The National Insurance Institute

Bureau of Research and Planning

SOCIAL ACTIVITY AND LONELINESS OF THE AGED

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Preface

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As a social security organization, the National Insurance Institute's primary objective regarding the population of aged in Israel has traditionally been the provision of adequate retirement income to retired individuals, in the form of old age pensions and other related benefits. The practical considerations of improving the pension programs have prompted the Institute's increasing involvement in policy and planning issues which are directly related to promoting the well-being of this heterogeneous and constantly growing population. In response to the need for systematic planning based on reliable data, the Institute's Research and Planning Bureau carried out a survey in 1972 on the living conditions of the aged based on a sample of old people in three Israeli settlements.

The present study is based on an analysis of data collected in that survey which, to date, constitutes the most recent comprehensive representative data in Israel, covering the areas of income, housing, health, work and social participation. A summary of principle findings was presented as a paper at the 10th International Congress of Gerontology in 1975. The completed study was subsequently submitted by the author in fulfillment of requirements for an MSW degree at the Paul Baerwald School of Social Work, the Hebrew University of Jerusalem. The research was funded by the National Insurance Institute.

The author gratefully acknowledges helpful suggestions and comments by Hannah Weihl and Professor Simon Bergman, on earlier drafts of this study.

SOCIAL ACTIVITY AND LONELINESS OF THE AGED

1. INTRODUCTION

This study is an application in Israel of issues which have been raised in gerontological research on the subject of social activity and well-being in old age. Specifically, the reported lack of contact with friends, as an indicator of social activity, and the reported high frequency of feelings of loneliness, as an indicator of low well-being, are examined in the context of relevant demographic and socioeconomic characteristics. Using multivariate analysis, two sets of regressions were performed in which the dependent variables were, respectively, the lack of contact with friends and a high frequency of feelings of loneliness.

The usefulness of this kind of study in Israel was suggested when a 1972 survey[1] of old people in Petah Tikva, Be'er Sheva and Yavne revealed an unexpectedly high proportion (66%) of persons who reported having no friends or having had no recent contact with friends. Thirty-seven percent of the sample reported a high frequency of feelings of loneliness. Moreover, preliminary bivariate analysis indicated that a lack of friends and that loneliness were especially characteristic of the same otherwise disadvantaged subgroups: non-working and low-income aged, and individuals whose self - appraisal of their health condition was negative (Cohen and Morgenstin, 1976).

These systematic relationships implied some connection between socio-economic and health disadvantage and a low level of social well-being. Moreover, bivariate results indicated relationships with demographic characteristics such as age, sex, marital status, and country of origin, suggesting an inherent tendency on the part of some demographic groups to lack friends and feel lonely. This study attempts to further explore these relationships using a multivariate model which examines the determinants of a lack of contact with friends and expressed feelings of loneliness.

An explanatory model is used which attempts to explain a part of the variation in the dependent variable. It is assumed for purpose of this study that the variables to be examined are causes rather than consequences of well-being. Clearly there might be other factors related to the dependent variables -- such as behavioral and personality patterns in early and middle age, contextual variables, the individual's perception of society's attitudes

toward the aged, etc., but these factors are exogenous to the model and its theoretical framework.

A second assumption of the study is that reported feelings of loneliness is a valid subjective indicator of a sense of well-being. Most researchers have defined well-being in terms of life-satisfaction, morale, or adjustment. They have typically utilized composite multi-item indices reflecting various elements of positive and negative gratification (Lawton, 1972). A number of investigators have used the concept of loneliness in studies of old age (Munnichs, 1964; Tunstall, 1966; Shanas et al., 1968). In addition to such direct measures of loneliness, this variable has been included as one item in various indices of adjustment and life satisfaction such as the social adjustment scale developed by Havighurst and Cavan, and the Life Satisfaction Index B (published in Williams et al., 1963).

Shanas et al (1968) has defined loneliness as a subjective mood indicating a person's sense of alienation. It generally indicates some vague feeling of being alone, reflecting dissatisfaction with the nature of a person's contacts as well as a sense of detachment from other people. Loneliness reflects a subjective, psychological sense of alienation, an undesirable subjective condition. It should be pointed out, however, that loneliness is not identical with aloneness or isolation, which is a characteristic reflecting place of residence and living arrangements and which may indeed account in part for feelings of loneliness.

The subjective well-being of the aged as a major outcome variable has been of central concern to social gerontologists in the the past two decades, especially in studies of what has sometimes been termed "successful aging". Although there seems to be a lack of multivariate studies of the predictors of well-being, various individual and situational characteristics of the aged have been examined in an effort to describe and understand the determinants of well-being.

One group of theories which have been developed is concerned with individual aging during the life span and the relationship between aging, patterns of social activity and well-being. The most important of these, considering the volume of research it has prompted, has been the much debated and controversial disengagement theory of aging (Cummings and Henry, 1961). This theory postulates that, independent of ill-health and poverty, normal aging is a natural,

inevitable, mutually satisfying withdrawal, resulting in decreased interaction between the aging person and others in the social system to which he belongs. According to disengagement theory, both the individual and society prepare for the individual's ultimate death by gradually disengaging the aging person from activity. Disengagement theory thus postulates a functional and mutually satisfying withdrawal of old people from society, the loss of roles, the reduction of social contacts and fewer commitments to social norms and values.

A competing approach in studying aging is found in activity theory which asserts a positive relationship between activity and well-being. According to this theory interpersonal activity is important in predicting an individual's sense of well-being. It seems, however, that neither activity nor disengagement, as general, comprehensive theories, can by themselves account for well-being in old age without taking into account individual variability. Gerontologists now seem to be reasonably confident that although there is a diminishing with age in the level of involvement for most older people, maintaining a relatively high level of activity contributes significantly to a sense of well-being. At the same time there has been an increased awareness of the variety of life styles, personalities and demographic settings which affect levels of activity and well-being (Blau, 1973; Maddox, 1963; 1970a,b; Munnichs, 1964; Neugarten, 1973; Palmore, 1970; Rose and Peterson, 1965; Rosow, 1967).

The usefulness of the present study is two-fold: Firstly, there has been no replication of studies concerning social activity and well-being in Israel which would take into account the specific characteristics peculiar to Israel's population. Secondly, although other studies have examined various individual and situational characteristics in an effort to identify the determinants of well-being, there seems to be a dearth of comprehensive multivariate studies.

Moreover, this study includes several previously neglected variables as predictors of activity and well-being. For example, the use of continuous variables such as age, length of residence and education has been refined by including a squared term for each variable in order to determine whether the relationship with the dependent variables is monotonic or curvilinear.

This study also uses two health measures which distinguish between

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functional ability and the individual's appraisal of his health
condition in an attempt to examine the interaction between these two
health variables in determining activity and well-being. Greater
significance is afforded to the effect of living arrangements as
a determinant by developing an interaction term defined to give
various combinations of marital status and living arrangements which
are likely to accompany life cycle and family development stages in
old age, begining with the nuclear family composed of married individuals
living with still unmarried children and ending with the aged person
living alone, or living in a shared household with married children
as a multi-generation family.

Thirdly, we have examined a somewhat neglected variable in research:
the extent of contacts with family members who are not part of the
household. This very important aspect of activity in old age has sometimes
been ignored in studies of activity and well-being or has been defined
as part of a composite dependent variable together with frequency of
contact with friends (Bultena, 1971; Connors and Powers, 1975). This
would seem to have been a misconceptualization: grouping both types of
contact in one measure of activity eradicates important differences
between them, especially their possible contingency. For example, we
might be interested in examining the changing function of contacts with
family as a substitute for, or complement of, contacts with friends
as the individual ages and relinquishes major life statuses. Analyzing
the interaction between the extent of contact with family and the
living arrangements of the aged, as they affect social activity and
well-being, seems useful in the context of increasing awareness in
gerontology of the importance of examining the aging individual
within the family context.

II LITERATURE SURVEY: EMPIRICAL FINDINGS

Disengagement theory (Cummings and Henry, 1961), which describes aging
as a natural, inevitable, mutually satisfying withdrawal, resulting in
decreased interaction between the aging person and others in the social
system to which he belongs, has stimulated numerous fruitful studies
concerning the level and kinds of activity engaged in by older people

and the relationship of activity to morale. Following is a concise summary of findings of several studies which are relevant to this study.

FINDINGS RELATED TO SOCIAL ACTIVITY

As predicted by disengagement theory, social activity (Blau 1961; Cummings and Henry, 1961; Havighurst et al., 1963; Kutner et al., 1956), and friendship participation in particular (Shanas, 1962; Townsend, 1957), tend to decline with advancing age. Attempting to specify this general relationship , however, preliminary findings from the Duke Longitudinal Study indicate that individual patterns of social behavior persist into old age (Maddox, 1966, 1970b). In fact, it seems that the negative correlation between age and social activity is probably a product of their relationship to major adult roles which define one's life condition (Videbeck and Knox, 1965).

Even individuals of similar age differ widely in activity level according to their health condition (Jeffers and Nichols,1970), socioeconomic status (Rosow, 1967), or the particular pattern of their role participation; in general individuals who are disadvantaged on such variables have been rated lower on activity and morale indices relative to other groups.

More specifically, social activity has been found to be positively related to level of education (Hunter and Maurice, 1953; Kutner et al., 1956; Scotch and Richardson, 1966); good health (Hunter and Maurice, 1953; Maddox and Eisdorfer, 1962; Scotch and Richardson, 1966); income (Kutner et al., 1956; Lowenthal, 1964); and length of residence in neighborhood (Langford, 1962). Preliminary bivariate analysis of the survey data upon which this study is based (Cohen and Morginstin, 1976) generally support these findings. In addition they indicate a positive relationship with being of Western origin and with living in an independent household (alone or with spouse and dependent children).

FINDINGS RELATED TO MORALE

It has been found that morale is negatively related to age, physical incapacity, and living alone (Kutner et al., 1956, Tunstall, 1966); positively related to health, especially self-appraisal (Kutner et al., 1956; Maddox and Eisdorfer, 1962; Streib, 1956; Suchman et al., 1958); education (Gurin

et al., 1960); socioeconomic status (Streib, 1956); and negatively related to feelings of economic deprivation (Thompson et al., 1960). Morale is generally higher among men than women (Kutner et al., 1956).

LOSS OF MAJOR ADULT ROLES; RETIREMENT AND WIDOWHOOD

In general, old people who are active in a particular role tend to have higher levels of social activity (Blau, 1973; Maddox and Eisdorfer, 1962; Scotch and Richardson, 1966) and morale (Gurin, 1960; Kutner et al., 1956) than those who are inactive in this particular role, even for similar levels of health and socioeconomic status (Streib, 1956).

Further elaboration of these relationships show, however, that findings regarding morale may not apply to those individuals who are not otherwise disadvantaged on variables such as age, health and income. For example, Streib (1956) found that retired old people who are healthy and have a high socioeconomic status tend to have higher morale than working old people who lack these advantages. In other words, health and income may be intervening variables modifying the negative relationship between not working and morale.

As for the relative effect of role loss, Blau (1973) has found that, for males, the loss of the work role has a stronger negative relationship to both social activity and morale that does widowhood. She also found an effect due to age differences: widowhood and retirement had a less detrimental effect for people over age 71 than for people under age 70, especially among males.

SOCIAL ACTIVITY AND MORALE

Contrary to predictions deriving from disengagement theory, feelings of well-being seem to be associated with high rather than low levels of activity (Maddox, 1963, 1970 a,b; Rosow, 1967; Munnichs, 1965).

Maddox (1970a) has found that the introduction of test factors into the analysis of the relationship between activity and feelings of satisfaction does not significantly modify the obtained positive relationship. However, Lowenthal and Boler (1965) have found that deprivation (defined in terms of health, widowhood and enforced retirement) is more closely associated with low morale than is low social activity.

III. RESEARCH DESIGN

A. THE POPULATION

The study is based on data collected by the National Insurance Institute in a 1972 survey of 1500 aged in three Israeli settlements: Petah Tikva, Be'er Sheva and Yavne. The sample population covered all non-institutionalized males aged 65+ and females aged 60+, in accordance with eligibility criteria of National Insurance Law which, under certain conditions, entitles persons of such age to receive old age pensions. The total population from which the sample was taken included approximately 16,500 individuals. Several methods were used to locate the population:

a. The most recent up-to-date Ministry of Interior voters list was used. In Petah Tikva and Yavne this was the list for March 1971, while in Be'er Sheva the list for the previous year was used.

b. To the voters list were added those names of persons in each settlement who receive pensions from the National Insurance Institute (from the list of pension recipients) and those who receive services from the respective municipal welfare authorities, if their names did not also appear on the voters list.

B. THE SAMPLE

The sample size differed in each settlement: 20% of the population in Be'er Sheva was sampled, 40% in Yavne, and 10% in Petah Tikva (except for the Yoseftal neighborhood where, because of the high density of aged, 50% of the population was sampled).

The sampling method was based on personal identity numbers, on the assumption that each digit represents 10% of the population. Thus two digits were sampled in Be'er Sheva, one digit in Petah Tikva, and four digits in Yavne. The final sample included 300 cases in Yavne, 949 in Petah Tikva, 190 in Yoseftal and 1097 in Be'er Sheva.

The following table shows the total number of persons who were finally included in the sample (Cohen and Morginstin, 1974), as well as the proportion of non-response.

TABLE 1.   SAMPLE SIZES AND NON-RESPONSE

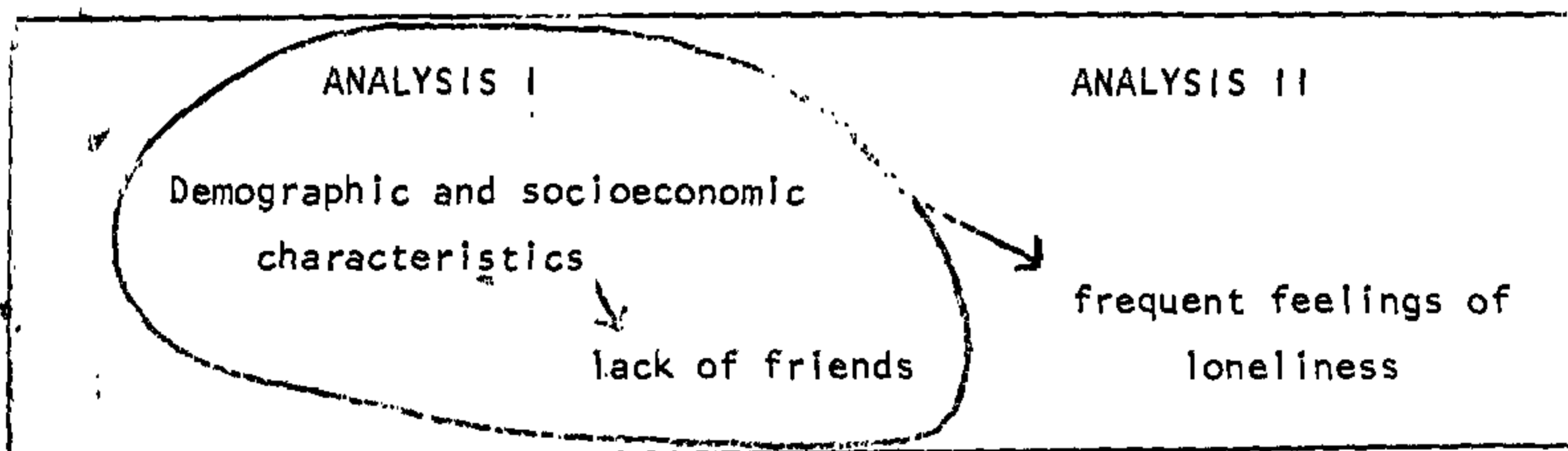| SETTLEMENTS	TOTAL NO. OF AGED POPULATION	ORIGINAL SAMPLE SIZE	INTERVIEWED	NOT INTERVIEWED TOTAL	NON-RESPONSE			
					NON-SAMPLE	NOT TOTAL	NOT LOCATED	REFUSALS INCAPABLE NOT HOME
Be'er Sheva								
n	5,842	1,097	605	492	209	283	214	69
%	-	100	55	45	19	26	20	6
Petah Tikva								
n	9,490	949	583	366	141	255	203	22
%	-	100	61	39	15	24	22	2
Yoseftal								
n	380	190	137	53	23	30	23	7
%	-	100	72	28	12	16	12	4
Yavne								
n	800	300	205	95	34	61	42	19
%	-	100	68	32	12	20	14	6

IV. METHODOLOGY - ANALYSIS OF DATA

The date analysis was comprised of three stages. In the first stage simple bivariate relationships between each independent variable and the two dependent variables (a lack of friends and loneliness) were obtained in order to indicate direction and magnitude of gross relationships. In the second stage two sets of single-equation multivariate regressions were performed, one in which the dependent variable was a lack of contact with friends, and the second in which a high frequency of feelings of loneliness was the dependent variable. We were thus able to obtain the net effect of independent variables on each of the dependent variables. Results of multivariate analysis were compared to those of bivariate analysis.

In the expectation that the net association between independent variables and the two dependent variables may be different for various subgroups (i.e., that there may be interaction effects) the third stage of analysis

consisted of running separate regressions for marital status, work status,
sex, ethnic groups and living arrangement categories. In general we were
interested in comparing different patterns in factors accounting for a lack
of friends and loneliness, thus adapting the original model to the peculiari-
ties of these groups.

In the course of this paper we repeatedly differentiate between
regression results for the two dependent variables. It is therefore important
to point out that at each stage of data analysis two sets of analysis were
performed: one in which a lack of friends was the dependent variable and the
second in which frequent feelings of loneliness was the dependent variable.
Note that a lack of friends is respectively defined as a dependent and in-
dependent variable. It is defined as a dependent variable in the first set
of regressions, in order to identify its determinants. In the second set of
regressions, a lack of friends is defined as an independent variable along
with the rest of the independent variables in the model in order to determine
its net effect on loneliness. This differentiation is an essential part of
the model: two sets of analysis were performed in order to obtain informa-
tion on what is essentially a single process. Schematically,

ANALYSIS I   ANALYSIS II

Demographic and socioeconomic
   characteristics

lack of friends   frequent feelings of
                              loneliness

All variables, except for age, duration of residence, education and
income, were defined as sets of dummy variables consisting of at least
two categories. For each variable one category was defined as a base which
was not programmed into the regression function. A step-wise regression
procedure was used. The criterion for choosing the optimal regression step
was whether the entering variable significantly contributed to explaining
variance in Y. Thus although a large number of independent variables were
programmed, regression results show only those variables which were included
in the optimal regression step. Not all categories originally defined for
each variable entered as significant. This procedure enabled us to reduce the
number of independent variables originally programmed in the regression

model to relatively few significant predictors. Thus, for example, although both Petah Tikva and Be'er Sheva were originally programmed as part of the "settlement" variable (Yavne was the base variable), only Petah Tikva entered the regression in which a lack of contact with friends was the dependent variable (Table 2). Be'er Sheva entered the function in which loneliness was the dependent variable.

On the other hand, for several other variables two categories entered the function as significant predictors. For example, where loneliness is the dependent variable (Table 3) both the positive and negative categories of health and frequency of contact with family were significant predictors ("average" was the base in each case). There is no significance to the order in which the independent variables are presented in the tables.

A. DEPENDENT VARIABLES - Measurement

In the survey which provided data for this study, social activity was measured on an ordinal scale based on the reported frequency of contacts with friends. Because of the finding that as much as 66% of the sample reported not having friends (60%) or not having had any recent contacts with friends (6%), and because of the problematics of using an ordinal scale as a dependent variable in regression analysis, we have defined social involvement as a dichotomous variable where having contact with friends is assigned a value of 1.

Loneliness, too, which was measured in the survey by the reported frequency of feelings of loneliness (never, sometimes, often), is defined as a dichotomous variable, where never or sometimes feeling lonely is assigned a value of zero and often feeling lonely is assigned a value of 1.

Thus defining these variables will permit us to determine, for various groups, the probability of being lonely often and the probability of having no contacts with friends.

B. INDEPENDENT VARIABLES

Theoretical and empirical findings guided the choice of independent variables. The same set of independent variables were programmed for each of the two regressions:

1. DEMOGRAPHIC VARIABLES

   age

    For purpose of regression analysis, age was defined as a continuous variable. In order to determine whether the net relationship between age and the dependent variable was monotonic or curvilinear we also included as an independent variable the respondent's age squared (age^2)[1].

   sex

    Females were assigned a value of 1 while males were assigned a base value of zero in the regression function.

   marital status

    Not being married was assigned a value of 1 and being married was assigned a value of zero.

   country of origin

    In order to examine the possibility of cultural differences, individuals originating from Eastern Europe, Asia and African countries were defined as being of Oriental origin while individuals from Western Europe and America were defined as being of Western origin (and assigned a value of 1 in the regression function).

2. SOCIOECONOMIC VARIABLES

   income

    For regression analysis income was defined as a continuous variable calculated per nuclear family member (including the aged person himself, his spouse and children under age 18), using a scale which assigns standard weights to each family member.

   education

    The education level serves as an indicator of educational attainment and of socioeconomic status. For purpose of regression analysis education

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[1] Including both the first and second degree variable in the regression tests the hypothesis of a curvilinear relationship with the dependent variable, i.e., whether a polynominal of the second degree will more accurately fit the data than a straight line. For age, if the relationship is curvilinear and positive it would mean that with increase in age, variables other than age have a gradually decreasing affect on the dependent variable.

level was defined as a continuous variable according to the number of school years completed.

work status

Individuals were defined as working if they reported being employed or having worked in the month prior to the survey. All others were defined as not working, which was assigned a value of 1 in the regression function.

health status

Two measures of health were used:

a) functional ability was defined according to the respondent's reported ability to climb stairs, to get on a bus, and to cut his toenails. A negative score on at least one of these items characterized the respondent as having poor functional ability.

b) the self-appraisal of the health condition was defined according to responses to the question, "How do you appraise your health condition?" Responses of 'very good,' 'good,' or 'relatively good' were defined as a positive self-appraisal; a response of 'not so good' was an average self-appraisal (assigned a base value of zero in the regression function); a response of 'not good' was a negative self-appraisal.

3. LIVING ARRANGEMENTS

We were interested in identifying the effect on the dependent variables of living arrangements, on the hypothesis that living arrangements would act as an intervening variable modifying the effect of demographic and socioeconomic factors. In general we expected that living arrangements would reduce the negative effects of socioeconomic disadvantage on the dependent variables.

In attempting to define living arrangements in a conceptually useful manner, we wanted to identify types of arrangements which are likely to accompany life cycle and family development stages, beginning with the nuclear family composed of aged living with still unmarried children and ending with the aged person living alone, or living in a shared household with married children as a multi-generation family. It subsequently became clear that living arrangements could not be usefully defined without

taking into consideration the aged individual's marital status. We thus developed an interaction term defined to give various combinations of marital status and living arrangements (marital status×living arrangements) . The categories of this variable were as follows:

    a. married, living with spouse and unmarried children.
    b. married, living with spouse only.
    c. widowed, living with unmarried children.
    d. widowed, living alone.
    e. married or widowed, living with married children
        (i.e., at least one married child).

In the last category (e) of living arrangements we did not distinguish between married and widowed aged since only 3% of the sample was married and living with married children. Thus the coefficient for this variable will reflect the effect on the dependent variables of living in a shared, multi-generation household, irrespective of marital status (Morginstin and Cohen, 1980).

Prior to defining the interaction term we included the marital status separately as an independent variable in order to see whether there was a net effect for this variable apart from living arrangements. Marital status, however, did not obtain a significant coefficient and was excluded from subsequent stages of analysis as a separate variable.

4. SOCIAL ACTIVITY VARIABLES
Frequency of Contact with Relatives

This variable was defined according to the reported frequency of contact with relatives who are not members of the household. The categories were defined as follows: a) low frequency: respondent has no relatives, never sees his relatives or reported having had contact with relatives more than one month prior to the survey.

b) average frequency: respondent reported having had contact with relatives during the month prior to the survey. This variable was assigned a zero value in the regression function.

c) high frequency: respondent reported having had contact with relatives on the day before the survey.

5. RESIDENCE VARIABLES

Duration of Residence in Israel

This variable was defined as a continuous variable according to the individual's year of immigration to Israel.

Change of Residence

Change of residence was measured by asking the respondent whether or not he had moved to a different apartment in the past 10 years, and was defined as a dichotomous variable, receiving a value of 1 if the respondent reported having changed residence and zero if he did not. This variable was used as an indicator of duration of residence in the immediate neighborhood.

It is difficult to determine whether or not the individual changed neighborhoods (or even buildings) as a result of moving. It is assumed, however, that a good proportion of those who moved also changed the immediate neighborhood and are therefore relatively new residents.

Settlement

Residence in Petah Tikva, Be'er Sheva or Yavne was included as an independent variable in order to ascertain whether there was a differential net effect of location on the dependent variables, assuming that there might be conditions specific to geographic location (i.e., services to the aged, community facilities, density of elderly in the community, etc.) related to the dependent variables.

In addition to the above list of independent variables, several variables originally included in the model were found to be unrelated to the dependent variables. These variables which were subsequently excluded in final stages of analysis include: occupation, standard of housing, and number of years since retirement.

V. RESEARCH FINDINGS

The following diagram is a schematic presentation of both sets of regression results for the total sample, shown as a comprehensive system of relationships between the independent and two dependent variables. Regression coefficients are not shown. Detailed results for the total sample are shown in Tables 2 and 3 and important findings comparing the total sample and subgroups are outlined in Table 4. Detailed results for sub-groups are shown

In appendix B.

The independent variables were able to account for about 18% of the variance in a lack of contact with friends as a dependent variable and about 21% of the variance in loneliness as a dependent variable. Most of the beta coefficients in the function were statistically significant. What is more interesting than the overall explanatory power of the model, however, is the relative importance of different predictors, group differences, and especially the pattern of relationships between the two sets of regressions.

DIAGRAM 1
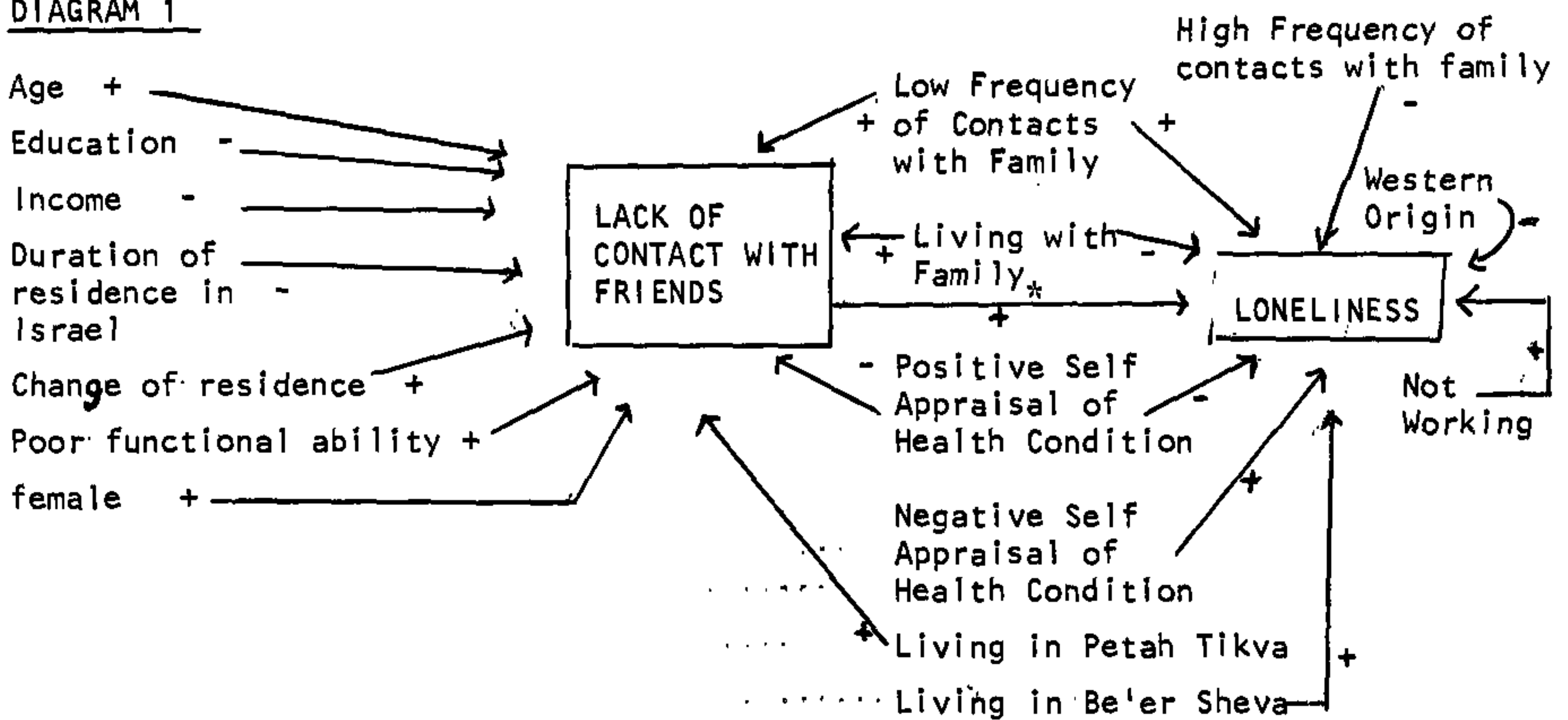
* as opposed to being widowed and living alone (base variable).
  Living with family includes married and widowed aged (see Tables 2 and 3)

Note: For each variable the direction of association and coefficient sign are indicated. (These are not standardized path coefficients).

TABLE 2   FACTORS ACCOUNTING FOR A LACK OF CONTACT WITH FRIENDS

n = 1498

R = .42739 R^2 = .18266

F = 20.69   (p = 0.01)

Variable x_i	Regression Coefficient b	T-value
constant a	.36452	2.449
age	.00508	2.607 **
female	.05219	2.018
European origin	-.04554	-1.627 *
duration of residence in Israel	-.00634	-6.735 **
change of residence	.05490	2.181
education	-.02072	-6.057 **
$(education)^2$	.00021	6.097 **
income	-.00032	-4.197 **
poor functional ability	.06331	2.309
positive appraisal of health	-.12513	-4.475 **
low frequency of contacts with family	.06505	2.493
live with spouse and unmarried children	.07777	1.813 *
live with spouse only	.12612	3.631 **
widowed, lives with unmarried children	.11807	2.268
live with married children (married or widowed)	.12105	3.046 **
Petah Tikva	.14832	5.707 **

mean of Y (no friends) = .658211

* not significant at 0.05 level   ** significant at 0.01 level; coefficient without asterisk are significant at 0.05 level.

Note: Variables shown in regression function include only those variables which entered at the chosen regression step. A larger number of variables were originally programmed (see Methodology).

TABLE 3   FACTORS ACCOUNTING FOR A HIGH FREQUENCY OF FEELINGS OF LONELINESS (n=1498)

$R = .45887$ $R^2 = .21056$

$F = 11.72$ $(p=0.01)$

Variable x_i	regression coefficient b	T-value
constant a	.42206	8.4609
European origin	-.08693	-3.647
negative appraisal of health	.17025	6.394
positive appraisal of health	-.06187	-2.140 *
not working	.10863	3.499
no friends	.14354	5.790
low frequency of contacts with family	.12933	4.381
high frequency of contacts with family	-.08271	-3.195
live with spouse and unmarried children	-.33135	-7.933
live with spouse only	-.28510	-8.449
widowed, lives with unmarried children	-.17469	-3.353
live with married children (married or widowed)	-.38038	-9.622
Be'er Sheva	.08571	3.697

Mean of Y (Loneliness) - .371162

* significant at 0.05 level. All other coefficients are significant at 0.01 level.

Note: Variables shown in regression function include only those variables which entered at the chosen regression step. A larger number of variables were originally programmed (see Methodology).

TABLE 4   SUMMARY OF MAIN FINDINGS

Variable	results for total sample		results for subgroups	
	Lack of Friends	Loneliness	Lack of Friends	Loneliness
income level	negative predictor	not related	esp. predictive for widowed, retired males, aged living alone	
education level	negative predictor	not related		negative predictor for Oriental aged, males, working males, married indiˑ
not working	not related	positive predictor	esp. predictive for males, negative predictor for females (but not significant)	not significant for females, widowed, esp. widowed living with children. esp. predictive for aged who live alone
poor functional health ability	Positive Predictor	not related	esp. predictive for Western aged, females, aged who live alone, working males, aged living with married children	
positive self-appraisal of health	negative Predictor	negative Predictor	esp. predictive for Oriental aged, females, aged who live alone	significant predictor only for females and aged who live alone
negative self-appraisal	not related	positive predictor		esp. predictive for aged who live with spouse only. Not predictive for working males, aged living with children
age (continuous variable)	positive predictor	not related	esp. predictive for Western aged, males, aged who live with spouse only; not predictive for working males, and aged who live alone	
sex (female)	positive predictor	not related	predictive only for Oriental aged	predictive for widowed, aged who live alone

TABLE 4 / continued......

variable	results for total sample		results for subgroups	
	lack of friends	loneliness	lack of friends	loneliness
Western origin	not related	negative predictor		esp. predictive for aged living with spouse only; not predictive for males and widowed
living with spouse and/ or children	positive predictor	negative predictor	not significant for Western aged, married, males, working males	
widowhood	not related	not related	negative predictor for aged of Western origin	
low frequency of contact with family	positive predictor	positive predictor	especially predictive for males, non-working males, married aged	esp. predictive for Oriental aged, aged who live alone, aged living with children
duration of residence in Israel	negative predictor	not related	not predictive for Oriental aged, aged who live alone, highly predictive for Western aged, working males	
change of residence	positive predictor	not related		
lack of contact with friends	——	positive predictor		esp. predictive for widowed aged living with children

Regression results clearly support the hypotheses that contacts with friends is related to well-being of the aged: In the regression in which loneliness was the dependent variable, not having contact with friends was a significant predictor, obtaining a coefficient of b=.14413 for the total population. This relationship is characteristic of all subgroups examined (see Appendix B, Table 3).

Looking at diagram 1 it is immediately apparent that besides being directly predictive of loneliness, the lack of friends variable mediates between a number of important variables and loneliness. We find that age, sex, education, income, length of residence in Israel, change of residence, and poor functional health, are not in themselves predictive of loneliness except through association with a lack of contact with friends.

On the other hand, we find several important variables which are directly predictive of loneliness but are not related to a lack of contact with friends. For example, not having friends is independent of cultural background (country of origin) and retirement status. Interesting patterns of interrelationships with the dependent variables were found for the following variables: frequency of contact with family, living arrangements, and the self-appraisal of the health condition. Following is a detailed discussion of these and other findings.

SOCIOECONOMIC VARIABLES.

As noted in the literature survey, socioeconomic variables such as income, education, and occupation have variously been viewed as important variables affecting well-being and have in general been found to be positively related to well-being. Results of this study do not generally support these findings. Occupation was not predictive of the dependent variables (for any subgroup) and was therefore excluded from the model in early stages of the study.

. As previously mentioned (see diagram 1 and Table 2) reported income was not related to loneliness for any of the subgroups examined but was a significant negative predictor of a lack of contact with friends.

In other words, the higher an individual's income the less likely he is to lack contact with friends. Comparison of subgroups shows that the income variable has a relatively greater predictive power for otherwise disadvantaged aged: widowed aged, retired males and aged who live alone. Interestingly, the only group for which income was not significantly predictive of a lack of friends was the group of working males (Appendix B, Table 2, see income, working males).

Thus although it had been expected on the basis of bivariate analysis (see Appendix A, Table 2) that income would be related to both a lack of friends and

loneliness it was found in the multivariate model to be an antecedent variable related to loneliness through a lack of friends, but not directly related to loneliness itself. This finding seems to suggest that a reasonable income may increase an individual's opportunities to develop and maintain social contacts, to entertain at home, obtain outside entertainment, etc.

Again contraty to the literature and to expectations from bivariate analysis (see Appendix A, Table 3) education was not directly related to loneliness for the total sample (although the coefficient was in the expected direction) but was significantly predictive of a lack of contact with friends: with higher education, old people are significantly less likely to lack friends. This relationship is curvilinear in nature (see education^2 in Table 2), tapering off in advanced education categories.

However, results for the education variable were not clear cut: although findings for the total population show no significant relationship with loneliness, education was a significant predictor for several subgroups, including aged of Oriental origin, males (especially working males), and married aged (see Appendix B, Table 3). It would seem that education is an intervening variable modifying the effect of cultural differences as well as the loss of the work role on well-being; although Oriental aged are generally more likely to feel lonely (Table 3) more years of formal education significantly decreases the likelihood of loneliness; among working males who are generally less likely to be lonely the phenomenon of loneliness is clearly associated with a low level of education.

WORK STATUS

Looking at the effect of the work variable, we find that, contrary to expextations based on bivariate analysis (Appendix A, Table 4), loss of the work role does not seem to be a significant predictor of a lack of friends (Table 2) (although coefficient signs were in the expected direction). Examination of early regression steps shows that the partial correlation of this variable with a lack of friends is considerably reduced when income and health are introduced into the regression function. For those cases in which not working entered the regression function, its coefficient was considerably reduced upon entry of the education variable. Controlling for sex further reduces the predictive power of the work variable.

Further analysis shows that loss of the work role has an opposite effect for males as compared to females: whereas not working increases the likelihood of loneliness for males it decreases this likelihood for females (Appendix B,

table 3). It seems that while not working constitutes a <u>loss</u> of a major adult status for aged males who have most likely worked all their lives, and is therefore associated with reduced social activity, among aged females of this cohort working is the exception rather than the rule. In other words, females who for whatever reasons decide to work are more likely to report a lack of contact with friends than females who do not work. The number of years since retirement was not a significant predictor for either group.

Because of the opposite effects of not working for the two sexes, it is not useful to talk about the effect of work role loss without considering sex. In the regressions in which a lack of friends is the dependent variable, prior entry of the sex variable reduces the partial correlation coefficient between not working and a lack of friends so that not working does not even enter the regression function. We would have expected, for example, that not working would be significantly predictive for the population of married aged, since those who do not work are probably more recently retired relative to widowed aged and have had less time to adjust to retirement. Moreover, the population of married aged is composed of a high proportion of males (55%) compared with widowed aged (18%). We thus expected to obtain an effect for not working for the population of married aged. Indeed, not working entered the regression function for married aged with a significant positive coefficient which was however considerably reduced upon subsequent entry of the sex variable. It is thus likely that not working would have remained significant if we had performed the regression for married males only.

Not working is significantly associated with loneliness, obtaining a co-efficient of .11082 (T=3.557) for the total population (Table 3). It is not significant for females and for several subgroups which are comprised of a high proportion of females (widowed, widowed living with unmarried children, and widowed living with married children). Loss of work role, however, is especially predictive of loneliness (b=.23634; T=2.322) for the most loneliness prone group of aged, the widowed who live alone.

Clearly, loss of the work role reduces well-being when the home offers little compensation for activity reduction.

HEALTH

Findings of this study reading the importance of health in providing social activity and morale is consistent with evidence presented in other studies. Moreover, we were able to ascertain the differential effects of two health measures, functional ability and the indivdial's self-appraisal of his health, by controlling for one measure while examining the effect of the other. Including both measures of health in the model turned out to be informative since results of multivariate analysis did not entirely support expectations based on separate bivariate analysis between each health variable and the dependent variables (see Appendix A, tables 5,6). Bivariate analysis seemed to suggest that both functional ability and the self-appraisal were systematically related to the dependent variables - those with poor functional ability, or perceiving their health to be poor, were simultaneously characterized by higher proportions of individuals re- porting a lack of friends and frequent feelings of loneliness relative to those in good health. In multivariate analysis however, functional ability was not directly associated with loneliness when all other variables were controlled. However, having poor functional ability significantly increased the probability of a lack of contact with friends, pointing to a clear effect of poor health and reduced mobility on the individual's activity level. The predictive power of functional ability on a lack of contact with friends was especially strong for aged of Western origin and aged who lived alone.

The self-appraisal of the health condition, on the other hand, is signi- ficantly related to both a lack of friends and to loneliness. Interestingly, whereas a negative self-appraisal is highly predictive of loneliness, obtaining a co-efficient of .17018 (T=6.391), it is not associated with a lack of friends. Conversely, a positive self-appraisal has a strong negative association (b=-.12513; T=-.4.475) with a lack of friends and a weaker but significant association (b=-.06128; T=-2.119) with loneliness. Thus, an individual's subjective percep- tion of his health condition, particularly if it is negative, strongly affects his subjective feelings of loneliness.

A look at subgroups (Appendix B) shows interesting differences in the predictive power of the health variables. Poor functional ability is strongly predictive of a lack of friends for aged of Western origin, working males, and aged who live alone, all of whom are characterized by relatively low frequencies of a lack of friends. As for the self-appraisal, a positive appraisal has an

especially strong negative association with a lack of friends for aged of
Oriental origin, females and widowed aged, all prone to a lack of contacts with
friends. In other words, those with a positive appraisal are less likely to lack
friends. However, the highest negative coefficient was obtained for the group
of aged who live alone (b=.26291) indicating the special importance of the self-
appraisal regarding social activity for this group. For this group also, the
positive self-appraisal received an especially high coefficient when regressed
on loneliness.

Finally, it is important to point out that neither the functional health
measure nor the self-appraisal are predictive of a lack of friends and loneli-
ness for the group of working males (Appendix B). It seems that the work role
is an intervening variable which counteracts the otherwise negative effects
of poor health.

DEMOGRAPHIC VARIABLES

Findings of this study support the hypothesis that age _per se_ is unrelated
to well-being. Contrary to predictions deriving from disengagement theory that
the older a person the less likely he is to feel lonely, there was no significant
relationship between age and loneliness for any of the subgroups examined in
the multivariate model (Table 3 and Appendix B, table 2). On the other hand,
age obtained a positive net coefficient with a lack of friends as the dependent
variable (Table 3) , indicating that the older the individual the more likely
he is to lack contacts with friends. This relationship is linear and monotonic
(age^2 did not enter the function as a significant predictor).

A similar but less striking pattern was found for sex. Regression results
for the total population indicate that females are in fact somewhat more likely
to report having no contact with friends, although the effect of the sex
variable was considerably reduced for various subgroups upon entry of education
into the regression function. It remained significant for aged of Oriental
origin. On the other hand, the sex variable did not even enter most regressions
in which loneliness was the dependent variable. It was however predictive of
loneliness for widowed aged, aged who live alone, and widowed aged who live
with unmarried children.

Contrary to expectations based on bivariate analysis which showed a strong
relationship between country of origin and both dependent variables (Appendix
A, table 10), regression results (Table 2) show that country of origin is not

predictive of a lack of friends when all variables in the function are controlled (although the relationship was in the expected direction). This variable usually became insignificant upon entry of the education variable into the regression function. Thus the higher proportion of Oriental aged reporting a lack of contact with friends (74% compared to 57% Western aged) does not seem to indicate a real cultural difference but reflects the more disadvantaged condition of Oriental aged in terms of education, income, health, widowhood, etc. On the other hand, the relatively greater tendency among Oriental aged to express frequent feelings of loneliness (45% compared to 29% Western aged) is not a spurious relationship: in multivariate analysis, being of Western origin obtained a significant negative coefficient. In other words, holding all other variables constant, there seems to be a basic cultural difference regarding subjective feelings of loneliness.

LIVING ARRANGEMENTS

In general living in a shared household was found to be positively related to a lack of contact with friends but negatively related to loneliness.

Regression results (Table 2) show clearly that, as opposed to living alone, living in some form of shared household, whether with spouse and unmarried children (b=.0777), with spouse only (b=.12612), with unmarried children (b=.11807), or with married children (b=.12105), is clearly associated with a lack of contact with friends.

This is not characteristic of all subgroups in which a lack of friends was the dependent variable. None of the living arrangement categories entered the regression function for aged of Western origin, married aged, and males (especially working males). Thus shared living arrangements are significantly predictive of a lack of friends only among aged of Oriental origin, females and widowed aged.

Although all categories of shared households were positively related to a lack of friends, there were inter-category differences in regression co-efficients, indicating differences in the predictive power among the various categories of living arrangements. Among aged of Oriental origin, for example, living with married children is a stronger predictor of a lack of friends than living with unmarried children, or living with spouse only. In other words, the three-generation household characteristic of this group is especially conducive to a low level of social activity. For widowed aged, living in this type of

household. is also somewhat conducive to a lack of friends when compared to living with unmarried children. On the other hand, looking at females only, we find that living as a nuclear family with the spouse (either with or without unmarried children) is more strongly predictive of a lack of friends than living with unmarried children only or together with married children.

The most likely explanation for these results is that old people who have the advantage of being involved with family household members are less motivated to maintain contacts with friends. For widowed aged and aged of Oriental origin this is especially true of the three-generation household.

Contrary to expectations, marital status as a separate variable was in most cases not significantly related to a lack of friends, and did not even enter the regression function for the total population and for most subgroups. Non-entry of marital status into the regression in which a lack of friends is the dependent variable is not attributable only to its correlation with the living arrangement categories. At every regression step, before and after entry of living arrangement categories, the partial coefficient (the partial correlation coefficient used to calculate F-ratio on the basis of which order of entry of variables into the regression function is determined) of marital status remains low.

It was surprising to find, therefore, that for Western aged marital status enters the regression function with a significant negative coefficient (Appendix B, table 2). Thus Western aged who are widowed are significantly <u>more</u> likely to have contact with friends that their counterparts, when all other variables are controlled (a similar, insignificant relationship was obtained for males). This finding would seem to indicate that widowed aged of Western origin may attempt to compensate for loss of spouse by social activity with friends.

The important implication of these findings is that, contrary to other studies, widowhood is not inherently associated with a lack of social contacts unless accompanied by other characteristics. Indeed when we ran a regression for the population of widowed aged (Appendix B, table 2) we found that strong predictors of a lack of friends include low income, short duration of residence in Israel, low education level and a negative self-appraisal of the health condition. Thus widowhood is associated with a lack of social activity only for those aged who are otherwise disadvantaged. The relatively high incidence of disadvantage, in terms of the above variables, among aged of

Oriental origin, females and among widowed aged, explains the lack of contact with friends characteristic of these groups.

Moreover, regression results show that for most groups, living arrangements is a much more important factor than widowhood in predicting the old person's social activity level. It is worthwhile to note that the living arrangements of the widowed individual are important in predicting his social activity level whereas the living arrangements of married aged do not affect his activity level. Regression results for both groups show that among widowed aged shared households (especially with married children) significantly increases the likelihood of a lack of friends (Appendix B, table 2) and decreases the likelihood of loneliness (Appendix B, table 3). For married aged none of the living arrangement categories are predictive of either dependent variable.

Final results (which exclude the marital status variable from those regressions in which living arrangements entered and reduced the regression coefficients of the widowhood variable) nevertheless reflect the effect of widowhood in interaction with living arrangements: looking at the total population we find that the probability of feeling lonely is highest for widowed aged living alone (this is the base variable which does not appear in the table but is positively related to loneliness), decreases by -.18 for widowed aged living with unmarried children, and decreases by -.39 for widowed aged living with married children. In other words, living in a shared household evidently mitigates the tendency among widowed people to feel lonely. Being married, and living either with spouse only or together with children, is negatively associated with loneliness.

FREQUENCY OF CONTACT WITH RELATIVES

This variable, defined in terms of the reported frequency of contact with relatives who are not members of the household, does not seem to have been examined in other studies as a factor which could affect social activity and well-being of the aged.

Results of this study indicate that this variable merits further study: a low frequency of contact with family significantly increases the likelihood of a lack of contact with friends, especially for males (especially retired males), married aged, and aged who live together with spouse and unmarried children. Thus, whereas it might have been expected that a lack of contact with family encourages contact with friends, this does not seem to be the case for

the population in general. It is not a significant predictor of a lack of friends for widowed females, aged who live alone, or working males. Having a low frequency of contact with family significantly increases the likelihood of loneliness for almost all groups. The interesting exception is that of working males. Among this group which retains its major social status, contacts with family is of no consequence regarding feelings of loneliness.

LENGTH OF RESIDENCE IN ISRAEL AND IN CURRENT DWELLING

Although not significantly related to loneliness, regression results (Table 2) indicate that the longer a person lives in Israel and in his current home, the less likely he is to lack contact with friends. A significant negative co-efficient (b=.00634; T=6.735) is obtained for duration of residence and a positive coefficient (b=.05490; T=2.181) for change of residence when these variables are regressed on a lack of friends. Examination of selected subgroups shows that duration of residence in Israel is not significantly predictive of a lack of friends for aged of Oriental origin and for those who live alone. It is strongly predictive for aged of Western origin and for working males. Change of residence is not significant for a larger number of subgroups (see Appendix B, table 2).

For social policy the implications are obvious : new immigrants and elderly prople who have recently moved into the neighborhood constitute primary target groups for whom opportunities for social involvement should be provided.

VI DISCUSSION

A study of this type must inevitable include some comment on the already much discussed theory of disengagement. Although a clear relationship between age and friendship participation was obtained, such that the older the individual the more likely he is to report a lack of contact with friends, it is clear that the findings do not support two basic propositions of disengagement theory. Firstly, in contradiction to the proposition that reduced social activity is functional for the older person in terms of feelings of well-being, findings indicate clearly that a strong relationship exists for all groups examined, between a low level of social activity, in terms of a lack of contact with friends, and feelings of loneliness. In other words, a lack of contact with friends seems conducive to feeling lonely.

Secondly, disengagement theory proposes that social disengagement is a chronological process: the older an individual the more likely he is to be characterized simultaneously by reduced social activity and increased well-being. This study does not support any relationship between age and feelings of loneliness for any group examined. The suggestion that loneliness is an inevitable aspect of aging has thus not been substantiated in this study.

In general, we found that a lack of contact with friends is associated with several important demographic variables such as age, sex (female), low level of education, low income, shorter duration of residence in Israel and in current residence, poor functional ability, a negative appraisal of the health condition and living together with spouse and/or children in a shared household. Work status was not a significant predictor of a lack of contact with friends.

Predictors of loneliness include a lack of contact with friends, a negative appraisal of the health condition, a low frequency of contact with family, not working, living alone and being of Oriental origin. Except for country of origin, demographic variables were generally not predictive of loneliness.

Of special interest is not the magnitude but the pattern of relationship between predictors included in the model and the dependent variables. An overview of results indicates a basic difference in the kinds of variables predictive of a lack of friends and those predictive of feelings of loneliness. Whereas determinants of a lack of friends include demographic variables such as age, sex, income, education level and duration of residence, these were generally not related to feelings of loneliness.

The difference in the nature of predictors is interesting in view of the expectation that loneliness, like morale or life satisfaction, is in part determined by socioeconomic status (see Literature Survey). Findings of this study suggest the contary: loneliness, unlike friendship participation, is not generally related to the individual's socioeconomic status. It would seem then that the likelihood of loneliness is not specific to chronological nor to any socioeconomic or demographic groups. The tendency to loneliness, which is conceptually a personal, subjective experience, does not develop suddenly in old age but is at least party determined during earlier stages of development and life experience.

On the other hand, results show that loneliness in old age <u>is</u> closely related to a number of social variables such as marital status and living arrangements, work status, and extent of contact with friends and family. In effect, these variables in combination define the individual's life cycle stage in terms of his specific social context <u>in</u> old age. In attempting to study and understand the phenomenon of loneliness it is therefore important to differentiate between the predisposition to loneliness developed as part of the personality and earlier life experiences and that aspect of loneliness in old age which is related to the life cycle stage or the particular social context of the older individual. The latter has been the subject of this study.

That the tendency to loneliness is related to some combination of variables defining the individual's stage in older life and his specific social context is the most likely explanation for the many differences in subgroup results obtained in this study. For example, not working was found to be predictive of loneliness for the total sample while examination of subgroups indicated variation according to living arrangements: not working was a good predictor of loneliness among aged who live alone but was not a predictor for widowed aged living with children. On the other hand, a lack of contact with friends is highly predictive of loneliness among widowed aged living with children. In other words, loneliness among widowed aged who live alone is associated with the social condition defined by not working. This is not the case for widowed aged living with children. Thus, although the general pattern of analysis in most research compares individuals according to marital status, examining marital status independently of living arrangements is inadequate, since marital status may not be a sufficiently broad measure of life cycle stage in terms of the aged individual's social context.

In addition, therefore, to the tendency in recent literature to consider well-being as related to personality types and to personality development, it would seem useful to study loneliness <u>in old age</u> as part of the aged individual's specific life cycle stage.

Life cycle stage would be defined in terms of composite measures of variables comprising the individual's social context: marital status and living arrangements; work status and social participation; etc.

Although there has been no consensus in the literature, findings of previous studies have also raised the question of whether there is an effect of socioeconomic disadvantage on social activity and well-being of the aged. It has already been pointed out that demographic variables defining the individual's socioeconomic status are generally unrelated to loneliness. In contrast, a relationship was obtained between socioeconomic disadvantage (in terms of advanced age, low income, low level of education and poor functional health) and a lack of contact with friends. Since income and education, besides having a net effect on a lack of contact with friends, are correlated, there is also most likely a compound effect of disadvantage in terms of low income and little education. The same is true for poor functional health and age. Thus the combined effect of these variables on friendship participation and on the general life style of the aged is indeed significant.

Of course, the individual's socioeconomic status is not established suddenly in old age but is usually part of an earlier pattern which continues into old age without drastic change, except for reduction in income level for some. An interesting question is the degree to which the effect of socioeconomic disadvantage on social activity in old age can be forecasted at an earlier stage for certain groups.

Especially interesting is the role of education as an intervening variable modifying the effect of sex, cultural differences and loss of the work role, on the dependent variables. Entry of education into the regression function reduces the effect of these other variables on the lack of contact with friends. Moreover, in exception to the general finding that education is not predictive of loneliness for the total sample, it is an important intervening variable for some groups. Thus, among Oriental aged who are generally loneliness-prone, more years of formal education significantly decreases the likelihood of loneliness; among working males, who of all subgroups are least likely to be lonely, the condition of loneliness is significantly associated with low education. The importance of the education factor is underscored if we keep in mind that future cohorts of elderly will increasingly be better educated and may have different patterns of and needs for social activity.

Disadvantage among the aged, however, cannot be viewed solely in terms of the above socioeconomic variables measuring age, income, education and functional health ability. Broadening the concept of disadvantage to include

living arrangements and the health appraisal adds dimensions of disadvantage, which may in fact be of relevance to aging, to the concept of aging proposed in this study, i.e., one of life cycle stages defined by social context. Previous studies have emphasized the usefulness of the health appraisal in the study of the aged. Results of this study indicate that whereas poor functional health is predictive only of a lack of contact with friends, the health appraisal is predictive of loneliness as well. Thus, whereas physical health limitations constitute a limitation on friendship participation without affecting well-being, the health appraisal clearly affects both friendship participation and well-being.

In fact, examination of subgroups shows that the health appraisal is related to loneliness in conjunction with other variables which define the older person's social context: work, marital status and living arrangements. For example, the health appraisal was found to be unrelated to loneliness among working males and aged living with children. A positive health appraisal was counteractive of loneliness especially among aged who live alone. Clearly, it is worthwhile to gain a better understanding of the health appraisal as a factor which affects well-being at various life cycle stages.

Findings of this study also underscore the usefulness for research of examining living arrangements in studies of the aged. Most apparent is the significant effect of disadvantage in terms of living alone on the well-being of the aged: whereas all shared household types were negative predictors of loneliness, living alone was highly predictive of loneliness for the sample. Interestingly, the opposite was true for the lack of contact with friends: aged who live in some form of shared household tend to lack friends while those who live alone tend to have friends, probably as a compensation for living alone. In other words, although individuals living alone tend to have friends they also tend to express feelings of loneliness.

The group of aged who live alone requires further study. Subgroup results indicate that several of the predictors examined in the model are especially significant for aged who live alone. For example. aged who live alone are especially likely to lack friends if thay have a low income. Similarly, loss of work role, a negative health appraisal and a low frequency of contact with family are highly predictive of loneliness especially among aged who live alone.

However, aged who live alone are only one subgroup which warrants special attention in research. The many subgroup differences obtained in this study (see summary of findings in Table 4 and Appendix B) indicate a need for a more flexible and pluralistic approach in the study of social activity and loneliness among the aged. A pluralistic approach would aim at examining specific groups rather than the general population. It is quite possible, for example, that social activity and loneliness have different meaning for various groups of aged at various stages of the life cycle and in various social contexts.

In Israel, for example, it is obvious that the study of social activity and well-being among the aged must take into consideration cultural differences. Results of this study reveal an interesting pattern of differences between aged of Western origin and aged of Oriental origin. For example, chronological age was a stronger predictor of a lack of friends for aged of Western origin. Moreover, although significant positive results for sex (female) and for shared households was obtained for the total sample, examination of subgroups showed that these are positive predictors of a lack of friends only for aged of Oriental origin. In other words, among Oriental aged, females and individuals living with spouse and/or children are more likely to report feelings of loneliness if they had a low frequency of contact with family. Among Western aged, widowhood, regardless of living arrangements, and duration of residence in Israel were more strongly related to a lack of friends than among Oriental aged. It seems, then, that social context variables are of greater relevance for Oriental aged than for Western aged. Also interesting were the differences obtained for the health variables: whereas aged of Western origin were especially likely to report a lack of friends if they were in poor functional health, for aged of Oriental origin the health appraisal was a more relevant variable. As for predictors of loneliness, the level of education was a significant negative predictor for aged of Oriental origin only. This variable was not significant for Western origin.

Another special group is the group of working males. Findings indicate that the work role modifies the relationship between a poor health appraisal and feelings of loneliness. Similarly, the work role modifies the effect of living alone and of a low frequency of contact with family on feelings of loneliness. In other words, work status is an intervening variable modifying

the negative effects of several otherwise important variables on well-being:
the health appraisal, living arrangements, and contacts with family. Among
working males, only disadvantage in terms of low education level was related
to feelings of loneliness. On the other hand, not working, positively re-
lated to loneliness for most groups, is especially predictive for the most
loneliness-prone group of aged, as well as the most disadvantaged in terms
of living arrangements: aged who live alone.

Another small and hitherto neglected group emerges from this study:
widowed aged living with unmarried children. Among this group a lack of
contact with friends was found to be highly predictive of loneliness, more
so than for any other subgroup. This relatively small group of aged who
are also probably younger, might be the subject of welfare planning research
which would examine the context within which a lack of friendship partici-
pation and loneliness occur.

In the present study we distinguished between contact with friends
and contacts with family, defining contact with family as an independent
variable which entered the regression functions as a significant predictor.
Findings indicate that contact with family living outside of the household
is not a substitute for social activity: a low frequency of such contacts
increased the likelihood of a lack of friends. In other words, there is a
distinct group of aged who are simultaneously characterized by a lack of
social contact with friends and with family and who are therefore especially
likely to experience loneliness. This group of aged, especially if they
live alone, warrants special attention of future research. Without doubt
family relationships are an important source of social interaction and
psychological support. The absence of such relationships, compounded by a
lack of contact with friends, is a serious social condition. It is important
that further research examine in greater detail the nature and function
of family relationships and their effect on well-being.

The proposed emphasis on research aimed at specific groups of aged has been
influenced by recent trends in gerontological thinking which questions the
usefulness of social disengagement as a general term describing social be-
havior. This trend places greater importance on identifying groups of aged
for whom social disengagement is an undesirable process, i.e., for whom
reduced social activity is in fact   accompanied by reduced well-being.
Hochschild (1975) has referred to these groups, for example, as "reluctant

disengages", or persons who are socially disengaged but normatively engaged. These are persons who desire engagement but lack it, as opposed to those who are both socially and normatively disengaged.

The objective of research in the direction proposed by this study would be to identify the context in which "undesirable disengagement" occurs. Such research would also provide information regarding those specific groups of elderly who would most likely benefit from intervention that would create opportunities for social contact. Examining friendship participation and loneliness within the context of life cycle stages, as has been suggested in this report, might facilitate this kind of group-specific research which would have a greater relevance for practitioners and policy makers.

APPENDIX A   RESULTS OF BIVARIATE ANALYSIS

1.   The lack of contact with friends

For purpose of analysis, the frequency of contact with friends was scaled
dichotomously, receiving a score of 1 if the respondent reported having
no friends or having had no contacts with friends in the past month, and
zero if he reported having had any contacts during this period. The bi-
variate relationship between the frequency of contacts with friends and
the frequency of feelings of loneliness indicates a strong variation in
loneliness based on frequency of contacts with friends: twice as many
individuals having no contacts with friends reported a high frequency of
feelings of loneliness as compared with those having contacts with friends.

TABLE 1   Percent reporting frequent feelings of loneliness according
          to frequency of contacts with friends   (n=1498)

contacts with friends	number in population	% reporting frequent feelings of loneliness
have no contacts with friends	986	44
have contacts with friends	512	23
TOTAL	1,498	37

$$x^2 = 69.02$$
$$p = 0.01$$

It was expected that this relationship would be maintained in the multi-
variate model and would be significant when the effect of other variables
were taken into account, thus supporting previous empirical findings.

2. Income Level

Income level was defined as the income per (standard) member in the nuclear
family of the aged individual (including the aged person himself, his
spouse, and children under age 18).

Bivariate analysis indicated generally decreasing proportions of individuals
reporting a lack of friends and feelings of loneliness, with increasing
income level.

TABLE 2   Percent reporting a lack of contact with friends and frequent
feelings of loneliness according to income level (n=1498)

Standard Adult income	number in population	% reporting a lack of friends	% reporting frequent feelings of loneliness
0-100	196	77	32
101-200	920	73	44
201-300	194	50	33
301-400	75	55	19
400+	113	27	12
TOTAL	1498	66	37

$$x^2 = 128.85 \qquad x^2 = 64.72$$
$$P = 0.01 \qquad P = 0.01$$

mean income: 184.97; S.D. = 192.77

3. Education Level

Bivariate analysis showed a systematic decrease in proportions of
individuals reporting a lack of friends and a high frequency of feelings
of loneliness, with increasing level of education.

TABLE 3   Percent reporting a lack of contact with friends and frequent
           feelings of loneliness according to education level (n=1498)

No. of years school completed	Number in population	% reporting a lack of friends	% reporting frequent feelings of loneliness
none	648	76	47
1-4	167	71	34
5-8	400	60	33
9+	283	45	22
TOTAL	1498	66	37

$$x^2 = 74.07 \qquad\qquad x^2 = 52.83$$
$$P = 0.01 \qquad\qquad P = 0.01$$

mean no. of school years completed; 5.6, S.D. = 11.3

4. Work status

Bivariate analysis indicates systematic variation in the dependent variables
according to work   status: non-working aged are more likely to lack friends
and be lonely than working aged.

TABLE 4   Percent reporting a lack of contact with friends and frequent
           feelings of loneliness according to work status (n=1498)

work status	number in population	% reporting a lack of friends	% reporting frequent feelings of loneliness
working	263	50	17
not working	1235	69	41
TOTAL	1498	64	31

$$x^2 = 34.96 \qquad\qquad x^2 = 52.51$$
$$P = 0.01 \qquad\qquad P = 0.01$$

5. Health

Two health variables were used in this study: a measure of functional ability and
a reported self-appraisal of health.

TABLE 5   Percent reporting a lack of contacts with friends and frequent
           feelings of loneliness according to functional ability (n=1498)

functional ability	number in population	% reporting a lack of friends	% reporting frequent feelings of loneliness
good	1069	61	33
poor	429	78	48
TOTAL	1498	$x^2 = 39.86$ $P = 0.01$	$x^2 = 29.18$ $P = 0.01$

Bivariate analysis of the two health variables and the two dependent
variables indicated that both functional ability and the self-appraisal
were systematically related to the dependent variables: those in poor health
or preceiving their health to be poor were characterized by higher propor-
tions of individuals reporting a lack of friends and frequent feelings of
loneliness relative to those in good health.

TABLE 6   Percent reporting a lack of contacts with friends and frequent
           feelings of loneliness according to the self appraisal of the
           health condition   (n=1498)

self appraisal of health condition	number in population	% reporting a lack of friends	% reporting frequent feelings of loneliness
positive appraisal	350	48	22
average appraisal	717	68	34
negative appraisal	431	77	55
TOTAL	1498	66 $x^2 = 73.05$ $P = 0.01$	37 $x^2 = 96.76$ $P = 0.01$

We expected to obtain strong relationships in this direction in multivariate
analysis, indicating the effect of poor health and reduced mobility on the
individual's social activity level and subjective well-being.

6. Age

Preliminary bivariate analysis of the age of the respondent by the frequency
of contacts with friends and by the reported frequency of feelings of
loneliness indicate consistent variation in the dependent variables based

on age, beginning with . the 71-75 age group. Table 5 shows that as we move along the age categories, we find increasingly higher proportions of individuals reporting a lack of contact with friends and frequent feelings of loneliness.

TABLE 7   Percent reporting a lack of contact with friends and frequent feelings of loneliness according to age group (n=1498)

age group	number in population	% reporting a lack of friends	% reporting frequent feelings of loneliness
- 64	315	61	33
65-70	577	61	34
71-75	342	71	40
76-80	158	77	44
81+	106	74	46
TOTAL	1498	66	37
		$x^2 = 25.14$	$x^2 = 11.98$
		$P = 0.01$	$P = 0.01$

7. Marital Status

Widowed as opposed to married aged were somewhat more likely to report a lack of friends and feelings of loneliness.

TABLE 8   Percent reporting a lack of contact with friends and frequent feelings of loneliness according to marital status

	number in population	% reporting a lack of friends	% reporting frequent feelings of loneliness
married	979	64	31
widowed*	519	70	48
TOTAL	1498	66	37
		$x^2 = 5.98$	$x^2 = 39.14$
		$P = 0.05$	$P = 0.01$

* includes small number of divorced, separated and single aged

8. Sex

Although findings of empirical studies have been inconclusive concerning the relationship between sex and the level of social activity, and

between sex and loneliness, bivariate analysis of our data indicated that females were somewhat more likely to lack friends and to report frequent feelings of loneliness (significant at 0.05).

TABLE 9   Percent reporting a lack of contact with friends and frequent feelings of loneliness according to sex   (n=1498)

sex	number of population	% reporting a lack of friends	% reporting frequent feelings of loneliness
females	863	69	39
males	635	62	34
TOTAL	1498	66	37
		$x^2 = 6.06$	$x^2 = 4.22$
		$P = 0.05$	$P = 0.05$

We were interested in seeing whether this relationship would be maintained in multivariate analysis, or whether it is spurious, expressing effects of widowhood, low education level, low income, non-participation in the labor force, etc.

9. Country of Origin

Preliminary analysis of data showed a strong relationship between country of origin and the dependent variabled, such that individuals of Oriental origin are characterized by much higher porportions reporting a lack of friends and frequent feelings of loneliness as compared to individuals of Western origin.

TABLE 10   Percent reporting a lack of contact with friends and frequent feelings of loneliness according to country of origin (n=1498

country of origin	number in population	% reporting a lack of friends	% reporting frequent feelings of loneliness
Western	726	57	29
Oriental	772	74	45
TOTAL	1498	66	37
		$x^2 = 47.14$	$x^2 = 41.22$
		$P = 0.01$	$P = 0.01$

10. Living Arrangements and Marital Status

No clear pattern emerges in bivariate analysis. The highest proportions of a lack of friends were reported by aged living with married children and widowed aged living with unmarried children. The highest frequencies of loneliness were reported by widowed aged living alone and those living with unmarried children.

TABLE 11   Percent reporting a lack of contact with friends and frequent feelings of loneliness according to living arrangements (n=1498)

living arrangements	number in population	% reporting a lack of friends	% reporting frequent feelings of loneliness
married, living with spouse and unmarried children	225	62	29
married living with spouse only	683	64	32
widowed, living with unmarried children	101	74	52
widowed living alone	222	60	62
married or widowed, living with married children	267	76	30
TOTAL	1498	66 $x^2 = 21.54$ P = 0.01	37 $x^2 = 91.53$ P = 0.01

11. Frequency of Contact with Relatives Living Outside of Household

TABLE 12   Percent reporting a lack of contact with friends and frequent feelings of loneliness according to frequency of contacts with relatives (n=1498)

frequency of contacts with relatives	number in population	% reporting a lack of friends	% reporting frequent feelings of loneliness
low	377	75	53
average	491	65	37
high	630	62	28
TOTAL	1498	66 $x^2 = 17.79$ P = 0.01	37 $x^2 = 60.92$ P = 0.01

With an increase in the frequency of contact with friends we found decreasing proportions in both a lack of friends and loneliness.

12. Length of Residence in Israel:Year of Immigration

Although we had expected that the longer a person has lived in Israel and in his neighborhood, the less likely he would be to report a lack of friends and frequent feelings of loneliness, bivariate analysis did not indicate consistent relationships in this direction. Individuals who immigrated prior to 1947 were generally characterized by relatively lower proportions of a lack of friends and loneliness compared to those who immigrated after 1948. However, recent immigrants (after 1968) were also characterized by lower proportions of those reporting a lack of friends and loneliness.

TABLE 13 Percent reporting a lack of contact with friends and frequent feelings of loneliness according to year of immigration (n=1498)

year of immigration	number in population	% reporting a lack of friends	% reporting frequent feelings of loneliness
-1947	248	39	23
1947-1954	507	70	44
1955-1967	630	72	38
1968+	113	68	29
TOTAL	1498	$x^2 = 95.46$ $P = 0.01$	$x^2 = 46.29$ $P = 0.01$

13. Duration of Residence in Neighborhood:Change of Residence

A somewhat higher proportion of those who changed residence reported a lack of friends when compared to those who did not change residence. There was no difference between the two groups in the frequency of feelings of loneliness.

TABLE 14 Percent reporting a lack of contact with friends and frequent feelings of loneliness according to change of residence (n=1498)

change of residence	number in population	% reporting a lack of friends	% reporting frequent feelings of loneliness
changed residence in past 10 yrs	420	71	38
did not change residence in past 10 yrs	1078	64	37
TOTAL	1498	66	37
		$x^2 = 8.03$	$x^2 = 2.00$
		$p = 0.01$	(not significant)

A net positive relationship was expected with a lack of friends for change of residence, such that an individual is more likely to lack friends if he has changed residence in the past 10 years (i.e., lives in his neighborhood a short period of time).

14. Settlement

Bivariate analysis shows some variation in the dependent variables according to settlement: individuals living in Yavne were characterized by a relatively higher proportion reporting frequent feelings of loneliness.

TABLE 15 Percent reporting a lack of conract with friends and frequent feelings of loneliness according to settlement (n=1498)

settlement	number in population	% reporting a lack of friends	% reporting frequent feelings of loneliness
Petah Tikva	695	65	31
Be'er Sheva	598	65	44
Yavne	205	72	37
TOTAL	1498	66	37
		$x^2 = 2.94$	$x^2 = 24.84$
		(not significant)	$p = 0.01$

This is most likely due to the differential demographic and socioeconomic character of these settlements, Yavne being the most socioeconomically deprived settlement comprised primarily of aged of Oriental origin, while Petah Tikva, an older settlement, is characterized by a higher proportion of aged of Western origin and is less disadvantaged socioeconomically.

TABLE A1.   INDEPENDENT VARIABLE MEANS AND PROPORTIONS IN SELECTED SUBSAMPLES

	Total Population	European-American	Asian-African	Males	Females	Married	Widowed	Working Males	Non-working Males
Education	5.57	8.60	2.73	6.43	4.95	6.53	3.78	8.03	5.64
Europeans	.485	--	--	.488	.482	.544	.372	.627	.420
Age	69.69	69.36	70.00	71.62	68.27	69.17	70.66	68.17	73.3
Not working	.824	.762	.883	.671	.937	.775	.917	--	--
Widowed	.346	.266	.422	.146	.494	--	--	.100	.169
Poor Funct. Health	.286	.198	.369	.249	.314	.237	.380	.091	.326
Self-Appraisal+	.234	.256	.212	.249	.222	.234	.233	.402	.174
Self-Appraisal-	.288	.242	.330	.265	.305	.276	.310	.102	.336
Be'er Sheva	.399	.331	.464	.386	.409	.386	.424	.344	.406
Petah Tikva	.464	.620	.317	.449	.475	.486	.422	.502	.423
Changed residence	.280	.300	.262	.291	.272	.271	.299	.301	.286
Years in Israel	18.37	21.17	15.74	18.91	17.97	18.96	17.25	18.96	18.89
Female	.576	.573	.579	--	--	.446	.821	--	--
Income	184.97	229.46	143.14	196.22	176.70	206.0	145.31	285.08	152.63
Low family	.252	.228	.275	.261	.244	.241	.272	.230	.277
High family	.421	.444	.399	.397	.438	.418	.426	.411	.390
Lives alone	.148	.136	.160	.074	.203	--	.428	.053	.085
Lives with spouse only	.456	.583	.337	.559	.380	.698	--	.526	.575
Lives with spouse and unmarried children	.150	.110	.189	.228	.093	.230	--	.297	.195
Widowed, lives with unmarried children	.067	.044	.089	.036	.090	--	.177	.024	.042
Married & widowed, live with married children	.178	.127	.227	.102	.234	.063	.395	.100	.103

TABLE A1 (Continued)

	live alone	live with spouse only	live w/ spouse & unmarried children	widowed & un-married children	live w/ married children	age -70	age 71+
Education	4.086	6.92	5.88	4.21	3.62	6.21	4.65
Europeans	.442	..619	.356	.317	.345	.512	.444
Age	70.14	69.32	68.40	69.24	71.51	65.48	
Not working	8.96	.804	.689	.901	.903	.756	.926
Widowed	---	---	---	---	.903	.305	.408
Poor Funct. Health	.266	.217	.262	.337	.483	.213	.394
Self-appraisal+	.225	.247	.187	.188	.262	.261	.193
Self-appraisal-	.284	.271	.280	.337	.322		.363
Years in Israel	18.02	19.33	19.33	14.57	16.83	18.31	18.46
Be'er Sheva	.378	.367	.382	.545	.457	.401	.396
Petah Tikva	.486	.526	.431	.307	.375	.467	.459
Changed residence	.293	.266	.236	.257	.352	.269	.297
Female	.788	.480	.356	.722	.757	.649	.469
Income	161.25	213.93	196.82	134.88	139.58	204.19	156.69
Low family	.225	.234	.244	.297	.307	.241	.267
High family	.495	.411	.422	.366	.401	.420	.421
Lives alone	---	---	---	---	---	.139	.162
Lives with spouse only	---	---	---	---	---	.467	.439
Lives with spouse & unmarried children	---	---	---	---	---	.180	.106
Widowed, lives with unmarried children	---	---	---	---	---	.066	.069
Married & widowed, live with married children	---	---	---	---	---	.147	.224

Variable	b coefficients						
x_i	total population	European-American	Asian-African	Males	Females	Married	Widowed
	n=1498	n=726	n=772	n=635	n=863	n=979	n=519
constant a	.36452	.24133 (2.404)*	.43155	-.00622 (-.024)*	.94164 (12.644)	.27047 (1.359)*	.85811 (18.563)
age	.00508 (2.607)	.00927 (2.946)	.01008 (2.769)			.00710 (2.509)	.00309 (1.050)*
female	.05219 (2.018)	.02962 (.804)	.07433 (2.148)	*	*	.04868 (1.403)*	*
changed residence	.05490 (2.181)	—	.05044 (1.464)*	.09659 (2.448)	*	.05332 (1.673)*	*
European origin	-.04554 (-1.627)	*	*	-.00428 (-.103)*	-.05459	-.00088 (-.026)*	-.08785 (-1.776)*
Years in Israel	-.00634 (-6.735)	-.01018 (-4.312)	*	-.00693 (-4.894)	-.00610 (-4.863)	-.00706 (-6.028)	-.00537 (-3.377)
education	-.02072 (-4.917)	-.02031 (-4.027)	-.01523 (-3.085)	-.01935 (-3.970)	-.02299 (-4.760)	-.02204 (-5.357)	-.01680 (-2.746)
(education)²	.00021 (6.097)	.00021 (4.465)	.00016 (3.020)	.00019 (3.829)	.00025 (5.064)	.00022 (5.291)	.00020 (3.011)
income	-.0032	-.00040 (-2.824)	-.00023	-.00026 (-2.609)	-.00038 (-4.436)	-.00025 (-3.517)	-.00058 (-3.613)
poor functional ability	.06331 (2.309)	.11052 (2.460)	.04352 (1.293)*	*	.10024 (2.964)	.08037 (2.255)	*
positive self-health	-.12513 (-4.475)	-.03957 (-.928)*	-.18630 (-4.770)	-.08438 (-1.935)	-.14860 (-4.1091)	-.11788 (-3.344)	-.15335 (-3.400)
low frequency of contacts with family	.06505 (2.493)	.04771 (1.191)*	.06297 (1.856)*	.10913 (2.675)	*	.12480 (3.765)	*
lives w/ spouse & unmarried children	.07777 (1.813)*	*	*	*	.07982 (1.396)*	—	*
lives with spouse only	.12612 (3.631)	.08845 (2.436)	*	*	.12498 (3.118)	*	—
widowed, lives w/ unmarried children	.11807 (2.268)	*	.07049 (1.238)*	*	.10706 (1.857)*	—	.11371 (2.147)
lives with married children	.12105 (3.046)	*	.12285 (2.894)	.08783 (1.436)*	.11568 (2.611)	*	.15729 (3.810)
widowed	*	-.10844 (-2.642)	*	-.08720 (-1.653)*	*	—	—
not working	*	*	*	.08252 (1.866)*	-.12310 (-1.973)	.02911 (.732)*	*
Petah Tikva	.14832 (5.707)	.17677 (4.750)	.11959 (3.484)	.19938 (5.1041)	.11009 (3.376)	.16682 (5.189)	.12154 (2.961)
mean of Y	.658211	.571625	.739637	.617323	.688297	.636364	.69942
R	.42739	.46862	.35446	.43306	.44033	.44013	.41792
R²	.18266	.21961	.12564	.18754	.1938q	.19371	.17466
F	20.69	18.27	8.38	11.03	15.71	17.83	11.97

TABLE A2 (Continued)

Variable / x_i	b coefficients					
	working males n=209	non-working males n=426	live alone n=222	live with spouse only n=683	live w/ spouse & unmar. child. n=225	married or widowed live w/ mar. child n=267
constant a	.75848 (10.346)	.11725 (.400)*	.98364 (6.776)	.19418 (.804)*	.77517 (11.064)	.83006 (13.684)
female	*	*	.03040 (.390)*	.06960 (1.857)*	*	-.16360 (-2.972)
age	.00895 (2.316)	*	*	-.00913 (2.805)	*	*
European origin	--	-.00709 (-.142)*	-.07570 (-.992)*	-.01417 (-.347)*	*	*
years in Israel	-.01018 (-3.898)	-.00555 (-3.337)	*	-.00728 (-5.598)	*	-.00569 (-2.972)
changed residence	*	.11824 (2.497)	*	.04804 (1.198)*	*	.11803 (2.297)
positive self-health	*	*	.05320 (1.405)*	.11097 (2.338)	*	*
low family contacts	-.05710 (-.816)*	-.10841 (-1.909)	-.26291 (-3.430)	-.12604 (-3.085)	.32764 (4.736)	*
education	-.01109 (-2.703)	-.01939 (-3.258)	-.03130 (-2.974)	-.02426 (-4.843)	*	-.02426 (-3.151)
$(education)^2$	*	*	--	--	--	--
income	-.00018 (-1.459)*	-.00068 (-.2809)	-.00063 (-2.201)	-.00025 (-3.319)	-.00049 (-2.027)	-.00050 (-2.854)
poor functional ability	.17851 (1.504)*	*	.13750 (-1.847)*	.09103 (2.125)	*	.15013 (3.000)
lives w/ spouse only	*	.08716 (1.840)*	--	--	--	--
lives with spouse & unmarried children	*	*	--	--	--	--
lives with unmarried children	*	*	--	--	--	--
widowed, lives with married children	*	*	--	--	--	--
lives with married children	*	.13522 (1.761)*	--	--	--	--
widowed	*	*	*	*	*	*
not working	--	--	-.14581 (-1.255)*	*	*	*
Petah Tikva	.19695 (2.587)	.11977 (4.708)	.11410 (1.690)*	.15883 (4.196)	.11546 (3.365)	.10117 (1.876)*
mean of Y	.478469	.685446	.599099	.638360	.617778	.760300
R^2	.39850	.41176	.42808	.46184	.46737	.41040
$\bar{R}^2$	.15880	.16955	.18325			

b coefficients

Variable x_i	total population n=1498	European-American n=726	Asian-African n=772	Males n=635	Females n=863	Married n=979	Widowed n=519	Non-working males n=426
constant a	.42206 (8.460)	.36971 (6.499)	.38224 (5.354)	.47516 (6.699)	.49958 (9.352)	.11545 (2.249)	.62370 (9.252)	.60331 (7.773)
European	-.08693	—	—	*	-.09309	-.09427 (-2.968)	-.12797 (-2.429)	—
females	*	*	*	—	—	*	**	*
(education)²	*	*	-.00453 (-2.546)	.00011 (2.609)	*	.0008 (2.057)	*	*
Education	*	*	-.01157 (-2.784)	*	-.09033 (-2.302)	-.00780 (-2.249)	*	*
positive self health	-.06187 (-2.140)	*	*	*	-.09033 (-2.302)	-.03564 (-1.027)*	-.09518 (-1.828)*	*
negative self-health	.17025 (6.394)	.20131 (5.529)	.16543 (4.693)	.12476 (3.164)	.20403 (5.856)	.18434 (5.667)	.14773 (3.171)	.15939 (3.405)
low frequency of contacts w/ family	.12933 (4.381)	.08706 (2.121)	.17062 (4.066)	.10839 (2.492)	.13843 (3.440)	.11997 (3.355)	.13189 (2.503)	.13378 (2.391)
high frequency of contacts w/ family	-.08271 (-3.195)	-.06423 (-1.865)*	-.10772 (-2.819)	-.07079 (-1.831)*	-.08755 (-2.516)	-.06467 (-2.105)	-.10734 (-2.237)	-.09866 (-1.941)
No friends	.14354 (5.790)	.19561 (3.407)	.19650 (5.152)	.13351 (3.666)	.15057 (4.422)	.13081 (4.382)	.16991 (3.763)	.16278 (3.377)
lives w/ spouse & unmarried children	-.33135 (-7.993)	-.39951 (-6.495)	-.27552 (-4.857)	-.39817 (-6.422)	-.30144 (-5.085)	*	*	-.43187 (-5.469)
lives w/ spouse only	-.28510 (-8.449)	-.36588 (-8.056)	-.21377 (-4.283)	-.36068 (-6.496)	-.26195 (-6.294)	.04295 (1.302)*	—	-.41082 (-6.064)
widowed, lives w/ unmarried children	-.17469 (-3.353)	-.25255 (-3.048)	-.11982 (-1.752)*	*	-.21741 (3.610)	—	-.17146 (-3.021)	*
lives w/ married children	.10863 (3.499)	.12105 (3.301)	.10516 (1.994)	.15725 (4.145)	*	.11989 (3.518)	*	-.55344 (-6.050)
not working	-.41622 (-9.622)	-.38028 (-7.086)	-.36485 (-6.784)	-.41754 (-5.731)	-.36799 (-8.024)	-.05365 (-.890)*	-.36210 (-7.972)	—
Be'er Sheva	.08571 (3.697)	.14087 (4.353)	*	.09081 (2.576)	.07379 (2.372)	.09873 (3.467)	*	.09890 (2.213)
mean of Y	.371162	.287879	.449482	.341732	.392816	.314607	.477842	.429577
R	.45887	.46762	.42904	.47779	.45776	.44760	.43836	.44326
R²	.21056	.21868	.18408	.22829	.20954	.20034	.191216	.19648
F	11.72	20.01	17.17	16.75	20.51	20.17	15.16	12.75

TABLE A3 (Continued)

Variable x_i	b coefficients						
	working males n=209	non-working males n=426	live alone n=222	live w/spouse only n=683	live w/ spouse & unmar. ch. n=225	widowed/ live with/ unmarried children n=267	mar or widowed live w/ married children n=267
constant a	.11346 (2.038)	.156988 (4.223)	.34442 (2.975()	.11205 (1.999)	.01088 (.153)*	.43185 (3.107)	.04862 (.830)*
females	—	—	-.14143 (-1.849)	*	*	-.22670 (-2.029)	*
European	*	-.04968 (-1.060)*	*	-.13002 (-3.787)	*	*	*
education	-.01457 (-2.704)	-.00317 (-1.581)*	*	*	*	*	*
(education)^2	.00019 (3.343)	*	*	*	*	*	*
positive self health	*	-.05540 (-.892)*	-.19643 (-2.476)	*	*	*	*
negative self health	*	.14177 (2.883)	.19682 (1.362)*	.22234 (5.860)	.15330 (2.317)	*	*
low family contacts	●	.12936 (2.303)	.17680 (2.421)	.10484 (2.454)	.15854 (2.311)	*	.25090 (4.367)
high family contacts	*	-.09332 (-1.825)	*	-.06547 (-1.771)*	*	-.24227 (-2.527)	*
no friends	.12483 (2.567)	.15265 (3.140)	.16441 (2.583)	.13821 (3.949)	.12540 (2.040)	.32414 (2.978)	.15265 (2.445)
live with spouse only	*	-.35758 (-2.735)	*	—	—	—	—
live w/ spouse & unmarried children	*	-.31101 (-2.502)	*	—	—	—	—
widowed, lives w/ unmarried children	*	*	*	—	—	—	—
live w/ married children	*	-.50690 (-4.982)	*	—	—	—	—
not working	—	—	.23634 (2.322)	.13167 (3.109)	16731 (2.655)	*	*
Be'er Sheva	.10653 (2.108)	.10205 (2.252)	.14611 (2.357)	.10126 (2.984)	1.0297 (1.758)*	-.21308 (2.258)	*
mean of Y	.162679	.429577	.621622	.320644	.288889	.524752	.303371
R2	.42051	.45535	.43174	.43813	.43822	.43801	.35490
R^2	.17683	.20735	.18640	.19195	.19204	.19186	.12596
F	8.72	9.00	7.00	22.91	8.64	5.70	12.63

NOTES TO TABLES A2 AND A3

* Indicates non-significant (at 0.05 level) b coefficient. Asterisk appearing in place of a coefficient means that the variable did not enter the regression function at the chosen regression step (see Methodology).

-- Indicates that the variable is not relevant for the subgroup.

T-values appear in parentheses.

Variables shown in regression function include only those variables which entered at the chosen regression step. A larger number of variables were originally programmed (see Methodology).

Note: Coefficients without asterisk are significant at least at 0.05 level. A T-value greater than 2.576 indicates that the coefficient is significant at the 0.01 level.

All R^2 are significant at $p=0.01$ (see F-test).

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