N=545)	1 (N=314)	2 (N=174)	3 (N=130)	4 (N=61)
<u>Current Health</u>					
Raw Score	32.75 (7.57)	32.84 (7.45)	33.30 (7.10)	34.45 (7.09)	34.56 (8.34)
Standardized Score	494.64 (101.44)	495.80 (99.83)	502.00 (95.11)	517.48 (94.98)	518.92 (111.85)
<u>Emotional Ties</u>					
Raw Score	13.77 (3.35)	13.88 (3.29)	14.40 (2.95)	14.86 (2.63)	14.96 (3.24)
Standardized Score	488.90 (104.64)	492.32 (102.99)	508.64 (92.18)	523.09 (82.30)	534.60 (86.84)
<u>Positive Well-Being</u>					
Raw Score	36.34 (8.45)	37.22 (7.73)	38.50 (7.23)	39.80 (6.45)	40.74 (8.56)
Standardized Score	482.87 (107.18)	494.12 (98.03)	510.26 (91.76)	526.79 (81.87)	539.67 (108.54)

^aStandard deviation in parentheses.

Table A.34

MEAN HEALTH CRITERION SCORES^a FOR GROUPS DIFFERING IN LEVEL OF GROUP ACTIVITY,
SEATTLE SITE (N=2235)

Criterion Variables	Activity Level			
	Does Not Belong (N=1055)	Not Active (N=272)	Fairly Active (N=430)	Very Active (N=424)
<u>Current Health</u>				
Raw Score	34.98 (6.70)	34.14 (7.26)	35.74 (6.44)	35.72 (6.15)
Standardized Score	497.38 (101.26)	484.64 (109.85)	508.85 (97.44)	508.50 (92.97)
<u>Emotional Ties</u>				
Raw Score	13.68 (3.43)	13.69 (3.57)	14.32 (3.04)	14.67 (2.93)
Standardized Score	484.89 (105.27)	488.77 (101.68)	521.75 (93.00)	527.32 (93.63)
<u>Positive Well-Being</u>				
Raw Score	36.39 (7.91)	36.68 (7.64)	39.16 (6.99)	39.58 (7.03)
Standardized Score	484.89 (105.27)	488.77 (101.68)	521.75 (93.00)	527.32 (93.63)

^aStandard deviation in parentheses.

Table A.35

MEAN HEALTH CRITERION SCORES^a FOR GROUPS DIFFERING IN LEVEL OF GROUP ACTIVITY,
FITCHBURG/FRANKLIN COUNTY SITE (N=1068)

Criterion Variables	Activity Level			
	Does Not Belong (N=567)	Not Active (N=119)	Fairly Active (N=171)	Very Active (N=182)
<u>Current Health</u>				
Raw Score	35.98 (6.80)	35.82 (6.38)	36.49 (6.60)	35.97 (7.28)
Standardized Score	499.38 (100.03)	497.12 (93.90)	506.99 (97.09)	499.32 (107.13)
<u>Emotional Ties</u>				
Raw Score	13.96 (3.16)	14.62 (2.89)	14.66 (2.58)	14.91 (3.04)
Standardized Score	488.46 (103.61)	510.20 (94.99)	511.39 (84.76)	519.63 (99.72)
<u>Positive Well-Being</u>				
Raw Score	36.54 (8.02)	38.35 (7.35)	38.00 (7.49)	39.29 (7.15)
Standardized Score	488.67 (104.18)	512.10 (95.46)	507.57 (97.34)	524.38 (92.93)

^a Standard deviation in parentheses.

Table A.36

MEAN HEALTH CRITERION SCORES^a FOR GROUPS DIFFERING IN LEVEL OF GROUP ACTIVITY,
CHARLESTON/GEORGETOWN COUNTY SITE (N=1300)

Criterion Variables	Activity Level			
	Does Not Belong (N=566)	Not Active (N=108)	Fairly Active (N=279)	Very Active (N=326)
<u>Current Health</u>				
Raw Score	32.72 (7.56)	32.37 (8.12)	33.29 (7.24)	33.91 (7.23)
Standardized Score	494.22 (101.37)	489.55 (108.90)	501.93 (96.98)	510.20 (96.90)
<u>Emotional Ties</u>				
Raw Score	13.78 (3.39)	13.87 (3.25)	14.25 (3.13)	14.62 (2.95)
Standardized Score	489.28 (105.89)	492.10 (101.62)	503.89 (97.78)	515.58 (92.23)
<u>Positive Well-Being</u>				
Raw Score	36.24 (8.69)	36.58 (6.92)	38.47 (7.35)	39.77 (6.91)
Standardized Score	481.70 (110.29)	485.93 (87.80)	509.98 (93.19)	526.41 (87.66)

^aStandard deviation in parentheses.

Table A.37

SUMMARY OF F RATIOS FOR DIFFERENCES
BETWEEN GROUP MEANS (GM) AND NONLINEAR TRENDS (NL),
THREE CRITERION VARIABLES, SEATTLE SITE (N=2235)

Social	Items	Criterion Variables					
		Current Health		Emotional Ties		Positive Well-Being	
		GM	NL	GM	NL	GM	NL
	Neighborhood acquaintances	5.03**	1.72	8.31**	<1	16.90**	<1
	Close friends and relatives	3.76**	<1	17.94**	<1	26.90**	<1
	Visits with friends/relatives	8.56**	1.31	8.64**	4.04*	17.20**	<1
	Home visits by friends	14.19**	<1	21.83**	<1	42.40**	1.40
	Visits to homes of friends	21.64**	1.31	2.90	5.18*	28.60**	4.16*
	Telephone contacts	4.35**	<1	4.35**	1.14	15.60**	2.30
	Getting along	23.95**	16.52**	25.38**	36.74**	49.20**	27.20**
	Attendance at religious services	<1	<1	4.82**	1.54	8.04**	<1
	Voluntary group membership	4.76**	3.49**	9.15**	1.10	22.88**	1.64
	Activity in groups	4.51**	3.79**	11.49**	1.13	26.28**	2.77

* p < .05

** p < .01

Table A.38
SUMMARY OF F RATIOS FOR DIFFERENCES
BETWEEN GROUP MEANS (GM) AND NONLINEAR TRENDS (NL),
THREE CRITERION VARIABLES, FITCHBURG/FRANKLIN COUNTY SITE (N=1068)

Social	Items	Criterion Variables					
		Current Health		Emotional Ties		Positive Well-Being	
		GM	NL	GM	NL	GM	NL
Neighborhood acquaintances		1.69	1.83	2.89**	1.22	6.94**	1.32
Close friends and relatives		3.45**	2.80**	6.15**	1.27	9.50**	1.14
Visits with friends/relatives		3.12*	<1	5.29**	3.88*	7.20**	3.23*
Home visits by friends		7.67**	<1	4.33**	3.98*	10.41**	6.86**
Visits to homes of friends		8.96**	3.70*	2.31	4.62*	9.18**	3.22
Telephone contacts		1.02	1.05	<1	<1	3.81**	2.23
Getting along		4.30**	4.67*	11.78**	17.05**	26.70**	18.56**
Attendance at religious services		1.86	2.43	<1	<1	2.20	<1
Voluntary group membership		<1	<1	3.36**	<1	5.38**	<1
Activity in groups		<1	<1	6.10**	<1	6.89**	<1

* p < .05

** p < .01

Table A.39

SUMMARY OF F RATIOS FOR DIFFERENCES
BETWEEN GROUP MEANS (GM) AND NONLINEAR TRENDS (NL),
THREE CRITERION VARIABLES, CHARLESTON/GEORGETOWN COUNTY SITE (N=1300)

Social	Items	Criterion Variables					
		Current Health		Emotional Ties		Positive Well-Being	
		GM	NL	GM	NL	GM	NL
Neighborhood acquaintances		<1	<1	3.66**	1.58	5.48**	1.86
Close friends and relatives		1.40	<1	6.97**	<1	13.15**	1.45
Visits with friends/relatives		5.67**	<1	5.15**	2.12	11.21**	<1
Home visits by friends		6.66**	<1	7.96**	3.40	16.70**	1.51
Visits to homes of friends		10.20**	<1	6.48**	10.51**	18.45**	8.14**
Telephone contacts		3.15**	3.84**	8.32**	7.35**	14.42**	8.93**
Getting along		18.46**	1.54	32.79**	33.54**	58.10**	16.32**
Attendance at religious services		1.25	<1	5.43**	2.20	10.34**	<1
Voluntary group membership		1.67	<1	5.64**	<1	10.64**	<1
Activity in groups		2.17	<1	6.10**	<1	15.70**	<1

* p < .05

** p < .01

Table A.40

PROPORTION OF VARIANCE WITH AND WITHOUT LINEARITY IN SOCIAL
ITEMS BEFORE AND AFTER ITEM REVISIONS, THREE CRITERION VARIABLES, COMBINED SAMPLE

Social Item	Before Revisions			After Revisions		
	Current Health	Emotional Ties	Positive Well-Being	Current Health	Emotional Ties	Positive Well-Being
Neighborhood acquaintances	.36 ^a	.73	.86	.52	.94	.96
Close friends and relatives	.37	.69	.72	.98	.98	.99
Visits with friends/relatives	.97	.38	.95	.92	.70	.98
Home visits by friends	.76	.18	.67	1.00	.93	.99
Visits to homes of friends	.86	0	.70	.93	.11	.87
Telephone contacts	.48	.62	.88	.52	.59	.84
Getting along	.74	.34	.76	.74	.34	.76
Attendance at religious services	.11	1.00	.98	.11	1.00	.98
Voluntary group membership	.56	.96	.98	.56	.96	.98
Level of group activity	.50	.98	.99	.50	.98	.99

^aThe ratio of r squared to η squared.

Table A.41
SUMMARY STATISTICS FOR TEN HIE SOCIAL ITEMS USING REVISED CODING RULES, THREE SITES

Social Item	Range of Scores ^a			Seattle			Fitchburg/ Franklin Co.			Charleston/ Georgetown Co.		
	Lowest	Middle	Highest	Mean	Std Dev	Var- ance	Mean	Std Dev	Var- ance	Mean	Std Dev	Var- ance
Neighborhood acquaintances	0	3	6	2.19	1.84	3.39	2.58	1.90	3.60	2.98	1.90	3.60
Number of close friends/relatives	0	4.5	9	4.81	1.68	2.81	4.67	1.71	2.93	4.26	1.99	3.96
Visits with friends/relatives	1	2.5	4	3.28	0.92	0.85	3.28	0.95	0.91	3.12	1.06	1.13
Home visits by friends	1	2	3	2.58	0.73	0.53	2.59	0.72	0.51	2.52	0.77	0.59
Visits to homes of friends	1	2	3	2.32	0.66	0.43	2.31	0.68	0.46	2.26	0.72	0.52
Telephone contacts	1	3	5	3.74	0.92	0.85	3.56	1.02	1.03	3.57	1.16	1.34
Getting along with others	1	2	3	2.16	0.45	0.20	2.12	0.41	0.17	2.13	0.46	0.21
Attendance at religious services	1	3	5	1.97	1.42	2.02	2.07	1.37	1.87	2.76	1.51	2.29
Voluntary group membership	0	2.5	5	0.98	1.26	1.59	0.90	1.28	1.63	1.23	1.43	2.05
Level of group activity	1	2.5	4	2.10	1.20	1.45	1.97	1.19	1.41	2.28	1.26	1.60

^aThe full range of possible scores was actually observed.

Table A.42

SUMMARY OF CORRELATIONS BETWEEN SOCIAL ITEMS
AND THE FIRST UNROTATED COMPONENT, THREE SITES

Abbreviated Item Content	Fitchburg/ Charleston/ Georgetown County		
	Seattle	Franklin County	Georgetown County
Neighborhood acquaintances	.51	.47	.54
Close friends and relatives	.46	.41	.50
Visits with friends/relatives	.54	.58	.49
Home visits by friends	.57	.67	.53
Visits to homes of friends	.58	.68	.53
Telephone contacts	.49	.50	.49
Getting along with others	.22	.27	.29
Attendance at religious services	.46	.29	.44
Voluntary group membership	.60	.45	.58
Level of group activity	.60	.51	.61

Table A.43

ROTATED FACTOR LOADINGS FOR SOCIAL ITEMS,
SEATTLE SITE^a

Abbreviated Item Content	Factors			h ²
	I	II	III	
Visits to homes of friends	.77	.02	.09	.61
Home visits by friends	.77	.03	.01	.59
Visits with friends/relatives	.76	-.01	.06	.57
Telephone contacts	.54	.10	.15	.32
Level of group activity	.00	.88	.05	.77
Voluntary group membership	.04	.86	.05	.74
Attendance at religious services	-.02	.71	.06	.50
Neighborhood acquaintances	.32	.42	.03	.28
Getting along with others	.00	-.02	.90	.81
Close friends and relatives	.27	.17	.52	.38

^aN's range from 2184 to 2232 due to missing data.

Table A.44

ROTATED FACTOR LOADINGS FOR SOCIAL ITEMS,
FITCHBURG/FRANKLIN COUNTY SITE^a

Abbreviated Item Content	Factors			h ²
	I	II	III	
Visits to homes of friends	.79	.04	.07	.63
Home visits by friends	.77	.04	.06	.59
Visits with friends/relatives	.71	-.05	.07	.51
Telephone contacts	.48	.00	.31	.33
Neighborhood acquaintances	.42	.27	.00	.25
Voluntary group membership	.02	.91	.04	.82
Level of group activity	.08	.90	.08	.83
Getting along with others	.03	-.09	.85	.73
Close friend and relatives	.23	.15	.43	.26
Attendance at religious services	.00	.35	.39	.27

^aN's range from 1040 to 1068 due to missing data.

Table A.45

ROTATED FACTOR LOADINGS FOR SOCIAL ITEMS,
CHARLESTON/GEORGETOWN COUNTY SITE^a

Abbreviated Item Content	Factors			h ²
	I	II	III	
Visits to homes of friends	.81	-.05	.06	.66
Home visits by friends	.77	-.04	.11	.61
Visits with friends/relatives	.72	-.04	.08	.53
Telephone contacts	.42	.33	.01	.28
Neighborhood acquaintances	.37	.24	.36	.33
Level of group activity	.02	.87	.12	.77
Voluntary group membership	-.01	.85	.13	.73
Attendance at religious services	-.01	.69	.03	.47
Getting along with others	-.07	.01	.86	.74
Close friends and relatives	.28	.16	.54	.40

^aN's range from 1273 to 1293 due to missing data.

Table A.46
CORRELATIONS^a BETWEEN SOCIAL ITEMS AND THREE
HYPOTHESIZED SCALES, SEATTLE

Abbreviated Content	Group Participation	Social Contacts	Social Well-being Index
Neighborhood acquaintances	26	21	34*
Close friends and relatives	16	23	27*
Visits with friends/relatives	05	51*	29*
Home visits by friends	06	53*	34*
Visits to homes of friends	04	56*	34*
Telephone contacts	11	35	29*
Getting along	05	11	14
Religious attendance	48	03	34*
Voluntary group membership	73*	07	48*
Level of group activity	73*	05	47*

Note: Decimals have been omitted.

*Item-scale correlation is corrected for overlap (i.e., correlation between item and the sum of all other items in that scale).

^aThe standard error for each correlation is 0.021.

Table A.47

CORRELATIONS^a BETWEEN SOCIAL ITEMS AND THREE HYPOTHESIZED
SCALES, FITCHBURG/FRANKLIN COUNTY

Abbreviated Content	Group Participation	Social Contacts	Social Well-Being Index
Neighborhood acquaintances	17	25	28*
Close friends and relatives	15	20	24*
Visits with friends/relatives	03	46*	29*
Home visits by friends	09	50*	38*
Visits to homes of friends	10	55*	39*
Telephone contacts	07	34	28*
Getting along	04	14	18
Religious attendance	21	07	19*
Voluntary group membership	75*	05	37*
Level of group activity	75*	11	43*

Note: Decimals have been omitted.

*Item-scale correlation is corrected for overlap (i.e., correlation between item and the sum of all other items in that scale).

^aThe standard error for each correlation is 0.031.

Table A.48

CORRELATIONS^a BETWEEN SOCIAL ITEMS AND THREE HYPOTHESIZED
SCALES, CHARLESTON/GEORGETOWN COUNTY

Abbreviated Content	Group Participation	Social Contacts	Social Well-Being Index
Neighborhood acquaintances	21	27	36*
Close friends and relatives	19	21	33*
Visits with friends/relatives	01	49*	26*
Home visits by friends	01	53*	31*
Visits to homes of friends	00	59*	32*
Telephone contacts	21	26	31*
Getting along	14	09	18
Religious attendance	44	00	30*
Voluntary group membership	72*	-01	43*
Level of group activity	72*	03	48*

Note: Decimals have been omitted.

*Item-scale correlation is corrected for overlap (i.e., correlation between item and the sum of all other items in that scale).

^aThe standard error for each correlation is 0.028.

Table A. 49

MEANS AND STANDARD DEVIATIONS USED TO
STANDARDIZE RECODED SOCIAL ITEM SCORES

Item Content	Mean ^a	Standard Deviation
Neighborhood acquaintances	2.506	1.900
Number of close friends/relations	4.624	1.793
Visits with friends/relations	3.236	0.974
Visits by friends	2.567	0.737
Visits to homes of friends	2.299	0.681
Telephone contacts	3.654	1.018
Getting along	2.145	0.443
Religious attendance	2.216	1.475
Voluntary Groups	1.034	1.322
Level of group activity	2.124	1.223

^aResponse codes for each item were first recoded as in Table 10. Standardized scores were computed by subtracting the appropriate mean from each social item and dividing by the standard deviation.

Table A.50

DESCRIPTIVE STATISTICS FOR HIE SOCIAL WELL-BEING
MEASURES AND OBSERVED SCORES, THREE SITES

Measure	Observed Scores ^a		Seattle		Fitchburg/ Franklin County		Charleston/ Georgetown County	
	Lowest	Highest	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
^b Multi-Item Scales^c								
Social Contacts (3)	0	100	73.43	26.61	73.70	26.63	69.71	29.40
Group Participation (3)	0	100	26.55	28.96	23.98	29.16	31.99	31.54
Social Well-Being Index (9)	0	100	51.22	15.50	50.70	15.23	52.98	17.07
^b Single-Item: Converted Scores^c								
Neighborhood Acquaintances	0	100	36.56	30.67	43.06	31.63	49.75	31.64
Close Friends/Relatives	0	100	53.48	18.62	51.86	19.02	47.34	22.11
Telephone Contacts	0	100	68.61	23.05	64.09	25.41	64.34	28.89
Getting Along	0	100	58.18	22.50	55.90	20.37	56.72	22.81
Religious Attendance	0	100	24.29	35.50	26.78	34.18	43.97	37.86
^d Single-Item (Revised Raw Scores)^d								
Neighborhood Acquaintances	0	6	2.19	1.84	2.58	1.90	2.98	1.90
Close Friends/Relatives	0	9	4.81	1.68	4.67	1.71	4.26	1.99
Telephone Contacts	1	5	3.74	0.92	3.56	1.02	3.57	1.16
Getting Along	1	3	2.16	0.45	2.12	0.41	2.13	0.46
Religious Attendance	1	5	1.97	1.42	2.07	1.37	2.76	1.51

^a Lowest and Highest possible scores were observed.

^b Scores transformed to a 0-100 scale.

^c Number of items in parentheses.

^d Using item scoring rules as defined in Table 10.

Table A.51

RELIABILITY ESTIMATES^a FOR SOCIAL ITEMS, THREE SITES

Item	b Seattle			c Fitchburg/ Franklin County			d Charleston/ Georgetown County					
	Highest r	IT	R	STAB	Highest r	IT	R	STAB	Highest r	IT	R	STAB
1. Neighborhood Acquaintances	.26	.34	.37	.56	.24	.28	.32	.59	.27	.36	.41	.50
2. Close Friends and Relatives	.21	.27	.33	.50	.19	.24	.30	.49	.27	.33	.37	.46
3. Visits with Friends/Relatives	.46	.29	.55	.47	.43	.29	.49	.41	.46	.26	.52	.33
4. Home Visits by Friends	.49	.34	.56	.42	.50	.38	.56	.41	.54	.31	.58	.34
5. Visits to Homes of Friends	.49	.34	.59	.49	.50	.39	.60	.44	.54	.32	.62	.40
6. Telephone Contacts	.30	.29	.39	.52	.29	.28	.37	.49	.23	.31	.36	.55
7. Getting Along	.14	.14	.20	.25	.15	.16	.20	.18	.14	.19	.20	.25
8. Religious Attendance	.47	.34	.49	.82	.22	.19	.24	.76	.45	.30	.47	.78
9. Voluntary Group Membership	.73	.48	.73	.65	.75	.37	.75	.68	.72	.43	.73	.62
10. Level of Group Activity	.73	.47	.75	.62	.75	.43	.76	.64	.72	.48	.75	.66

^a Highest r = highest correlation between the item and the remaining nine social items.
IT = item-total correlation (i.e., correlation between item and the Social Well-Being Index, corrected for overlap).

R = multiple correlation coefficient.

STAB = stability coefficient computed between enrollment and the First Annual Health Questionnaire in each site.

^b N's range from 1855 to 2225 due to missing data.

^c N's range from 981 to 1067 due to missing data.

^d N's range from 264 to 1289 due to missing data.

Table A.52
ASSOCIATIONS AMONG SOCIAL WELL-BEING MEASURES,
SEATTLE^a SITE

Social Well-Being Measure	1	2	3	4	5	6	7	8
1. Neighborhood Acquaintances	(.56)							
2. Close Friends and Relatives	.16	(.50)						
3. Telephone Contacts	.14	.20	(.52)					
4. Getting Along	.05	.14	.07	(.25)				
5. Religious Attendance	.20	.09	.05	.06	(.82)			
6. Social Contacts	.22	.22	.35	.11	.03	(.72)		
7. Group Participation	.26	.16	.11	.05	.48	.07	(.84)	
8. Social Well-Being Index	.52*	.47*	.49*	.14	.49*	.70*	.63*	(.69)

^a N's range from 2108 to 2223 due to missing data.

^b Coefficients in parentheses are the highest lower-bound reliability estimates taken from Table 30. For the three multi-item measures, coefficients in parentheses are internal-consistency reliability estimates.

Note: All coefficients in the table greater than .03 are statistically significant at $p < .05$ (i.e., all correlations but that between Religious Attendance and Social Contacts are significant).

*Indicates inflated correlation due to overlapping definitions (e.g., the Social Contacts scale was included in the Social Well-Being Index).

Table A.53

ASSOCIATIONS AMONG SOCIAL WELL-BEING MEASURES,
MASSACHUSETTS SITE^a

Social Well-Being Measure	1	2	3	4	5	6	7	8
1. Neighborhood Acquaintances								
2. Close Friends and Relatives	.12	(.49)						
3. Telephone Contacts	.11	.16	(.49)					
4. Getting Along	.07	.11	.10	(.20)				
5. Religious Attendance	.10	.04	.10	.07	(.76)			
6. Social Contacts	.26	.20	.34	.15	.07	(.70)		
7. Group Participation	.16	.15	.07	.04	.21	.10	(.86)	
8. Social Well-Being Index	.49*	.44*	.50*	.18	.38*	.74*	.58*	(.66)

^a N's range from 1008 to 1068 due to missing data.

^b Coefficients in parentheses are the highest lower-bound reliability estimates taken from Table 30. For the three multi-item measures, coefficients in parentheses are internal-consistency reliability estimates.

Note: All coefficients in the table greater than .04 are statistically significant at $p < .05$ (i.e., all correlations but those between Close Friends/Relatives and Religious Attendance and between Getting Along and Group Participation are significant).

*Indicates inflated correlation due to overlapping definitions (e.g., the Social Contacts scale was included in the Social Well-Being Index).

Table A.54
ASSOCIATIONS AMONG SOCIAL WELL-BEING MEASURES,
SOUTH CAROLINA STATE^a

Social Well-Being Measure	1	2	3	4	5	6	7	8
1. Neighborhood Acquaintances	(.50) ^b							
2. Close Friends and Relatives	.27	(.46)						
3. Telephone Contacts	.10	.21	(.55)					
4. Getting Along	.09	.13	.07	(.25)				
5. Religious Attendance	.17	.08	.12	.10	(.78)			
6. Social Contacts	.28	.21	.25	.09	-.01	(.72)		
7. Group Participation	.21	.19	.21	.14	.44	.01	(.84)	
8. Social Well-Being Index	.53*	.51*	.53*	.18	.45*	.67*	.62*	(.68)

^a N's range from 1227 to 1291 due to missing data.

^b Coefficients in parentheses are the highest lower-bound reliability estimates taken from Table 30. For the three multi-item measures, coefficients in parentheses are internal-consistency reliability estimates.

Note: All coefficients in the table greater than .01 are statistically significant at $p < .05$ (i.e., all correlations but those between Social Contacts and Religious Attendance and between Social Contacts and Group Participation are significant).

*Indicates inflated correlation due to overlapping definitions (e.g., the Social Contacts scale was included in the Social Well-Being Index).

Appendix B

ELEVEN SOCIAL ITEMS FIELDDED IN THE
HEALTH INSURANCE EXPERIMENT

SOCIAL ACTIVITIES

99. ABOUT HOW MANY FAMILIES IN YOUR NEIGHBORHOOD ARE YOU WELL ENOUGH ACQUAINTED WITH, THAT YOU VISIT EACH OTHER IN YOUR HOMES?

_____ families

100. ABOUT HOW MANY CLOSE FRIENDS DO YOU HAVE—PEOPLE YOU FEEL AT EASE WITH AND CAN TALK WITH ABOUT WHAT IS ON YOUR MIND? (YOU MAY INCLUDE RELATIVES.) (Enter number on line)

_____ close friends

101. OVER A YEAR'S TIME, ABOUT HOW OFTEN DO YOU GET TOGETHER WITH FRIENDS OR RELATIVES, LIKE GOING OUT TOGETHER OR VISITING IN EACH OTHER'S HOMES? (Circle one)

Every day 1
Several days a week 2
About once a week 3
2 or 3 times a month 4
About once a month 5
5 to 10 times a year 6
Less than 5 times a year 7

102. DURING THE PAST MONTH, ABOUT HOW OFTEN HAVE YOU HAD FRIENDS OVER TO YOUR HOME? (DO NOT COUNT RELATIVES.) (Circle one)

Every day 1
Several days a week 2
About once a week 3
2 or 3 times in past month 4
Once in past month 5
Not at all in past month 6

103. ABOUT HOW OFTEN HAVE YOU VISITED WITH FRIENDS AT THEIR HOMES DURING THE PAST MONTH? (DO NOT COUNT RELATIVES.) (Circle one)

Every day 1
Several days a week 2
About once a week 3
2 or 3 times in past month 4
Once in past month 5
Not at all in past month 6

DO NOT
WRITE IN
THIS SPACE

CARD 05

13-14/

15-16/

17/

18/

19/

CARD 05

104. ABOUT HOW OFTEN WERE YOU ON THE TELEPHONE WITH CLOSE FRIENDS OR RELATIVES DURING THE PAST MONTH?

(Circle one)

- Every day 1
- Several times a week 2
- About once a week 3
- 2 or 3 times 4
- Once 5
- Not at all 6

DO NOT
WRITE IN
THIS SPACE

20/

105. ABOUT HOW OFTEN DID YOU WRITE A LETTER TO A FRIEND OR RELATIVE DURING THE PAST MONTH?

(Circle one)

- Every day 1
- Several times a week 2
- About once a week 3
- 2 or 3 times in past month 4
- Once in past month 5
- Not at all in past month 6

21/

106. IN GENERAL, HOW WELL ARE YOU GETTING ALONG WITH OTHER PEOPLE THESE DAYS—WOULD YOU SAY BETTER THAN USUAL, ABOUT THE SAME, OR NOT AS WELL AS USUAL?

(Circle one)

- Better than usual 1
- About the same 2
- Not as well as usual 3

22/

107. HOW OFTEN HAVE YOU ATTENDED A RELIGIOUS SERVICE DURING THE PAST MONTH?

(Circle one)

- Every day 1
- More than once a week 2
- Once a week 3
- 2 or 3 times in past month 4
- Once in past month 5
- Not at all in past month 6

23/

108. ABOUT HOW MANY VOLUNTARY GROUPS OR ORGANIZATIONS DO YOU BELONG TO—LIKE CHURCH GROUPS, CLUBS OR LODGES, PARENT GROUPS, ETC. ("Voluntary" means because you want to.)

_____ groups or
organizations

(Write in number.
If none, enter "0")

24-25/

CARD 05

109. HOW ACTIVE ARE YOU IN THE AFFAIRS OF THESE GROUPS OR CLUBS YOU BELONG TO? (If you belong to a great many, just count those you feel closest to. If you don't belong to any, circle 4.)

(Circle one)

- Very active, attend most meetings 1
Fairly active, attend fairly often 2
Not active, belong but hardly ever go 3
Do not belong to any groups or clubs 4

DO NOT
WRITE IN
THIS SPACE

28/

Appendix C

FREQUENCY DISTRIBUTIONS FOR MULTI-ITEM
SOCIAL WELL-BEING MEASURES

SPSS BATCH SYSTEM

FILE SOCACT (CREATION DATE = 12/07/79)

SOCNT SOCIAL CONTACTS

CODE	FREQ	ADJ PCT	CUM PCT	CODE	FREQ	ADJ PCT	CUM PCT	CODE	FREQ	ADJ PCT	CUM PCT
-6.	102	2	2	-3.	72	2	15	-1.	8	0	32
-5.	119	3	5	-3.	40	1	16	-1.	38	1	33
-5.	15	0	5	-2.	177	4	20	-1.	47	1	34
-5.	33	1	6	-2.	14	0	20	-0.	106	2	37
-4.	52	1	7	-2.	48	1	21	-0.	38	1	37
-4.	45	1	8	-2.	1	0	21	-0.	390	9	46
-4.	101	2	10	-2.	23	1	22	0.	20	0	46
-4.	21	0	11	-2.	57	1	23	0.	89	2	48
-4.	40	1	12	-2.	29	1	24	1.	646	14	62
-3.	9	0	12	-1.	129	3	27	1.	43	1	63
-3.	74	2	13	-1.	10	0	27	1.	184	4	67
-3.	14	0	14	-1.	243	5	32	2.	1488	33	100

MISSING DATA			
CODE	FREQ	CODE	FREQ
-999999.	38		
MEAN	-0.004	STD ERR	0.035
MODE	2.401	STD DEV	2.399
KURTOSIS	-0.206	SKEWNESS	-0.838
MINIMUM	-6.329	MAXIMUM	2.401
VALID CASES	4565	MISSING CASES	38
		MEDIAN	0.891
		VARIANCE	5.753
		RANGE	8.731

SDSS BATCH SYSTEM

FILE SOCACT (CREATION DATE = 12/07/79)

SOCONT SOCIAL CONTACTS

CODE	FREQ	ADJ PCT	CUM PCT	CODE	FREQ	ADJ PCT	CUM PCT	CODE	FREQ	ADJ PCT	CUM PCT
0.	102	2	2	40.	72	2	15	61.	8	0	32
12.	119	3	5	43.	40	1	16	65.	38	1	33
16.	15	0	5	44.	177	4	20	66.	47	1	34
17.	33	1	6	45.	14	0	20	68.	106	2	37
24.	52	1	7	48.	48	1	21	69.	38	1	37
27.	45	1	8	49.	1	0	21	71.	390	9	46
29.	101	2	10	51.	23	1	22	73.	20	0	46
31.	21	0	11	52.	57	1	23	76.	89	2	48
32.	40	1	12	55.	29	1	24	83.	646	14	62
34.	9	0	12	56.	129	3	27	84.	43	1	63
35.	74	2	13	57.	10	0	27	88.	184	4	67
39.	14	0	14	60.	243	5	32	100.	1488	33	100

CODE	FREQ	MISSING DATA		CODE	FREQ
-999999.	38				
MEAN	72.447	STD ERR	0.407	MEDIAN	82.699
MODE	100.003	STD DEV	27.474	VARIANCE	754.834
KURTOSIS	-0.206	SKEWNESS	-0.838	RANGE	100.007
MINIMUM	0.004	MAXIMUM	100.003		
VALID CASES	4565	MISSING CASES	38		

SPSS BATCH SYSTEM

FILE SOCACT (CREATION DATE = 12/07/79)

GROUP

GROUP PARTICIPATION

CODE	FREQ	ADJ PCT	CUM PCT	CODE	FREQ	ADJ PCT	CUM PCT	CODE	FREQ	ADJ PCT	CUM PCT
-2.	2130	48	48	1.	5	0	66	3.	12	0	90
-1.	41	1	48	1.	45	1	67	3.	58	1	92
-1.	21	0	49	1.	271	6	73	3.	163	4	95
-0.	4	0	49	2.	344	8	81	4.	43	1	96
-0.	291	6	56	2.	3	0	81	4.	80	2	98
-0.	7	0	56	2.	15	0	81	5.	84	2	100
1.	111	2	58	2.	155	3	85				
1.	341	8	66	2.	254	6	90				

CODE	FREQ	MISSING DATA		CODE	FREQ
		CODE	FREQ		
-999999.	125				
MEAN	0.013	STD ERR	0.028	MEDIAN	-0.149
MODE	-1.701	STD DEV	1.864	VARIANCE	3.476
KURTOSIS	-0.970	SKEWNESS	0.570	RANGE	6.235
MINIMUM	-1.701	MAXIMUM	4.534		
VALID CASES	4478	MISSING CASES	125		

SPSS BATCH SYSTEM

FILE SOCACT (CREATION DATE = 12/07/79)

GROUP	GROUP PARTICIPATION
-------	---------------------

ADJ CUM				ADJ CUM				ADJ CUM			
CODE	FREQ	PCT	PCT	CODE	FREQ	PCT	PCT	CODE	FREQ	PCT	PCT
0.	2130	48	48	39.	5	0	66	74.	12	0	90
12.	41	1	48	50.	45	1	67	75.	58	1	92
13.	21	0	49	50.	271	6	73	76.	163	4	95
24.	4	0	49	51.	344	8	81	87.	43	1	96
25.	291	6	56	61.	3	0	81	88.	80	2	98
26.	7	0	56	62.	15	0	81	100.	84	2	100
37.	111	2	58	63.	155	3	85				
38.	341	8	66	64.	254	6	90				

M I S S I N G D A T A

CODE	FREQ	CODE	FREQ	CODE	FREQ
-999999.	125				
MEAN	27.497	STD ERR	0.447	MEDIAN	24.897
MODE	-0.003	STD DEV	29.903	VARIANCE	894.194
KURTOSIS	-0.970	SKEWNESS	0.570	RANGE	100.002
MINIMUM	0.003	MAXIMUM	99.999		
VALID CASES	4478	MISSING CASES	125		

SPSS PATCH SYSTEM

FILE SOCACT (CREATION DATE = 12/07/79)

NINDEX SOCIAL WELL-BEING INDEX

CODE	FREQ	ADJ PCT	CUM PCT	CODE	FREQ	ADJ PCT	CUM PCT	CODE	FREQ	ADJ PCT	CUM PCT
-15.	4	0	0	-5.	187	4	17	5.	209	5	88
-14.	9	0	0	-4.	206	5	22	6.	175	4	92
-13.	13	0	1	-3.	283	7	28	7.	129	3	95
-12.	25	1	1	-2.	333	8	36	8.	93	2	97
-11.	33	1	2	-1.	357	8	44	9.	77	2	99
-10.	56	1	3	0.	373	9	53	10.	34	1	99
-9.	60	1	5	1.	372	9	61	11.	16	0	100
-8.	87	2	7	2.	367	8	70	12.	6	0	100
-7.	110	3	9	3.	323	7	77	13.	3	0	100
-6.	153	4	13	4.	254	6	83	14.	4	0	100

CODE	FREQ	M I S S I N G	D A T A	CODE	FREQ
-999999.	252				

MEAN	0.017	STD ERR	0.072	MEDIAN	0.196
MODE	0.0	STD DEV	4.745	VARIANCE	22.511
KURTOSIS	-0.055	SKEWNESS	-0.211	RANGE	29.000
MINIMUM	-15.000	MAXIMUM	14.000		

VALID CASES 4351 MISSING CASES 252

SPSS BATCH SYSTEM

FILE SOCACT (CREATION DATE = 12/07/79)

SOCIND SOCIAL WELL-BEING INDEX

CODE	FREQ	ADJ PCT	CUM PCT	CODE	FREQ	ADJ PCT	CUM PCT	CODE	FREQ	ADJ PCT	CUM PCT
0.	4	0	0	34.	58	1	15	66.	84	2	83
3.	4	0	0	35.	50	1	16	67.	77	2	84
4.	2	0	0	36.	53	1	17	68.	64	1	86
5.	1	0	0	37.	66	2	19	69.	54	1	87
6.	2	0	0	38.	53	1	20	70.	58	1	88
7.	3	0	0	39.	65	1	21	71.	54	1	90
8.	5	0	0	40.	86	2	23	72.	43	1	91
9.	5	0	1	41.	81	2	25	73.	52	1	92
10.	8	0	1	42.	94	2	27	74.	47	1	93
11.	5	0	1	43.	69	2	29	75.	30	1	94
12.	10	0	1	44.	107	2	31	76.	44	1	95
13.	6	0	1	45.	105	2	34	77.	30	1	95
14.	4	0	1	46.	91	2	36	78.	32	1	96
15.	9	0	2	47.	103	2	38	79.	19	0	96
16.	18	0	2	48.	82	2	40	80.	28	1	97
17.	14	0	2	49.	152	3	44	81.	21	0	98
18.	18	0	3	50.	106	2	46	82.	19	0	98
19.	18	0	3	51.	89	2	48	83.	26	1	99
20.	9	0	3	52.	144	3	51	84.	12	0	99
21.	23	1	4	53.	79	2	53	85.	11	0	99
22.	17	0	4	54.	144	3	56	86.	8	0	99
23.	32	1	5	55.	77	2	58	87.	7	0	99
24.	24	1	6	56.	121	3	61	88.	7	0	100
25.	17	0	6	57.	117	3	64	89.	5	0	100
26.	32	1	7	58.	85	2	66	90.	1	0	100
27.	23	1	7	59.	131	3	69	91.	3	0	100
28.	46	1	8	60.	83	2	71	92.	2	0	100
29.	25	1	9	61.	100	2	73	94.	2	0	100
30.	49	1	10	62.	100	2	75	97.	2	0	100
31.	54	1	11	63.	93	2	77	98.	2	0	100
32.	38	1	12	64.	77	2	79	100.	1	0	100
33.	55	1	13	65.	66	2	81				

MEAN	51.594	STD EPR	0.242	MEDIAN	52.101
MODE	49.000	STD DEV	15.935	VARIANCE	253.931
KURTOSIS	-0.066	SKEWNESS	-0.209	RANGE	100.000
MINIMUM	0.0	MAXIMUM	100.000		
VALID CASES	4351	MISSING CASES	252		

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