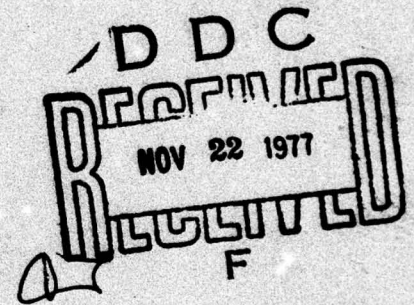SR77-36

SMALL COMMUNITIES RESULT IN GREATER SATISFACTION

An Examination of Undermanning Theory

C. Burgess Ledbetter

DDC

NOV 22 1977

F

November 1977

An examination of undermanning theory.

7. AUTHOR(s)	6. PERFORMING ORG. REPORT NUMBER
C. Burgess/Ledbetter	8. CONTRACT OR GRANT NUMBER(s) DA Project 4A76273ØAT42 Task A3 Work Unit 005

9. PERFORMING ORGANIZATION NAME AND ADDRESS	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
U.S. Army Cold Regions Research and Engineering Laboratory Hanover, New Hampshire 03755	

11. CONTROLLING OFFICE NAME AND ADDRESS	12. REPORT DATE
Directorate of Military Construction Office, Chief of Engineers Washington, DC 20314	November 1977
	13. NUMBER OF PAGES 18

14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)	15. SECURITY CLASS. (of this report)
CRREL-SR-77-36	Unclassified
	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Distribution
Organization theory
Population
Sociology
Statistical analysis

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Roger Barker's undermanning theory states that the smaller an organization, the greater the degree of undermanning, resulting in greater inhabitant satisfaction. This theory is examined using the National Opinion Research Center's General Social Survey for 1974. Two groups of survey variables were dichotomized and net transmittances or coefficients of correlation for the system were determined. Two groups of variables were chosen: objective groups, such as age and income, and subjective ones, such as sociability and job

20. Abstract (cont'd) *of p 1473A*)

satisfaction. The only positive correlation found was that people residing
in small communities are more satisfied with their community than are people
who live in large communities. Only a small portion of this is explained by
the degree to which small town inhabitants are satisfied with their financial
situation.

PREFACE

This report was prepared by C. Burgess Ledbetter, Research Architect, of the Applied Research Branch, Experimental Engineering Division, U.S. Army Cold Regions Research and Engineering Laboratory. Funding was provided by DA Project 4A762730AT42, *Design, Construction and Operations Technology for Cold Regions*, Technical Area A3, *Facilities Technology/Cold Regions*, Work Unit 005, *Habitability of Cold Regions Military Facilities*. This report is a statistical investigation to substantiate a theory about community size and the occupants' satisfaction.

SMALL COMMUNITIES RESULT IN GREATER SATISFACTION
An Examination of Undermanning Theory

C. Burgess Ledbetter

Barker[1,2] developed undermanning theory to describe the effects of an organization on its inhabitants. An organization is an assemblage of people for a given purpose or task; it can be a church, school, business or a town. Organizations can exist as part of larger organizations.

Barker states that an undermanned organization results in pressure upon each individual to perform at a higher level of responsibility than would occur in an overmanned organization. This pressure or environmental press on the individual to assume higher levels of responsibility results in satisfaction for that inhabitant, and the individual is more satisfied with the organization. Undermanning may be thought of as an optimal situation, since there is also a lower level of manning in which the pressures to perform are too great a strain on the occupants. Overmanning is excessive manning of an organization, resulting in only vicarious participation by a majority of occupants.

The guidelines for measuring the manning of an organization are behavior settings and performer/population ratios. Without going into lengthy definitions of Barker's behavior settings, they might be cursorily viewed as distinct activities making up an organization, such as family housing unit y, Sunday afternoon football game, lawyer office x, Madge's Beauty Shop, etc.

The performer/population ratio is the number of people in positions of responsibility divided by the total number of all occupants. For example, players and coaches are performers in a game and members of the audience are nonperformers. The lawyer and secretary are performers but the clients are not. Undermanned organizations have more behavior settings per population (each setting requiring leaders or performers) and higher performer/population ratios than do overmanned organizations.

When studying behavior settings and performer/population ratios it is found with all organizations that the smaller the organization, the more likely it is undermanned. That is, under natural conditions found in society, the smaller the organization the more undermanned it is likely to be.

This generalization can be tested using data available from the National Opinion Research Center (NORC) General Social Survey[3] for 1974. While there are no measures available to tell us the number of behavior settings or performers, the community in which one lives is known. Furthermore, measures that are both objective, such as age and income, and subjective, such as sociability and job satisfaction, can be investigated. If a correlation exists between the size of community in which one lives and the respondent's expressed satisfaction with the community, as the undermanning theory leads us to expect, then the objective and subjective variables can be examined to determine whether or not they explain the correlation.

In the following analysis of the 1974 NORC data, all variables will be dichotomized. A zero-order gross correlation will be obtained from the Dartmouth College IMPRESS* computer program. By scanning the data in this way, the potential for variables explaining the relationship between size of community and satisfaction with community will be determined; that is, the test variable is either positively or negatively correlated with both the primary community size and satisfaction variables. Confidence limits of 95% will be applied to the correlations. If significantly contributing variables are found, net transmittances or coefficients of correlation for the system will be determined using the IMPRESS CATFIT** computer program.

The NORC sample is a multistage area probability sample to the block or segment level. At the block level, however, quota sampling was used with quotas based upon sex, age and employment status. Respondents, numbering 1484, were a cross section of persons 18 years of age and over living in noninstitutional arrangements within the United States.

The size of place in which a respondent resides is dichotomized as follows using 1970 U.S. Census population figures:

(a) "small" — Town less than 49,999 population and rural or open country

(b) "big" — Suburb of a city or city larger than 49,999 population

The percentages of respondents in (a) and (b) are 31.5% and 68.5%, respectively.

The responses to the question of how satisfied the respondent is with the city or place where he lives are dichotomized as follows:

(a) "very" — "a great deal" to "a very great deal" 46.5%

(b) "little" — "none" to "quite a bit" 53.4%

0.1% are excluded.

The frequency distribution for the correlation between size of community (SIZPLC) and satisfaction with community (SATCIT) is shown below.

---

* Interdisciplinary Machine Processing for Research and Education in the Social Sciences.

** Code name for program designed for statistical analyses.

Down: NORC size of place code
Across: Respondent's satisfaction with place where R lives

Percentage Table

	Very	Little	Total
Small	17.7%	13.7%	31.4%
Big	28.9%	39.7%	68.6%
Total	46.6%	53.4%	100%(1483)

The correlation is 0.144 with a 95% confidence limit of ± 0.055. This result agrees with undermanning theory expectations although the correlation is small.

$$\text{SIZPLC} \xrightarrow{\quad 0.144 \ (\pm 0.055)\quad} \text{SATCIT}$$

Tests of Objective Variables

Test variables of an objective nature to determine their contribution, if any, are:

(a)	respondent's income	OWNINC
(b)	age	AGE
(c)	occupation status	OCC
(d)	race	RACE
(e)	sex	SEX

The dichotomies of each of these variables are mapped as follows:

(a) OWNINC

"LOW" - <$8000 per year   24.9%
"HIGH" - >$8000 "   "   31.6%

43.5% excluded, e.g. unemployed, response refused, etc.

(b) AGE

"OLD"   - >40 years   54.7%
"YOUNG" - <40 years   44.9%

0.4% excluded

(c) OCC (the 1.9% farm workers excluded to represent industrial characteristics)

"HIGH" - managers, administrators and professional 22.9%
"LOW" - all others

10.9% excluded, e.g. farm workers and not applicable

3

(d) RACE

    "WHITE"   87.9%
    "BLACK" (11.7%) and others (0.5%) 12.2%

(e) SEX

    "MALE"   46.6%
    "FEMALE"   53.4%

The frequency distribution and the zero-order gross correlation between each of the preceding test variables and size of community (SIZPLC) and satisfaction with community (SATCIT) are as follows.

INCOME

Income is positively correlated to size of community but not correlated to satisfication with it. People living in small communities tend to have lower incomes, but this does not influence their satisfaction with their community.

SIZPLC BY OWNINC

DOWN: NORC size of place code
ACROSS: Respondent's personal earnings in 1973

PERCENTAGE TABLE

	LOW	HIGH	TOTAL
SMALL	18.0%	9.8%	27.8%
BIG	38.0%	34.2%	72.2%
TOTAL	56.0%	44.0%	100%(839)

Gross Correlation = 0.122 (± 0.075)

OWNINC BY SATCIT

DOWN: Respondent's personal earnings in 1973
ACROSS: R's satisfaction with place where R lives

PERCENTAGE TABLE

	VERY	LITTLE	TOTAL
LOW	21.7%	34.3%	56.0%
HIGH	20.0%	24.0%	44.0%
TOTAL	41.7%	58.3%	100%(839)

Gross Correlation = -0.068 (± 0.069) ∿ 0

AGE

Age is correlated with satisfaction with community but not with size of place. Regardless of size of community, older people express greater satisfaction with their community.

AGE BY SIZPLC

DOWN: Respondent's exact age
ACROSS: NORC size of place code

PERCENTAGE TABLE

	BIG	SMALL	TOTAL
OLD	7.7%	18.4%	26.1%
YOUNG	19.1%	54.8%	73.9%
TOTAL	26.8%	73.2%	100%(901)

Gross Correlation = 0.035 ($\pm$ 0.068) $\sim$ 0

AGE BY SATCIT

DOWN: Respondent's exact age
ACROSS: R's satisfaction with place where R lives

PERCENTAGE TABLE

	VERY	LITTLE	TOTAL
OLD	12.5%	13.5%	26.1%
YOUNG	26.0%	48.0%	74.0%
TOTAL	38.5%	61.5%	100%(901)

Gross Correlation = 0.129 ($\pm$ 0.075)

OCCUPATION

Occupational status is not correlated to either size of community or satisfaction with community.

SIZPLC BY OCC

DOWN: NORC size of place code
ACROSS: Respondent's occupation

PERCENTAGE TABLE

	HIGH	LOW	TOTAL
SMALL	7.4%	22.0%	29.4%
BIG	18.2%	52.3%	70.6%
TOTAL	25.6%	74.3%	100%(1322)

Gross Correlation = -0.006 ($\pm$ 0.053) $\sim$ 0

5

OCC BY SATCIT

DOWN:	Respondent's occupation		
ACROSS:	R's satisfaction with place where R lives		

PERCENTAGE TABLE

	VERY	LITTLE	TOTAL
HIGH	12.4%	13.2%	25.6%
LOW	33.8%	40.5%	74.3%
TOTAL	46.2%	53.8%	100%(1322)

Gross Correlation = 0.029 ($\pm$ 0.063) $\sim$ 0

Occupation was remapped to form a dichotomy between white collar and blue collar workers to see if some change in correlation would develop. White collar makes up 46.3%, blue collar 44.7% and excluded 9% of the total respondents. A negative correlation results from the remapped version. People in small towns tend to be blue collar workers and farm workers. Satisfaction with community is not influenced by occupation.

SIZPLC BY OCC

DOWN:	NORC size of place code		
ACROSS:	Respondent's occupation		

PERCENTAGE TABLE

	WHITE	BLUE	TOTAL
SMALL	12.4%	18.1%	30.6%
BIG	38.3%	31.1%	69.4%
TOTAL	50.8%	49.2%	100%(1351)

Gross Correlation = -0.145 ($\pm$ 0.058)

OCC BY SATCIT

DOWN:	Respondent's occupation		
ACROSS:	R's satisfaction with place where R lives		

PERCENTAGE TABLE

	VERY	LITTLE	TOTAL
WHITE	24.1%	26.6%	50.8%
BLUE	22.4%	26.9%	49.2%
TOTAL	46.5%	53.5%	100%(1351)

Gross Correlation = 0.021 ($\pm$ 0.053) $\sim$ 0

RACE

There is a small positive relationship between race and size of community and satisfaction with community. Nonwhites tend to live in large communities and are less satisfied with their communities than are whites.

RACE BY SIZPLC

DOWN: Race of respondent
ACROSS: NORC size of place code

PERCENTAGE TABLE

	SMALL	BIG	TOTAL
WHITE	28.5%	59.4%	87.9%
BLACK	3.0%	9.1%	12.1%
TOTAL	31.5%	68.5%	100%(1484)

Gross Correlation = 0.080 ($\pm$ 0.069)

RACE BY SATCIT

DOWN: Race of respondent
ACROSS: R's satisfaction with place where R lives

PERCENTAGE TABLE

	VERY	LITTLE	TOTAL
WHITE	42.1%	45.9%	87.9%
BLACK	4.5%	7.6%	12.1%
TOTAL	46.6%	53.4%	100%(1483)

Gross Correlation = 0.104 ($\pm$ 0.077)

SEX

There is no relationship between sex and size of community or satisfaction with community.

SEX BY SIZPLC

DOWN: Sex of respondent
ACROSS: NORC size of place code

PERCENTAGE TABLE

	SMALL	BIG	TOTAL
MALE	14.9%	31.7%	46.6%
FEMALE	16.6%	36.9%	53.4%
TOTAL	31.5%	68.5%	100%(1484)

Gross Correlation = 0.010 ($\pm$ 0.048) $\sim$ 0

7

SEX BY SATCIT

DOWN: Sex of respondent
ACROSS: R's satisfaction with place where R lives

PERCENTAGE TABLE

	VERY	LITTLE	TOTAL
MALE	21.0%	25.6%	46.6%
FEMALE	25.6%	27.8%	53.4%
TOTAL	46.6%	53.4%	100%(1483)

Gross Correlation = -0.027 ($\pm$ 0.0519) $\sim$ 0

None of the "objective" test variables are promising explanations of the correlation between size of community and satisfaction with community.

Tests of Subjective Variables

Test variables of a subjective nature are:

(a)	job satisfaction	SATJOB
(b)	sociability	SOCNEI
(c)	church attendance	CHURCH
(d)	happiness	HAPPY
(g)	financial satisfaction	SATINC

The dichotomies for each of these variables are mapped as follows:

(a) SATJOB
   "SATIS" - very satisfied   39.5%
   "DISSAT" - very dissatisfied to moderately satisfied   42.9%
   17.6% excluded

(b) SOCNEI "how often spend social evening with neighbor?"
   "SOC" - almost everyday to several times a month   43.5%
   "UNSOC" - never to about once a month   56%
   0.5% excluded

(c) CHURCH "how often attend church?"
   "OFTEN" - several times month to once 2 month   52.8%
   "SELDOM" - never to several times a year   47%
   0.2% excluded

(d) HAPPY "how happy do you feel these days?"
   "HAPPY" - very happy   37.8%
   "UNHAP" - not too happy to pretty happy   61.9%
   0.3% excluded

8

(e) SATINC "degree of satisfaction with present
family financial situation"
"VERY" - pretty well satisfied   31.1%
"NOTVER" - not satisfied at all to more or
less satisfied   68.5%
0.4% excluded.

These variables are selected because they may help to develop a
psychological profile of respondents. Small town inhabitants may simply
be more optimistic than inhabitants of large communities. We will not
be able, however, to determine whether the size of community influences
these feelings or if people with these feelings choose to live in one
size of community more than another. Frequency distributions and zero-
order gross correlation coefficients for the preceding variables are
given when correlated with size of community and satisfaction with
community.

SATJOB

There is no correlation between job satisfaction and size of com-
munity but a moderate positive correlation exists between job satisfaction
and satisfaction with community. Regardless of the size of community a
person resides in, people who are more satisfied with their job are more
satisfied with their community.

SIZPLC BY SATJOB

DOWN: NORC size of place code
ACROSS: R's satisfaction with job

PERCENTAGE TABLE

	SATIS	DISSAT	TOTAL
SMALL	15.5%	15.4%	31.0%
BIG	32.4%	36.7%	69.1%
TOTAL	47.9%	52.1%	100%(1223)

Gross Correlation = 0.034 ($\pm$ 0.062) $\sim$ 0

SATJOB BY SATCIT

DOWN: R's satisfaction with job
ACROSS: R's satisfaction with place where R lives

PERCENTAGE TABLE

	VERY	LITTLE	TOTAL
SATIS	27.6%	20.4%	48.0%
DISSAT	18.9%	33.1%	52.0%
TOTAL	46.5%	53.5%	100%(1222)

Gross Correlation = 0.212 ($\pm$ 0.056)

9

<u>SOCNEI</u>

Regardless of size of community, there is a small positive cor-
relation between people who are sociable with neighbors and their
degree of satisfaction with their community.

SIZPLC BY SOCNEI

DOWN: NORC size of place code
ACROSS: Frequency of social evenings with neighbors

PERCENTAGE TABLE

	SOC	UNSOC	TOTAL
SMALL	13.6%	17.9%	31.4%
BIG	30.2%	38.3%	68.6%
TOTAL	43.8%	56.2%	100%(1476)

Gross Correlation = -0.056) ∿ 0

SOCNEI BY SATCIT

DOWN: Frequency of social evenings with neighbors
ACROSS: R's satisfaction with place where R lives

PERCENTAGE TABLE

	VERY	LITTLE	TOTAL
SOC	22.0%	21.8%	43.8%
UNSOC	24.6%	31.6%	56.2%
TOTAL	46.6%	53.4%	100%(1475)

Gross Correlation = 0.064 (± 0.052)

<u>CHURCH</u>

There is no relationship between church attendance and size of com-
munity and only a small correlation between church attendance and satis-
faction with community. Regardless of size of community, churchgoers
tend to be more satisfied with their community than non-churchgoers.

SIZPLC BY CHURCH

DOWN: NORC size of place code
ACROSS: How often R attends religous services

PERCENTAGE TABLE

	OFTEN	SELDOM	TOTAL
SMALL	17.7%	13.8%	31.5%
BIG	35.2%	33.4%	68.5%
TOTAL	52.9%	47.1%	100%(1481)

Gross Correlation = 0.049 (± 0.056) ∿ 0

CHURCH BY SATCIT

DOWN: How often R attends religous services
ACROSS: R's satisfaction with place where R lives

PERCENTAGE TABLE

	VERY	LITTLE	TOTAL
OFTEN	26.8%	26.0%	52.8%
SELDOM	19.7%	27.4%	47.2%
TOTAL	46.6%	53.4%	100%(1480)

Gross Correlation = 0.089 ($\pm$ 0.052)

HAPPY

Regardless of the size of one's community, there is a moderate to strong correlation between people who consider themselves happy and their satisfaction with their community.

SIZPLC BY HAPPY

DOWN: NORC size of place code
ACROSS: How happy R considers himself to be

PERCENTAGE TABLE

	HAP	UNHAP	TOTAL
SMALL	12.8%	18.6%	31.5%
BIG	25.1%	43.4%	68.5%
TOTAL	37.9%	62.1%	100%(1480)

Gross Correlation 0.042 ($\pm$ 0.055) ~ 0

HAPPY BY SATCIT

DOWN: How happy R considers himself to be
ACROSS: R's satisfaction with place where R lives

PERCENTAGE TABLE

	VERY	LITTLE	TOTAL
HAP	23.7%	14.2%	37.9%
UNHAP	22.9%	39.2%	62.1%
TOTAL	46.6%	53.4%	100%(1479)

Gross Correlation = 0.257 ($\pm$ 0.052)

SATINC

A small number of small community inhabitants are very satisfied with their financial situation. For those very satisfied with their finances, there is a moderate tendency to be satisfied with their community.

11

SIZPLC BY SATINC

DOWN: NORC size of place code
ACROSS: R's satisfaction with financial situation

PERCENTAGE TABLE

	VERY	NOTVER	TOTAL
SMALL	11.5%	19.8%	31.3%
BIG	19.7%	49.0%	68.7%
TOTAL	31.2%	68.8%	100%(1478)

Gross Correlation = 0.080 ($\pm$ 0.053)

SATINC BY SATCIT

DOWN: R's satisfaction with financial situation
ACROSS: R's satisfaction with place where R lives

PERCENTAGE TABLE

	VERY	LITTLE	TOTAL
VERY	19.6%	11.6%	31.2%
NOTVER	26.9%	41.9%	68.8%
TOTAL	46.5%	53.5%	100%(1477)

Gross Correlation = 0.238 ($\pm$ 0.054)

The SATINC-SATCIT category is the only variable of the 10 objective and subjective variables selected that influences the relationship between size of community and satisfaction with community. To determine its effects, the net transmittances from size of community via financial satisfaction will be calculated using the IMPRESS CATFIT program.

The following eight-fold table gives the frequencies for the respondents in each category of variable when size of community is controlled.

CONTROL: NORC size of place code
DOWN: R's Satisfaction with financial situation
ACROSS: R's Satisfaction with place where R lives

SIZPLC = SMALL

PERCENTAGE TABLE

	VERY	LITTLE	TOTAL
VERY "X"	26.4%	10.4%	36.8%
NOTVER	30.1%	33.1%	63.2%
TOTAL	56.5%	43.5%	100%(462)

12

SIZPLC = BIG

<u>PERCENTAGE TABLE</u>

	VERY	LITTLE	TOTAL
VERY "Y"	16.6%	12.1%	28.7%
NOTVER	25.4%	45.9%	71.3%
TOTAL	42.0%	58.0%	100%(1015)

Exclusion analysis:
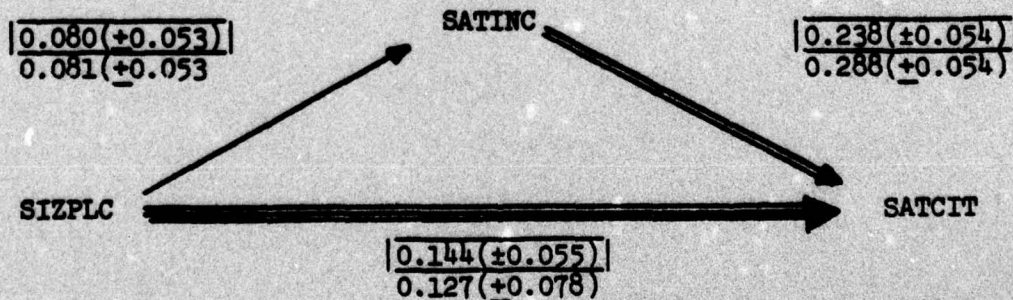Table total   1477
Excluded   7
Sample size   1484

For reference purposes, "X" represents 122 persons (26.4%) living in
small communities who are very satisfied with their financial situation
and very satisfied with their community. "Y" represents 168 persons
(16.6%) living in large communities who are very satisfied with their
financial situation and very satisfied with their community.

The following IMPRESS CATFIT output shows the net transmittances
for the system.

FROM ...	TO SATINC = NOTVER		
SIZPLC + BIG	DIRECT	0.081 ($\pm$0.076)	SIZPLC $\longrightarrow$ SATINC

FROM ...	TO SATCIT = LITTLE		
SATINC = NOVER	DIRECT	0.228 ($\pm$0.076)	SATINC $\longrightarrow$ SATCIT
SIZPLC = BIG	DIRECT	0.127 ($\pm$0.078)	SIZPLC $\longrightarrow$ SATCIT

The following diagram shows the net transmittances within two sigma
confidence limits. In the box are shown the zero-order gross correlations.

SATINC

0.080($\pm$0.053)
0.081($\pm$0.053)

0.238($\pm$0.054)
0.288($\pm$0.054)

SIZPLC   SATCIT

0.144($\pm$0.055)
0.127($\pm$0.078)

From the model we see that, of the gross correlation between size of community and satisfaction with community, 0.127 is direct and not accounted for by satisfaction with income. Only 0.017 of the correlation between SIZPLC and SATCIT is explained by SATINC.

We are still left with a positive correlation -- that people residing in small communities are more satisfied with their community than are people who live in large communities. Only a small portion of this is explained by the satisfaction that small town inhabitants have with their financial situation.

To prove or disprove undermanning theory, other variables must be tested, of which only a few have been excluded in this report. As Barker[1] suggests, however, the number of behavior settings and the performer/population ratio may still be required to prove or disprove undermanning theory.

14

LITERATURE CITED

1. Barker, R.G. (1965) Ecology and Motivation. Nebraska Symposium on Motivation, Lincoln: University of Nebraska Press.

2. Barker, R.G. (1968) Ecological psychology: Concepts and methods for studying the environment of human behavior. Stanford, California: Stanford University Press.

3. National Opinion Research Center (1974) General Social Survey. University of Chicago, Chicago, Illinois.