The Discussion Networks of the American Population*

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Abstract

Results are reported on the size, density, heterogeneity, and kin/nonkin composition of interpersonal environments involving the discussion of "important matters." Data were obtained in the 1985 General Social Survey. These are the first survey network data representative of the American population. The personal networks they describe are small, relatively dense, homogeneous by comparison with the sample of respondents, and centered on kin. Bivariate examination of subgroup differences by age, education, race/ethnicity, and sex suggests that network range is greatest among the young and the highly educated. Few sex differences in network structure are found.

This paper provides a descriptive overview of features of the social networks of the American population. Results on the size, density, heterogeneity, and kin/nonkin composition of discussion networks are presented for the entire population and for population subgroups defined by age, education, race/ethnicity, and sex. The materials are presented for two reasons. First, since network concepts are increasingly used to explain individual behavior and responses, benchmark descriptions of important aspects of networks for a nationally representative sample of Americans are useful as a reference point. Second, the paper calls attention to the availability of survey network data collected as part of the 1985 General Social Survey (GSS); these data enable both substantive research projects using network characteristics and methodological research on network measurement.

Survey Network Data and the 1985 GSS

Survey network data describe the social contexts or "interpersonal environments" (Rossi, 1966) in which individuals live. Such data are especially well-suited to measuring social differentiation and integration at the individual level. Those using this sort of network data share the concern of the standard survey design with explaining variation in individual responses, but modify that design by measuring the social contexts in which respondents are embedded. Survey network data have come to be used frequently in substantive studies, and account for variation in diverse responses. They have been used recently in studies of such topics as socioeconomic attainment (Lin et al., 1981), social integration, both generally and into subcultures (Fischer, 1982a), psychological mood and well-being (Fischer, 1982a; Kadushin, 1982, 1983), availability of social support (Wellman, 1979; Fischer, 1982a), willingness to contribute to collective action (Oliver, 1984), diffusion of innovations to individuals (Rogers, 1979), and recruitment into social movements (Snow et al., 1980). The breadth of these applications warrants careful attention to the instruments used to gather survey network data and to the properties of the measurements themselves.

The use of survey network data has been limited, however, by the absence of standardized instruments for collecting them; there are no network instruments parallel to those used to obtain detailed occupation data (Reiss et al., 1961). This has complicated comparison and replication of findings and delayed the cumulation of knowledge. Deliberations leading to the inclusion of the network items in the 1985 GSS, described in Burt (1984), constitute a first step toward establishing such instruments. The availability of these measurements, the variety of possible response variables included in the GSS, and the national sampling frame used by the survey should make methodological research based on these items maximally relevant to the many substantive concerns to which survey network data are pertinent.

A central issue in the collection of survey network data involves the choice of a specific relational content, or "type of tie," to elicit names of alters from a focal individual. The GSS network data center on persons with whom a respondent "discusses important matters." Selection of this content as a name generator (see Burt, 1984: pp. 317-320) was based in part on precedent: most prior survey network data have focused on "best friends" or similar ties based on intimacy and positive affect. An additional theoretical consideration is the argument that such ties give rise to normative pressures through which some contextual effects on responses may operate. Also, an analysis of features underlying the overlap of different contents (Burt, 1983a) suggests that "discussing important matters" is a moderately intense content that represents a middle ground between acquaintanceship and kinship, but is less ambiguous in its meaning than friendship (Fischer, 1982b). Finally, prior work (Fischer, 1982a) using the similar name generator of "discussing personal matters" suggested that "discussing important matters" would generate a number of alters small enough to be tractable within the limited interview time available on the GSS.

The instrument used to obtain the network data begins with the elicitation of names of alters by the "discussing important matters" criterion. Respondents are asked to name all those people with whom they discussed important matters within the past six months. Remaining questions focus on the first five names mentioned, as a concession to time constraints. Respondents are asked to describe the relations among pairs of alters by saying whether or not the persons in each pair are "especially close" to one another and whether or not they are "total strangers." Items describing the respondent's tie to each alter in terms of closeness, frequency of contact, duration of acquaintance, and role relations are included, as are questions asking for the sex, race/ethnicity, education, age and religious preference of each alter. Burt (1984: pp. 331-336) presents a preliminary version of the instrument, which was modified on the basis of pretest results and time constraints before the GSS data were gathered.

Measures of the Structure of Interpersonal Environments

There have been several efforts within the literature to catalog the characteristics, properties, or "dimensions" of interpersonal environments, notably Mitchell (1969: pp. 10-29) and Jackson et al. (1977).[1] These point to a variety of features including size, density, homogeneity, dispersion, span, reachability and anchorage. Many of these disparate concepts can be brought together under the heading of network <u>range</u> (Burt, 1983b): an actor's interpersonal environment has range to the extent that it connects her or him to a diverse set of other actors.

Recent research (Campbell et al., 1985) examining the intercorrelations of range measures in Fischer's (1982a) Northern California Communities Study (NCCS) suggests that range as a conceptual domain has several largely independent dimensions. In this report I focus on three of these: network size, density, and heterogeneity. Size is simply the number of alters in an

[1] I focus on properties of <u>networks</u> only, leaving discussion of features of individual <u>ties</u> (frequency, duration, intensity, multiplexity, and so forth) for other reports.

interpersonal environment and provides a reasonably direct measure of social integration. In the GSS, size is measured as the number of alters elicited by the "discuss important matters" name generator.

Network density is an inverse measure of range; dense, "closed" interpersonal environments typically contain less diverse others (Granovetter, 1973). Density is related to the availability of social support and to well-being, at least under some conditions (Fischer, 1982a; Kadushin, 1983); it also measures the strength of normative pressures toward conformity. Often operationalized using dichotomous data on tie strength as the proportion of possible ties among alters that are actually present, it can be defined more generally as the mean intensity or strength of ties joining alters. Using the measures collected in the GSS data, the intensity of the tie between a pair of alters is coded 0 if the respondent reports that they are total strangers, 1 if the respondent reports that they are "especially close", and 0.5 otherwise.[2] The density measure then varies from

[2] This coding is justified in Marsden (1985). A well-worn proposition in structural sociology states that pairs of alters should tend to be more similar to one another with increasing tie strength (e.g. Granovetter, 1973). Loglinear analyses using association models (Goodman, 1981; Clogg, 1982) of three-way tabulations of characteristics (race, religion, education, age) of pairs of alters by tie strength reveal that interactions involving pairs of alters said to know one another, but not to be especially close, are intermediate between those for pairs said to be total strangers and those for pairs said to be especially close; hence the coding indicated in the text.

zero, in networks in which alters are mutually unaware of one another, to one, when all pairs are especially close.[3]

The heterogeneity of alters increases with network range; heterogeneity measures are the most direct indicators of the diversity of persons an actor can contact within his or her interpersonal environment. Such diversity implies integration into several spheres of society, which is deemed advantageous for instrumental actions like gathering information (Granovetter, 1973; Lin et al., 1981; Campbell et al., 1985). Of course, in a society characterized by substantial intersection of different attributes at the individual level (Blau and Schwartz, 1984), any given individual's network may be highly heterogeneous in some respects, yet homogeneous in others.[4] Here, I examine network heterogeneity of four types: by age, education, race/ethnicity,[5] and sex. Age and educational heterogeneity are measured as the standard deviations of the respective sets of alter characteristics; education is measured in years completed by assigning midpoints of categories offered to respondents by interviewers. For the nominal characteristics of race and sex,

[3] The density measure cannot be defined for networks smaller than size 2, for which there are no ties joining alters.

[4] Specifically, substantial intersection of attributes means that networks homogeneous in all respects are very difficult to construct, because an individual must be selective in many ways simultaneously; with great consolidation of attributes, selectivity in one respect carries selectivity in others with it. It is less difficult under conditions of intersection, and more difficult in the presence of consolidation, to construct networks that are heterogeneous in many ways.

[5] Categories of race/ethnicity are white, black, Hispanic, and other. "Others" are largely, but not exclusively, Asians.

diversity is measured using the index of qualitative variation (Agresti and Agresti, 1978: p. 208).[6,7]

As distinct from range and its emphasis on the variability of alters, network composition refers to the types of alters in an individual's network. Like heterogeneity, network composition can be measured with respect to many different attributes of alters. In this report I present material on only one of these: the extent to which discussion partners are kin rather than nonkin. Fischer (1982a) has shown this aspect of composition to be salient in characterizing the interpersonal environments described by survey network data. Kin/nonkin composition is measured as the proportion of alters bearing any kinship relation to the respondent. If a respondent describes a relationship as having both kin and nonkin ("friend", "advisor", etc.) components, priority is given here to the kinship tie.

[6] This choice of diversity measures is sensitive to the diversity of alters, not to the differences between respondent and alters. For instance, a respondent might have a network composed of very similar alters, all of whom are quite different from her or him. The general tendency toward homophily in networks (e.g. Verbrugge, 1977; Blau and Schwartz, 1984: p. 35) makes the latter situation unlikely; moreover, basing heterogeneity measures only on alter characteristics eliminates any definitional dependencies in the study of relationships between respondent characteristics and heterogeneity measures.

[7] The heterogeneity measures obviously cannot be defined for networks of size 0. For networks of size 1, heterogeneity is trivially zero. In results presented here, I have excluded all networks of size 0 and 1, but will note any differences that obtain if size 1 networks are treated as being homogeneous.

The Average American Discussion Network

Table 1 presents basic data on the distributions of the network characteristics studied here. Perhaps the most striking

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thing about the table is the distribution of network size: comparatively large percentages of persons report that they recently discussed important matters with no one, or with only one person. Nearly a quarter of the respondents have networks of size 0 or 1, and thus have "inadequate" or "marginal" counseling support according to Fischer's (1982a: pp. 125-126) criteria. Few respondents indicated that they had more than six discussion contacts; the mean and mode are three.[8]

The alters included in these networks are fairly densely linked. The mean network density is 0.61. Since few similar data exist, it is difficult to judge whether this is a high or low figure, but it can be compared with the 0.44 reported by Fischer (1982a: p. 145) for a regional sample and the 0.33

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[8] In the data made available by the GSS, all responses of six or more are grouped together; Dr. Tom Smith of the National Opinion Research Center, in private communication, provided the following itemization of the numbers of respondents citing more than 6 alters in response to the "discuss important matters" name generator: six respondents had networks of size 7, three size 8, four size 9, three size 10, and one size 15. I have coded the "6+" category for network size to its mean (6.5) for purposes of computing means below.

Table 1

Univariate Distributions of Measures of Network Form

Variable	Value	Percent	Mean	Standard Deviation	(N)
Network Size	0	8.9%	3.01	1.77	1531
	1	14.9			
	2	15.3			
	3	20.9			
	4	15.2			
	5	19.2			
	6+	5.5			
Density	<0.25	8.1%	0.61	0.28	1161
	0.25-0.49	18.0			
	0.50-0.74	39.5			
	>0.74	34.4			
Age Heterogeneity	<5	25.0%	10.54	6.39	1153
(Std. Deviation)	5-<10	23.2			
	10-<15	25.7			
	15+	26.1			
Population Heterogeneity			17.91		
Education	0-1	29.8%	1.78	1.37	1132
Heterogeneity	>1-2.5	43.3			
(Std. Deviation)	>2.5	26.9			
Population Heterogeneity			3.17		
Race Heterogeneity	0	91.8%	0.05	0.16	1167
(I.Q.V.)	>0	8.2			
Population Heterogeneity			0.38		
Sex Heterogeneity	0	22.4%	0.68	0.38	1167
(I.Q.V.)	0.01-0.90	40.7			
	>0.90	36.9			
Population Heterogeneity			0.99		
Proportion Kin	0	19.2%	0.55	0.37	1395
	0.01-0.33	15.4			
	0.34-0.66	20.7			
	0.67-0.99	14.5			
	1.00	30.2			

reported by Wellman (1979: p. 1215) for an urban sample.[9] Twenty-two percent of the networks consist of alters who are all "especially close" to one another (network density of 1.0), while five percent consist of alters who are mutual strangers (network density of 0.0).

The distributions for the heterogeneity measures in Table 1 show that the alters in the networks of Americans are homogeneous by comparison with population distributions, especially in terms of race/ethnicity. There is, however, substantial variation across the networks of respondents in the levels of heterogeneity. In 25% of the networks the standard deviation of the ages of alters is lower than 5 years; in 26% it is greater than 15 years. The mean age diversity is 10.54; comparing this to the standard deviation of the ages of respondents in the GSS (17.91), we see that the mean age heterogeneity of these networks is roughly 60% of the heterogeneity in the American population. Similarly, 30% of the networks are highly homogeneous in terms of education, with standard deviations of the education levels of alters lower than 1 year. The mean educational heterogeneity of

[9] The measures used by Fischer and Wellman differ from the one used here in that they are based on different criteria for coding tie strength among alters, and on dichotomous rather than trichotomous measures of tie strength. Fischer also excluded persons with networks of size 2 from his computations. Networks of size 2 do have higher density (0.69) than larger ones in these data; if they are excluded, mean density falls to 0.59.

networks, 1.78, is slightly over half the standard deviation of years of education across all respondents, 3.17.[10]

The race/ethnic homogeneity of the networks is most pronounced; only 96 respondents (8% of these with networks of size 2 or greater) cite alters with any racial/ethnic diversity. Mean race/ethnic heterogeneity is 0.05; this is a mere 13% of the index of qualitative variation computed for the race/ethnic distribution of respondents. By contrast, there is substantial sex diversity. While 22% of the respondents have networks with alters of only one sex or the other, in 37% the index of qualitative variation is 0.90 or greater, near-maximum heterogeneity. Mean sex heterogeneity in these networks is 0.68, which is nearly 70% of the sex heterogeneity among respondents. Much of this heterogeneity is related to the fairly high kin

[10] These estimates of the extent of homogeneity in the networks are conservative since respondents with network size 1 have been excluded from the computations of mean heterogeneity rather than being assigned values of 0 on the heterogeneity measures. Moreover, the high kin composition of the networks tends to increase heterogeneity by age and education, since kin ties are likely to bridge generations. The regression of age heterogeneity on proportion kin yields an unstandardized coefficient of 6.52 with corresponding standardized coefficient of 0.351, and a parallel regression of educational heterogeneity on proportion kin gives coefficients of 0.41 (unstandardized) and 0.102 (standardized). Both results are statistically significant beyond the 0.01 level. The result for educational heterogeneity is interpretable in terms of period and cohort effects on educational attainment.

composition of the networks, with many cross-sex ties to spouses, parents, children, and siblings.[11]

The typical interpersonal environment of an American draws heavily on kinship as a source or focus for relationships (Feld, 1981). Thirty percent of these networks consist only of persons having some family relation to the respondent; the average network has a proportion kin of 0.55. This appears comparable to the level of kin composition found in previous surveys of large populations including network items based on intense name generators.[12] It is notable that the distribution of kin/nonkin composition is bimodal: nearly twenty percent of the respondents include no kin among their alters.

Overall, these descriptive figures suggest that American interpersonal environments involving the discussion of important matters are "core" networks, as the choice of a relatively intense name generator implies. They are small, comparatively dense, homogeneous by comparison to the respondent population as

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[11] The regression of sex heterogeneity on proportion kin gives an unstandardized coefficient of 0.31 and a standardized coefficient of 0.285, $p < 0.01$. By contrast, race heterogeneity is inversely related to kin composition, with unstandardized and standardized regression coefficients of -0.08 and -0.176, respectively ($p < 0.01$).

[12] The proportion of all ties involving kinship in the GSS is 0.523, which compares to Wellman's (1979: p. 1210) figure of 0.500 for the six closest associates and the 0.483 among those "discussing personal problems" in the NCCS, reported by Burt (1984: p. 319). Since the first alter cited is somewhat more likely to be a family member than others (the proportion kin among first alters is 0.598, and ranges from 0.494 for the second alter to 0.476 for the fifth; see also Wellman [1979: p. 1210]), and since the data contain a large number of small networks, the mean proportion kin in a network exceeds the proportion of all <u>ties</u> involving kin.

an opportunity structure, and centered on kin. These features do vary substantially across the networks of different respondents, though, and the next section will examine this variation across four sets of population subgroups.

Subgroup Differences in Network Form

The measures of network form just described differ substantially across subgroups of the American population. Table 2 presents subgroup means. Differences are largest for subgroups

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defined by age and education, and appreciable for race. There are few notable differences in network form between men and women. Subgroup differences are most pronounced for network size, and are not substantial for either age or educational heterogeneity.[13]

[13] A caveat must be entered here: if networks of size 1 are regarded as having no heterogeneity, then all subgroup differences in age heterogeneity become significant. The most age-heterogeneous networks are found for the subgroups with the largest network size: the young, the highly educated, whites, and women. Since these results reflect network size alone, differences in which are already plain from Table 1, I chose not to report them here. Results for the other three heterogeneity measures are little affected by the treatment of size 1 networks in terms of heterogeneity.

Table 2. Subgroup Means on Network Measures

	Network Size	Density	Heterogeneity: Age (S.D.)	Heterogeneity: Education (S.D.)	Heterogeneity: Race (I.Q.V.)	Heterogeneity: Sex (I.Q.V.)	Proportion Kin
OVERALL SAMPLE	3.01	0.61	10.54	1.78	0.05	0.68	0.55
(N)	(1531)	(1161)	(1153)	(1132)	(1167)	(1167)	(1395)
Age							
< 30	3.37	0.61	10.92	1.66	0.06	0.75	0.55
30-45	3.31	0.56	9.95	1.79	0.06	0.71	0.49
46-64	2.96	0.65	10.77	1.84	0.04	0.62	0.57
65 and older	2.14	0.70	10.81	1.86	0.01	0.60	0.65
Eta	0.25**	0.18**	0.07	0.06	0.10*	0.16**	0.14**
Education							
< High School (< 12 yrs.)	2.22	0.71	9.82	1.96	0.05	0.59	0.66
High School Grad (12 yrs.)	2.85	0.63	10.56	1.63	0.04	0.69	0.56
Some College (13-15 yrs.)	3.52	0.57	11.07	1.75	0.04	0.70	0.49
BA Plus (> 16 yrs.)	3.90	0.54	10.62	1.85	0.05	0.75	0.46
Eta	0.34**	0.22**	0.07	0.09*	0.03	0.15**	0.20**
Race/Ethnicity							
White	3.12	0.61	10.63	1.76	0.03	0.71	0.56
Black	2.25	0.63	9.73	1.79	0.12	0.52	0.48
Hispanic	2.71	0.64	10.40	2.15	0.18	0.57	0.60
Other	2.80	0.63	9.51	1.43	0.23	0.52	0.45
Eta	0.15**	0.03	0.04	0.07	0.29**	0.15**	0.07
Sex							
Male	3.00	0.60	10.22	1.77	0.04	0.68	0.51
Female	3.02	0.62	10.78	1.78	0.05	0.69	0.58
Eta	0.01	0.05	0.04	0.00	0.02	0.02	0.09**

* means differ significantly at p < .05
** means differ significantly at p < .01.

Age Differences

Figure 1 displays age differences in five measures of network form.[14] Network range is clearly greatest among the

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young and middle-aged. Mean network size drops rapidly for the over-65 age group, from near or over three to just over two (see Fischer and Oliker, 1983). Density and proportion kin are lowest for the 30-45 age group;[15] these findings are related to the degree that nonkin alters are less likely to be linked by "especially close" ties.

Heterogeneity in terms of race/ethnicity and sex also differs significantly by age, with younger age groups having more diverse sets of alters. These differences may be attributable to life-course variability in the opportunities to form cross-sex or cross-race contacts (Feld, 1981, 1982); they may also reflect period-related changes in exposure to sex- and race-segregated contexts or in the social approval of such contacts.

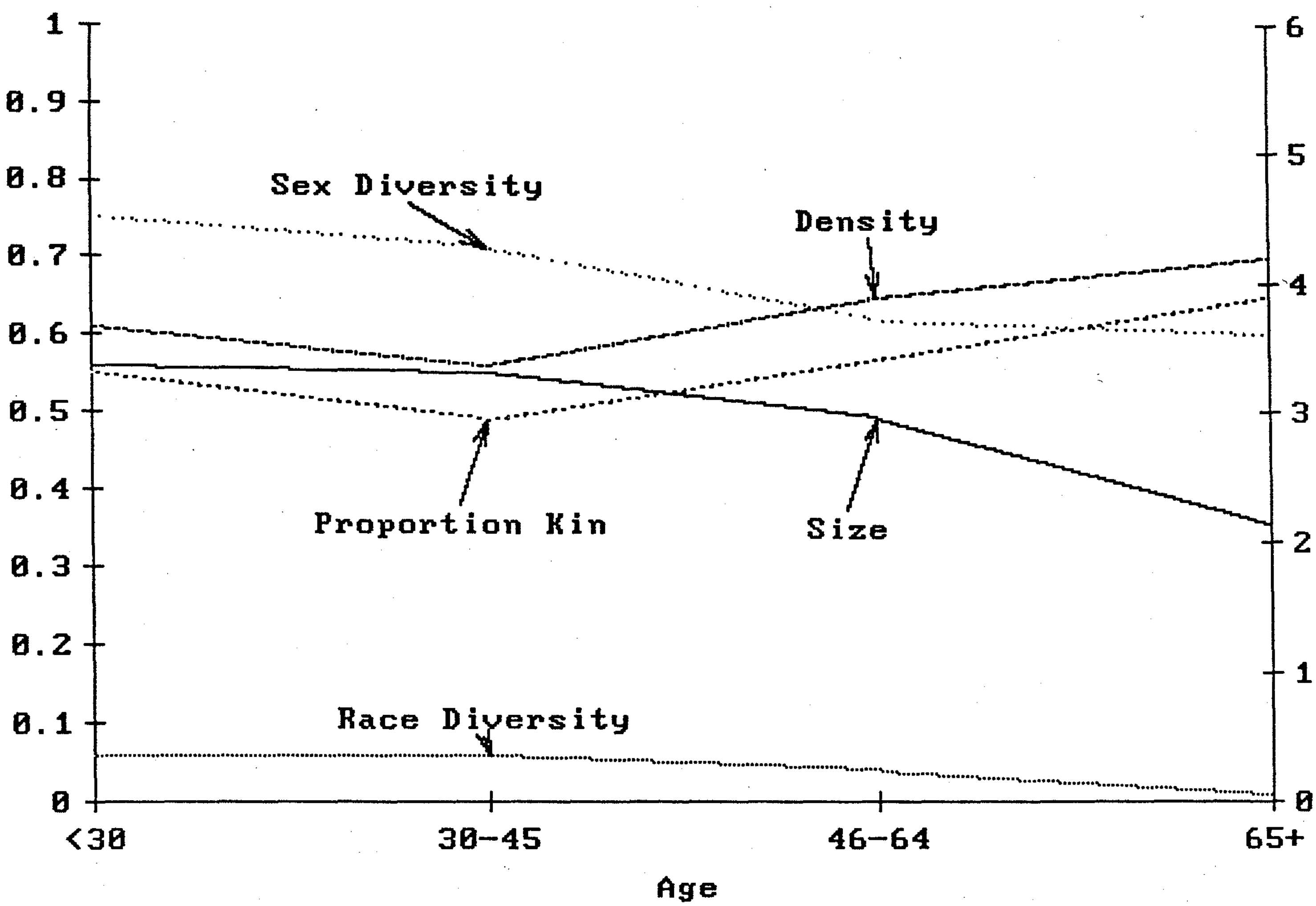
Education Differences

For five of the seven measures of network form in Table 2, education differences, as given by eta, are largest. This is in accord with Fischer's (1982a: p. 251) observation that education

[14] In the figures presented in this section, the scale for network size and educational heterogeneity is given by the vertical axis on the right, while that for density, race/ethnic heterogeneity, sex heterogeneity, and proportion kin is given by the vertical axis on the left.

[15] Nonlinearities in the relationships of age to network size, density, and percent kin are all statistically significant.

Figure 1. Age Differences in Network Form



was the personal characteristic most clearly influencing differences in network form in the NCCS. These relationships involving education are displayed in Figure 2.

Insert Figure 2 about here

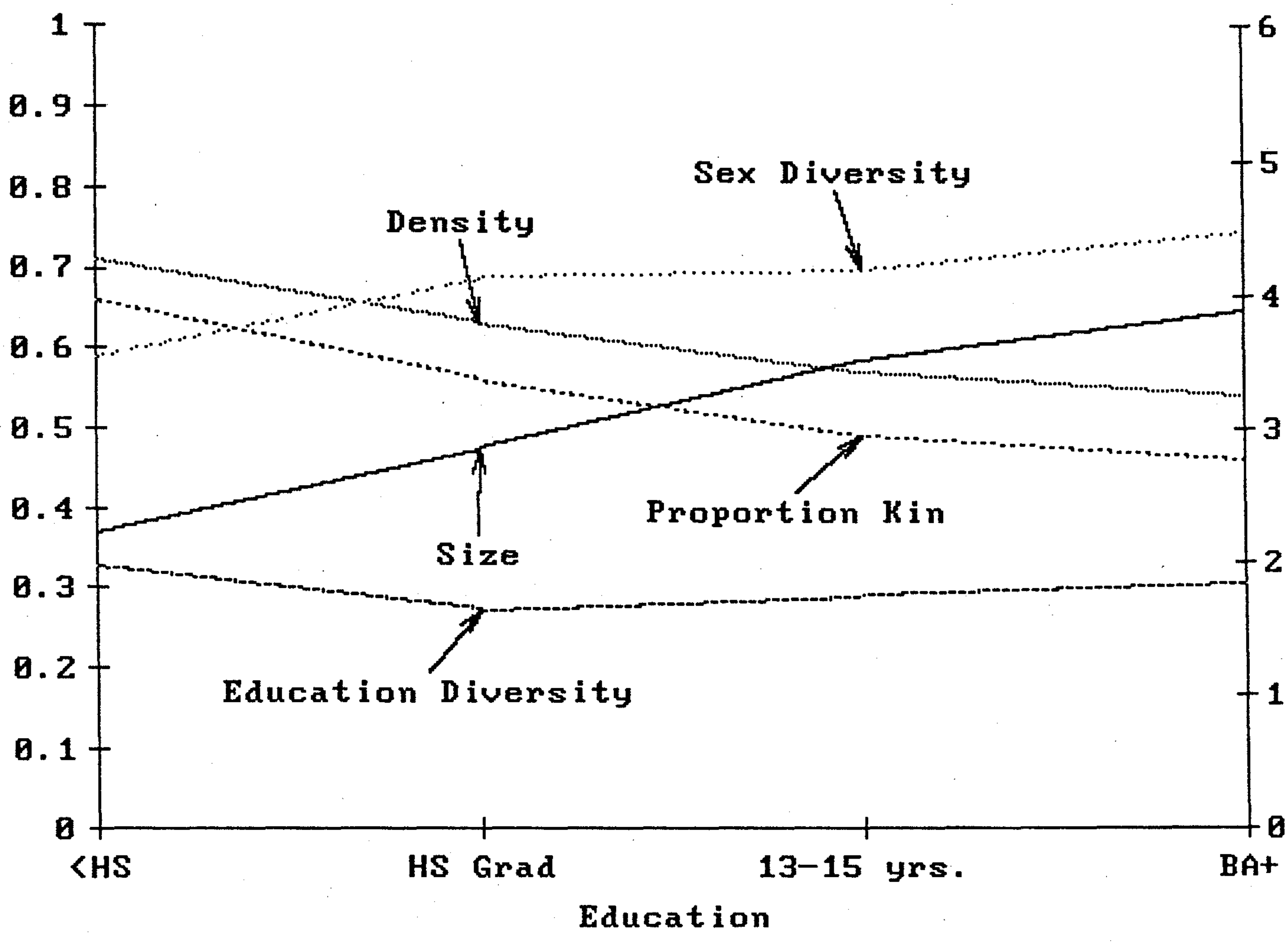
Figure 2 clearly indicates that network range grows with education.[16] Mean network size among those holding a college degree is nearly 1.8 times larger than among those who did not finish high school. The alters in the networks of the educated are less likely to be closely connected to one another, as density declines from a mean of 0.71 among those with little education to 0.54 among those with much; they are similarly less likely to be embedded within the context of kinship. The sex diversity of alters also increases smoothly with education.[17] Generally, then, education is associated with larger, more cosmopolitan networks providing access to diverse others, and differentiated from the "traditional" (Fischer, 1982a: p. 118) setting of kinship.

Education is the only personal characteristic associated with educational heterogeneity (see Table 2); the mean variability of the education of alters is greatest for persons with both little and much education, and least for those with

[16] This confirms the findings of Campbell et al. (1985), based on the NCCS.

[17] There are no significant nonlinearities in the relationships between education and size, density, sex diversity, and proportion kin. The relationship of education to educational heterogeneity, discussed in the following paragraph, <u>is</u> significantly nonlinear.

Figure 2. Education Differences in Network Form



moderate levels. This is precisely the opposite of what one would expect if heterogeneity differences were a result of the operation of "edge" effects limiting the availability of homophilous alters (Verbrugge, 1977). The results are more consistent with Blau's (1977: p. 23) proposition that group size and heterogeneity are negatively related, since the subgroups of intermediate education levels here are largest.[18]

Race/ethnic Differences

Figure 3 illustrates four race/ethnic differences in network form. No clear generalization about differences in network range

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Insert Figure 3 about here

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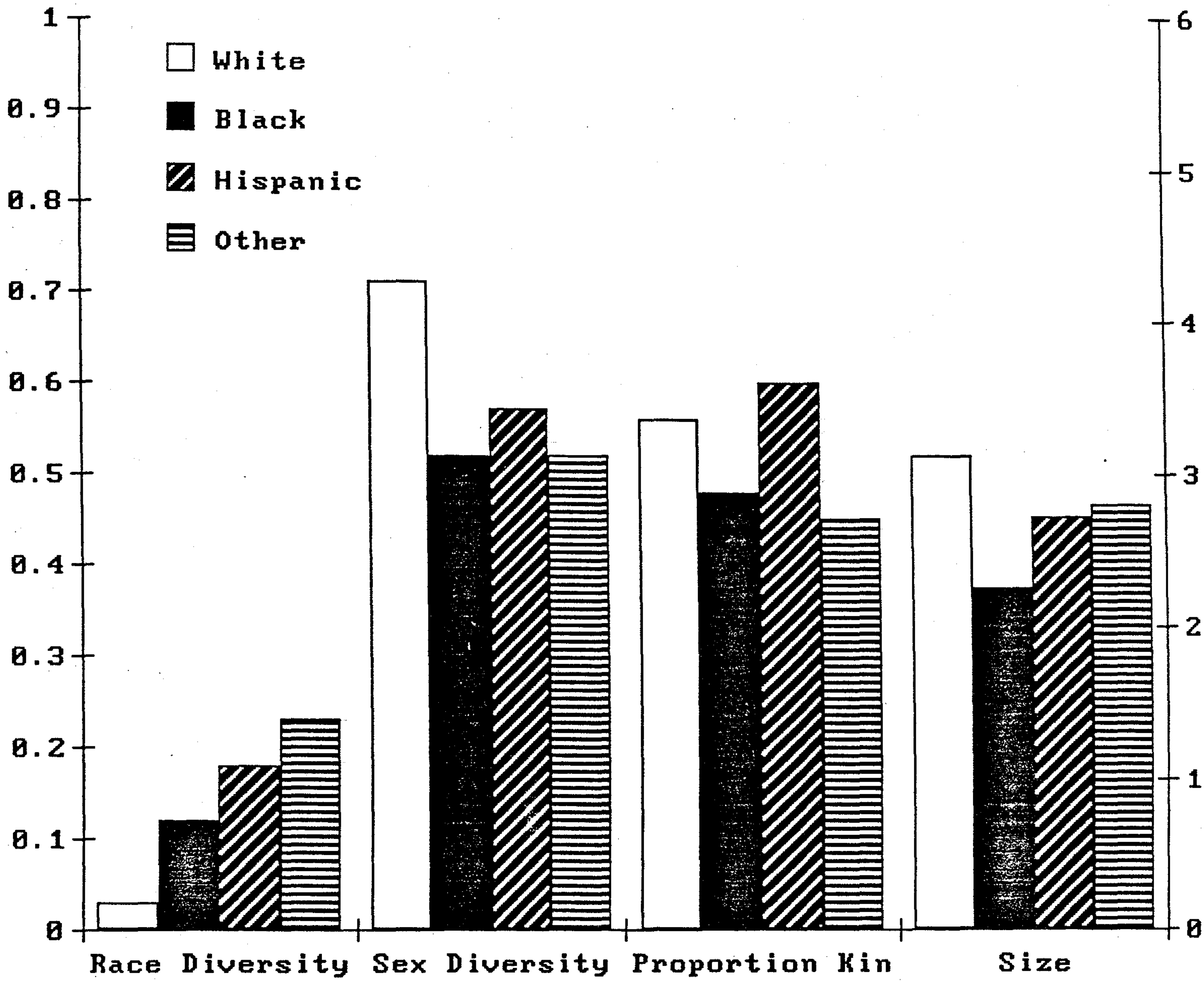
can be reached on the basis of these data since different subgroups have the highest range according to different indicators. Whites have the largest networks (mean size 3.1), blacks the smallest (mean size 2.25); Hispanics and others are intermediate. Similarly, sex diversity is higher among whites than blacks or others, with Hispanics intermediate. Proportion kin is largest in the networks of Hispanics (0.60). Whites (0.56) and blacks (0.48) have networks intermediate in kin composition, and others (0.45) are least likely to have kin alters.

[18] Specifically, of the 1132 persons who are included in the tabulations for educational heterogeneity, 21% finished fewer than 12 years of education, and 22% obtained college degrees or more; while 33% finished high school and 25% have 13-15 years of education. (Percentages total 101% due to rounding error.)

Figure 3. Race Differences in
Network Form



Race/ethnic differences in race/ethnic diversity are worthy of special comment, since they too are consistent with Blau's (1977) proposition about group size and heterogeneity. The mean index of qualitative variation in the race/ethnicity of alters is 0.03 among whites, who constitute 83% of the GSS respondents. It rises to 0.12 for blacks (10% of the respondent pool), to 0.18 for Hispanics (5% of the respondents), and further to 0.23 among others, who are 1.5% of all respondents. The structural constraints of group size identified by Blau are visible even in the highly limited levels of intergroup contact measured in the interpersonal environments of the GSS respondents.

Sex Differences

The measures of network form analyzed here do not differ greatly between men and women. The only significant zero-order sex difference in Table 2 indicates that women's networks contain a proportion kin 0.07 higher than do men's. Sex differences in the structure of interpersonal environments emerge when they are examined in interaction with life course variables such as age, marital status, and the presence and number of children;[19] other studies of sex differences in networks (Fischer and Oliker, 1983; Campbell, 1985) also have found these to be important conditioning variables.

[19] In analyses of variance involving sex, marital status, and age, significant two- and three-way interactions involving sex are found for five of the seven measures of network form examined here (network size and race/ethnic heterogeneity are exceptions). The results are not reported in detail here to conserve space, and because this report is concerned with zero-order subgroup differences.

Conclusion

The GSS survey network data describe relatively small, dense, kin-centered, homogeneous social worlds surrounding Americans. Variability in these indicators of network range is substantial, however, and patterned by respondent characteristics. To the extent that the success of "networking" as an instrumentally oriented pursuit is conditioned on gaining access to diverse others, those best situated to make use of it are the young, middle-aged, and the well-educated.

These data present many opportunities for both substantive and methodological research. The wide variety of potential response variables in the GSS permits network-related research into numerous substantive areas. For instance, levels of individual well-being can be examined as correlates of the availability of social support operationalized in terms of network size or density; the traditionalism of sex role attitudes can be studied in relation to the density, sex composition, and sex diversity of a respondent's interpersonal environment. Methodologically, these data will support research on important issues in network measurement. They will facilitate the development of standardized instruments for the collection of information on the structure and composition of interpersonal environments. They should also foster the construction of high-quality, reliable measures of network characteristics.

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