

SOCIAL NETWORKS, SUPPORT CLIQUES, AND KINSHIP

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Data on the number of adults that an individual contacts at least once a month in a set of British populations yield estimates of network sizes that correspond closely to those of the typical "sympathy group" size in humans. Men and women do not differ in their total network size, but women have more females and more kin in their networks than men do. Kin account for a significantly higher proportion of network members than would be expected by chance. The number of kin in the network increases in proportion to the size of the family; as a result, people from large families have proportionately fewer non-kin in their networks, suggesting that there is either a time constraint or a cognitive constraint on network size. A small inner clique of the network functions as a support group from whom an individual is particularly likely to seek advice or assistance in time of need. Kin do not account for a significantly higher proportion of the support clique than they do for the wider network of regular social contacts for either men or women, but each sex exhibits a strong preference for members of their own sex.

KEY WORDS: Networks; Kinship; Sex differences; Family size;
Support group.

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There has been considerable interest in both the sociological and the anthropological literatures regarding the people with whom individuals interact. The current view emphasizes the fact that an individual lies at the focal point of a number of partially overlapping social networks, each of which is oriented towards a different social context or purpose (Milardo 1988). Thus, an individual may have a number of different sets of friends based on work, leisure activities (such as an interest group or sports club), church, the extended family, and so on. Moreover, the pattern of relationships may change over an individual's lifetime (Larson and Bradney 1988).

It is clear, however, that there are limits to the number of contacts that an individual can maintain over a given period of time. "Small world" experiments in which individuals are asked to send messages to distant parts of the world via a chain of contacts rooted in their circle of personal acquaintances suggest that the number of people on whom any one individual can call for such favors is limited to between 130 and 250 (Killworth et al. 1984). This estimate of the size of an individual's social world is on the same order as that estimated from the size of the modern human neocortex based on a relationship between neocortex size and group size derived from primates (Dunbar 1993).

Many of these individuals, however, are likely to be acquaintances rather than intimate friends. It is widely recognized that this inner circle of more intense relationships plays a crucial role in mediating the individual's interactions with (and place within) the local community (Bott 1971; Milardo, ed. 1988; Mitchell 1969; Young and Willmott 1957). Estimates of the size of this inner circle (the so-called sympathy group) have yielded values on the order of 10–12 individuals (Buys and Larsen 1979). In this case, the estimates were obtained by asking individuals to list all the people whose death they would find personally devastating, but they probably correspond to those people with whom an individual keeps in regular contact. Network sizes estimated from frequency of contact have yielded values ranging from seven in U.S. college freshmen (Hays and Oxley 1986) to 16.6 in young women (McCannell 1988) and around 20 in married couples (Rands 1988). Differences in both the criteria used to define network membership and the stages of the life cycle at which networks are sampled are largely responsible for the differences found between studies. Nonetheless, it is clear that all these values tend to converge on the same group size (10–15 individuals).

One reason for our interest in the size of these groupings derives from the suggestion that language may have evolved to allow the exchange of social information in order to facilitate the integration of relatively

large social groups (Dunbar 1993). There is some evidence to suggest that the constraints in this respect derive not so much from the ability to monitor all individuals in the community but rather from the need to monitor the activities and doings of one's key social allies (principally, presumably, one's family and immediate friends) (Kudo et al. 1995). One aim of this study, then, was to try to determine the size and composition of the inner circle (or network) that might constitute the focus of an individual's social interest.

Kinship is known to play an important role in both human social relationships and the structure of human groups in traditional as well as modern postindustrial societies (see, for example, Firth 1956; Hughes 1988; Keesing 1975). Hames (1979) has shown that Ye'kwana villagers of Venezuela interact more often with individuals who are closely related to them, while Berté (1988) found that among the horticultural K'ekchi' of Central America the availability of a network of kin is an important determinant of the amount of land an individual can cultivate. The extent to which kinship is a consideration in the creation of social networks in industrial societies remains unclear, however, even though interview-based studies suggest that considerable weight is placed on kinship in contemporary European societies (Bott 1971; Young and Willmott 1957).

We examine here the role that kinship plays in determining the composition of an individual's social network in a modern European society. Our main concern is with the circle of friends and relations with whom an individual maintains regular contact. Given that we can identify such a group, we can then ask what role kinship plays in determining its composition. In addition, we examine the size and composition of the inner clique of intimates (the *support clique*) that individuals would normally approach for advice or assistance when in difficulty. We might expect kinship to be an important factor in the selection of support clique members because the opportunity for reciprocal altruism is likely to be much less in situations of advice and/or help than it is with respect to social interaction.

Studies of social networks have tended to focus either on quantitative analyses of network size and structure (Burt 1982; Coleman 1964; Knoke and Kuklinski 1982) or on more descriptive studies of individuals' networks and their role in facilitating social life (Bott 1971; Fischer 1982; studies in Mitchell, ed. 1969 and Milardo, ed. 1988). In general, the more quantitative studies have typically concerned themselves with large-scale structures at the societal level, often with a focus on organizations rather than individuals (e.g., business and political networks) and the functional roles that exist within organizations of this kind. In contrast, studies of personal and support networks have tended to be based on

in-depth interviews with a handful of individuals, with the focus on how individuals relate to their immediate social circles. Our aim here is to provide a preliminary assessment of the size of an individual's network of intimates and the extent to which kin contribute to it.

METHODS

A questionnaire was designed which asked respondents to list the first names of individuals whom they (a) lived with, (b) contacted with varying degrees of frequency (termed their *network*), and (c) relied on for advice and/or help at the personal level (termed the *support clique*), as well as (d) the size of their extended biological family (defined as all individuals related to the subject by $r \geq 0.125$, assuming full paternity certainty). Contacts were defined as social exchanges involving face-to-face, letter, or telephone interaction. Respondents were specifically asked not to include business and professional contacts, unless the individuals concerned were deemed to be personal friends. In responding to (a)–(c), subjects were required to distinguish between relatives and nonrelatives, with the criterion for a relative being limited to full cousins or more closely related individuals. Subjects were asked to list the first names of individuals they contacted daily, twice weekly, weekly, and at least once a month, as well as those individuals they contacted regularly but less than once a month.

Considerable effort has been put into questionnaire design during the past decade (see Milardo 1988, and references therein). The burden of this work has been to suggest that questionnaires that take more than a few minutes to complete and have too many instructions and/or more than 10–12 name-eliciting questions tend to result in loss of concentration. The questionnaire was therefore designed to contain just four sets of questions, each accompanied by a series of boxes to be filled in. The questionnaire was tested on students and refined until it required no more than 5 minutes to complete.

The questionnaire design used a recall procedure rather than asking individuals to list all those whom they actually contacted during a set period of time from receipt of the questionnaire. This approach was largely chosen for speed and convenience. Although recall procedures run a risk that respondents will overlook contacts they have made (see Bernard et al. 1982, 1984), the relatively short time depth used in the present case should tend to minimize this source of inaccuracy. In contrast, prospective questionnaires greatly increase the load on the subject because they require respondents to keep a daily tally of whom they have contacted; as a result, under-reporting by those who lead especially busy lives tends to increase. In addition, they tend to underestimate the

actual network size because individuals may not always be able to contact all their normal interactees during a particular sample period (e.g., because they are away or other unusual circumstances intervene). In order to try to circumvent some of these problems, subjects were asked to say whom they *normally* contacted during a given time period. It was felt that this would reduce both errors of omission and the number of trivial contacts listed (i.e., those casual contacts who were not members of the respondent's circle of friends).

Questionnaires were distributed at five different locations within England and Scotland. These respondents were not chosen to be a representative sample in any conventional sense, but simply to provide a broad sample of subjects of different age, background, and geographical location. In each case, a single assistant was responsible for handing out and collecting completed questionnaires. Each assistant was instructed to tell respondents only that the purpose of the questionnaire was to find out about people's social contacts. They were, however, allowed to help with the filling in of questionnaires if requested to do so. Questionnaires were distributed only to subjects between 18 and 65 years of age who were members of a golf club or staff at a hospital in Lincolnshire, staff at an employment consultancy in Aberdeen, employees at a farm machinery factory in Doncaster, and personal contacts within the London area. With just a few exceptions, only one respondent was sampled per household.

Individuals over 65 years of age were excluded from the sample because they are known to have reduced network sizes owing to greater vulnerability to infirmity as well as deaths among lifelong friends (Blieznier 1988; Brown 1981). Similarly, children and younger teenagers were excluded because their networks are known to be atypical in both composition and stability (Foot et al. 1980; Levinger and Levinger 1986; Thorne 1986).

A total of 155 questionnaires were returned from the 170 given out. The resulting response rate of 91% is high by normal questionnaire standards and can largely be attributed to the fact that in most cases the subjects were themselves known to the assistants distributing the questionnaires. Personal loyalty is thus likely to have been an important factor influencing the completion of questionnaires. Of the returned questionnaires, 54 were excluded from the analysis: the majority had been incompletely (or in a few cases, incorrectly) filled in (mostly failure to identify contacts by sex), but 11 were spoiled in transit or otherwise unreadable and 8 contained too many comments and queries to be considered reliable. So far as we could tell, incomplete and spoiled questionnaires were not biased in favor of any particular category of subject by sex, age, or domestic status. The remaining 101 subjects consisted of 34 men and 67 women. Of these, 24.8% (5 men and 20 women) were single, 50.5% (18 men and 33 women) lived with a partner but did not

have dependent offspring living with them, 21.8% (9 men and 13 women) lived with a partner and dependent children, and two women lived alone with dependent children.

Our concern was to identify the set of primary associates (“friends” in the normal meaning of the term) that an individual has. This is the set of people whose activities and life histories are of sufficient interest to an individual for that person to be willing to make some effort to keep up to date. Rather than ask respondents to specify these individuals using their own criteria, we preferred to use a more objective criterion that could be applied uniformly across the entire sample. The number of contacts was bimodal, with peaks in the weekly and monthly frequency categories. We therefore used the frequency with which individuals were contacted on at least a monthly basis as the criterion for inclusion in a subject’s network. We took the view that individuals who contacted each other less often than once a month were unlikely to remain up to date with each other’s more intimate experiences, and thus fell outside the scope of the present concern.

All statistical tests are two-tailed. Data were log-transformed in order to normalize values for all parametric statistical analyses.

RESULTS

Network Size and Composition

Figure 1 shows the distribution of network sizes in the sample. The mean network size for all subjects was 11.6 (range 0–30, $sd = 5.64$; $N = 101$). The distribution exhibits some degree of bimodality, with peaks at network sizes of 6 and 11–12, suggesting that it may be possible to distinguish between more- and less-sociable individuals. Before we can safely draw this conclusion, however, we need to check that the bimodality is not due to confounding variables such as gender or domestic circumstances.

There was a slight, but nonsignificant, gender difference in network size: women averaged a network of 12.4 individuals ($N = 67$) compared with 10.9 ($N = 34$) for men (Mann-Whitney test, $z = -1.006$, $P = 0.315$). This is largely a consequence of the fact that the distribution of network sizes for women was more skewed (longer tail to right) than that for the men. Modal network size was very similar for the two sexes.

As might be anticipated, the domestic status of subjects did have some influence on their network size. Single subjects had a mean network size of 15.4 (range 7–30, $sd = 6.20$; $N = 25$), compared with means of 11.1 (range 0–25, $sd = 5.55$; $N = 51$) for couples without children at

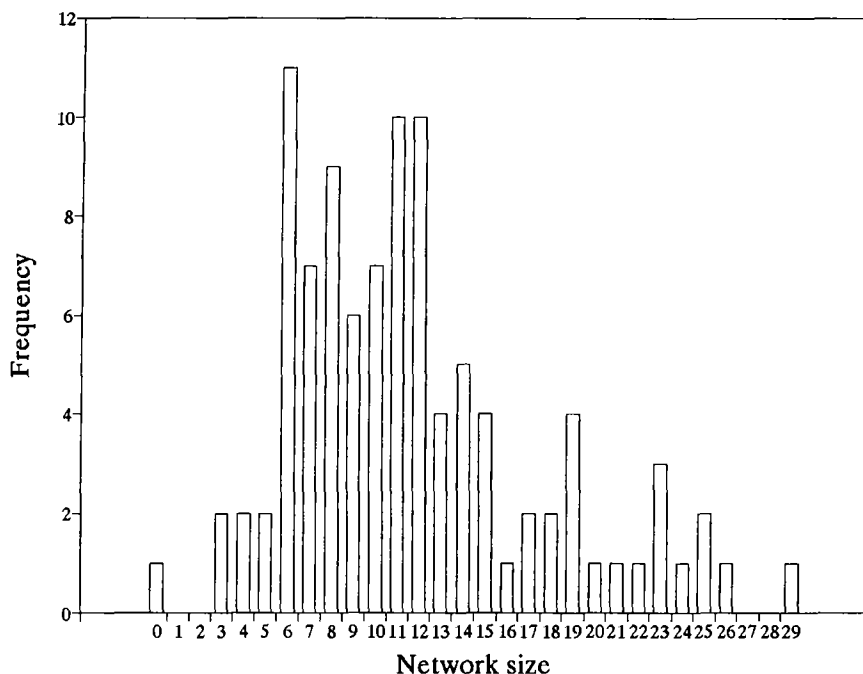


Figure 1. Distribution of network sizes.

home and 8.7 (range 0–19, $sd = 4.16$; $N = 24$) for couples with dependent children (including the two single mothers). However, the variance within each category was considerable, and the differences between them were not significant (Mann-Whitney tests: singles vs couples without children, $z = 0.99$, $P = 0.322$; couples without children vs couples with children, $z = 1.48$, $P = 0.139$). For all three distributions, however, the same pattern is evident: 40.0% of singles had networks of size 6–12 compared with 66.7% of couples both with and without dependent children. The differences are largely in the lengths of the tails on either side of the modal values. Singles had a truncated lower range, whereas couples with children had a truncated upper range, while couples with no dependent children had a more even distribution.

We examined gender differences in the composition of the network using a MANOVA with respondent's gender as the independent variable and the proportions of contacts that were male (as opposed to female) and kin (as opposed to non-kin) as the dependent variables. (For these purposes, kin were defined as individuals related to the subject by $r \geq 0.125$.) This examination revealed that the two sexes differed significantly in terms of the ratio of male to female contacts (mean percent of

network members that were male: 67.7% for men and 30.8% for women; $F_{1,94} = 47.75$, $P < 0.001$), number of female kin contacted (means of 1.88 for men and 3.06 for women: $F_{1,94} = 9.64$, $P = 0.002$), number of male non-kin contacted (means of 5.62 for men and 1.75 for women: $F_{1,94} = 52.81$, $P < 0.001$), and number of female non-kin contacted (means of 1.65 for men and 5.51 for women: $F_{1,94} = 57.97$, $P < 0.001$), but not in terms of the number of male kin contacted (means of 1.74 for men and 2.06 for women: $F_{1,94} = 0.14$, $P = 0.705$). In summary, women had a larger number of female friends and relatives in their networks, whereas men had a larger number of male friends, with kin being significantly less important for men than for women.

There were no differences in the number of non-kin contacted monthly (means of 7.26 for men and 7.25 for women), or in the proportion of non-kin contacted at least once a month who were contacted at least once a week (means of 39.3% for men and 43.9% for women: Mann-Whitney test, $z = 0.99$, $P = 0.327$). However, there was a significant difference in the proportion of all monthly non-kin male contacts that were contacted at least weekly (means of 81.4% for men and 22.8% for women: Mann-Whitney test, $z = -4.78$, $P < 0.001$).

There was no difference between the sexes in the proportion of their extended families (defined as the total number of living individuals related to the subject by $r \geq 0.125$) who were contacted monthly (means of 29.9% out of an average family of 12.1 members for men and 36.3% out of an average family of 14.1 for women: Mann-Whitney test, $z = 0.18$, $P = 0.857$). Although men did not contact more male kin than women did in absolute terms, they did contact a higher proportion of the males in their extended families than women did (means of 48.8% of 3.6 male kin for men vs 40.2% of 5.1 male kin for women; Mann-Whitney test, $z = -2.67$, $P = 0.008$).

Overall, kin accounted for 37.5% of the network, a figure that is almost certainly significantly higher than would be expected if people chose their network members at random either from the local population as a whole or from the subsample of that population whom they know by sight. Unfortunately, we cannot test the significance of this because we do not have any appropriate values to use for the null hypothesis. Nonetheless, kin are likely to account for a relatively small proportion of all the individuals that any one person knows. If we take the lower more conservative figure of 150 acquaintances from the "small world" experiments (Killworth et al. 1984) and the average extended family size obtained in this study of 12.1 for men and 14.1 for women (see above), we would expect only about 8.1% and 9.4%, respectively, of network members to be kin if chosen at random. On this basis, the observed proportion is clearly significantly biased in favor of kin for

both sexes: the proportion of kin in the network is greater than the expected value for 32/34 men ($\chi^2 = 26.47$, $df = 1$, $P < 0.001$) and for 63/66 women (one woman with a network size of 0 was excluded) ($\chi^2 = 54.55$, $df = 1$, $P < 0.001$).

Network Size and Kin Group Size

If the number of individuals who can be maintained in a close social network is limited either by the time available for interaction (e.g., Dunbar 1992) or by constraints imposed by the processing capacity of the cognitive machinery (e.g., Dunbar 1993), then we might expect there to be an inverse relationship between total network size and the size of the family. In other words, individuals who have large extended families may be more likely to confine their social contacts to members of their family circle than are those individuals with fewer close relatives to choose from.

Figure 2 suggests that there is a weak negative relationship between the numbers of kin and non-kin contacted at least monthly (Pearson's $r = -0.138$, $t_{99} = 1.37$, $P > 0.05$). One likely reason why the correlation is

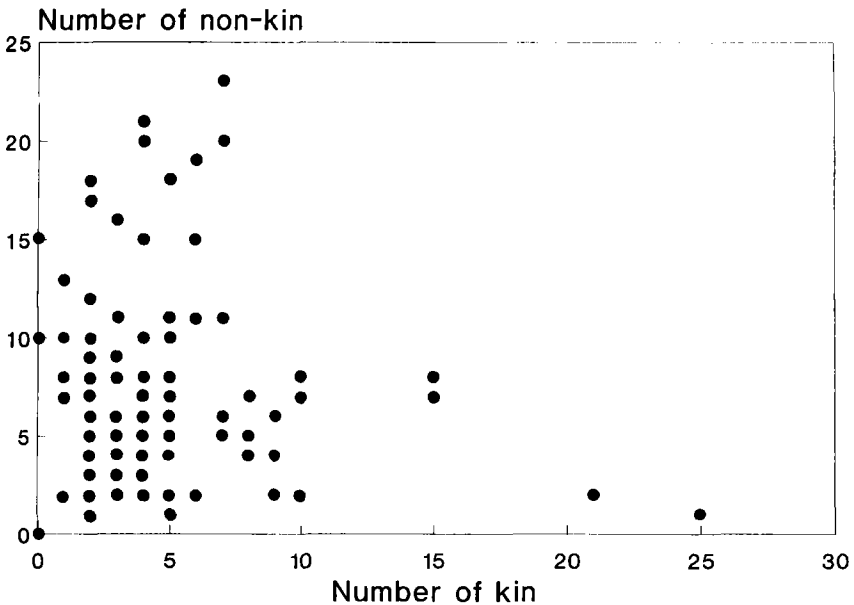


Figure 2. Number of non-kin contacted at least once a month plotted against the number of kin contacted at least once a month.

poor is the large number of individuals in the lower left quadrant (who contact only a small number of both kin and non-kin). In other words, it may be that for relatively asocial individuals whose network size is well below the cognitive limit, the number of kin does not restrict the number of non-kin contacted. If all subjects who contacted fewer than 10 individuals are excluded, then there is a highly significant negative correlation between numbers of kin and non-kin contacted ($r = -0.554$, $t_{58} = -5.06$, $P < 0.001$).

One reason for this seems to be that individuals from large families tend to contact more kin (Figure 3: Pearson's $r = 0.397$, $t_{99} = 4.30$, $P < 0.001$). In contrast, the number of non-kin contacted is not significantly related to the size of the family (Figure 4: $r = -0.032$, $t_{80} = -0.32$, $P > 0.05$; for subjects with networks larger than nine members: $r = -0.096$, $t_{58} = -0.74$, $P > 0.05$); rather, it may be related more closely to individuals' respective opportunities for interaction outside the family.

These results suggest that people place a premium on maintaining family contacts and only extend their network of contacts beyond the family if they have spare capacity in their total network size once their key family contacts have been exhausted. This seems to be independent

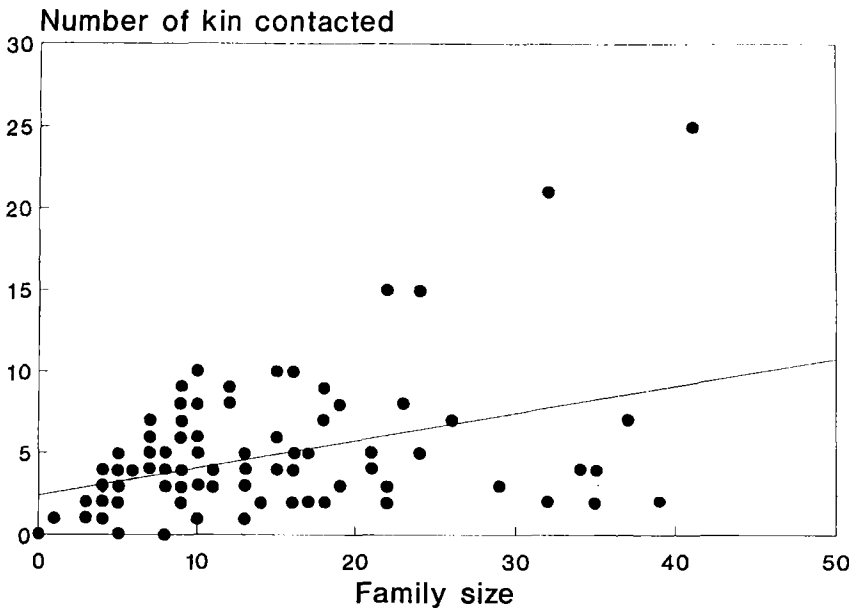


Figure 3. Number of kin contacted at least once a month plotted against total family size.

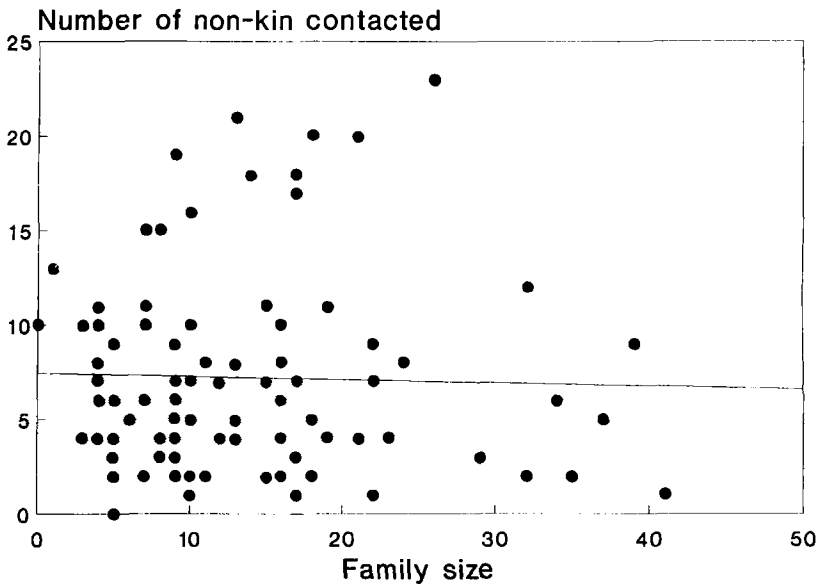


Figure 4. Number of non-kin contacted at least once a month plotted against total family size.

of the distribution of degrees of kinship within the family (i.e., kinship density): number of kin contacted is not related to subject's mean degree of relatedness, r_{mean} , to all the members of his/her extended family (Pearson's $r = 0.092$, $F_{1,99} = 0.47$, $P = 0.496$). In other words, families with a higher proportion of closely related individuals (e.g., siblings) do not show any tendency to interact more frequently with each other than those with a lower proportion (e.g., fewer siblings, more cousins). Note, however, that individuals do not necessarily interact with *all* the members of their extended family. On average, men contacted only 30.0% of the members of their extended family at least once a month, while women contacted 36.6% of their family members.

Kinship and the Support Clique

The mean number of individuals from whom support would be sought was 4.72 (range 0–14, $sd = 2.95$; $N = 101$). There was no difference in the sizes of the support cliques of men and women (means of 4.47 for 34 men and 4.85 for 67 women; Mann-Whitney test, $z = -1.18$,

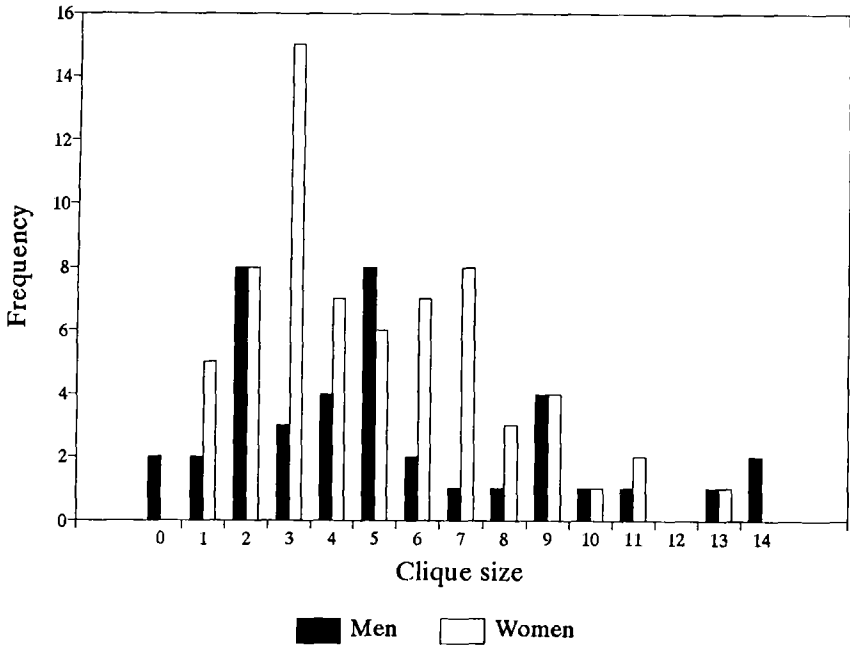


Figure 5. Distribution of support clique sizes.

$P = 0.236$). Figure 5 suggests that, as with the network size, the distribution is bimodal with peaks at 2–3 and 5. Disaggregation of the data for men and women yields a similar picture, but with slightly offset peaks: men at 2 and 5, women at 3 and 7. As with the distribution of network sizes, the peaks in the size of the support clique may correspond to contrasts between more- and less-social individuals. Some evidence to support this suggestion comes from the fact that the size of the support clique is linearly related to total network size (Figure 6: Pearson's $r = 0.427$, $t_{97} = 4.651$, $P < 0.001$) and represents an average of 39.8% of the individual's total contact network. There seem to be no conspicuous differences between the sexes in this respect.

Of the support clique, 22.6% were typically female kin, 33.5% female non-kin, 17.1% male kin, and 26.8% male non-kin. The proportion of support sources that were kin does not differ from the proportion of total monthly contacts (i.e., network size) that were kin (Wilcoxon matched pairs tests: for men, $z = -0.18$, $P = 0.860$; for women, $z = -0.62$, $P = 0.536$); nor does the proportion of the support clique that was of the opposite sex differ from the proportion in the total network (Wilcoxon tests: for men, $z = -1.172$, $P = 0.086$; for women, $z = -1.91$, $P = 0.056$). This sug-

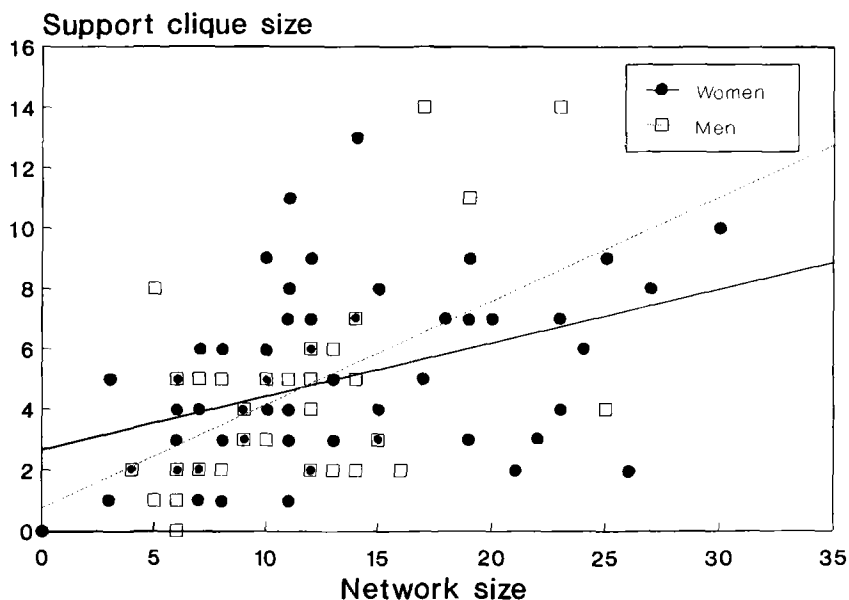


Figure 6. Support clique size plotted against total network size.

gests that, overall, the support clique is chosen on the same basis as the wider network of friends, and it appears to be a more or less random sample of that wider network. Nonetheless, on average, 40% of support clique members were close kin: the proportion of kin in the support clique was higher than would be expected if they were drawn at random from an acquaintances network of about 150 for 24/33 men and 54/66 women ($\chi^2 = 6.82$ and 26.73 , respectively; $df = 1$, $P < 0.01$ in both cases).

As with total network size, both men and women tended to select the two sexes of kin with about equal frequency as support sources (mean percentage of kin support sources that were male: 49.1% for men and 40.6% for women). However, among non-kin sources of support, men and women showed striking preferences for their own sex (mean percent of males among non-kin support sources: 26.6% for women and 82.5% for men, Mann-Whitney test, $z = 32.74$, $P < 0.001$).

DISCUSSION

We have shown that the number of individuals contacted on a regular basis (i.e., at least once a month) conforms closely to that obtained from estimates of the size of "sympathy groups." In selecting the members of

this group, both sexes contact kin disproportionately more often than they do non-kin; as a result, the number of kin available ultimately limits the number of non-kin that can be included in the network. Women contact kin more often than men do, while both sexes exhibit a strong tendency for contacts with their own sex to be more common than contacts with the opposite sex. The inner clique of individuals from whom support or advice might be sought tends to mirror these preferences rather closely.

These results are generally in line with those reported by both Rands (1988) and Booth (1972) for North American populations. Booth (1972) noted that while there were no differences in network size between men and women, there did seem to be a sex difference in social participation: men were more socially active than women, but women maintained stronger emotional ties with their contacts and had more ties with kin than men did.

Our results suggest that the sizes of both networks and support cliques are bimodal. Although part of the difference between small and large networks can be attributed to the reproductive status of individuals, it seems that there is some residual variation in network size that is due to differences in sociability. Although network size is known to vary with life history stage (Larson and Bradney 1988), the possibility remains that some of the variance in network size is due to differences in personality. We are currently exploring this possibility in more detail.

The preference for kin over non-kin seems to be in line with what would be expected from the theory of kin selection (that individuals will prefer to associate with and/or be altruistic towards kin when all other things are equal). In a now classic study of a working class community in the east end of London during the 1950s, Young and Willmott (1957) found a similar tendency for male and female networks to be distinct and largely sex-specific. They also noted that kinship played a particularly important role in female networks, with mothers and daughters forming what amount to mutually supportive alliances. Bott (1971) also reported a tendency for maternal relatives to be more important than paternal relatives in the social lives of London middle-class families. The present study provides quantitative support for these largely informal studies; it also suggests that these effects have remained stable despite the enormous changes that have taken place in British society over the past half century.

These results appear to be at odds with the view that human societies are typically patrilocal (e.g., Foley and Lee 1989; Levi-Strauss 1969; Rodseth et al. 1991), such that in some cases women's kinship bonds are weakened or even severed. One possible reason why female kinship bonds may become relatively more important in modern industrial societies is that groups of males are no longer able to monopolize resources

or other sources of investment that women need for successful reproduction. In societies where male kin-based alliances allow men to monopolize such services, women may be forced to choose between these services and their own kinship ties. In the absence of monopolizable services, women may find that their own kin-based alliances are more valuable and men may then be less inclined to continue servicing their own kinship networks.

The finding that kin do not play a more prominent role in the support clique than they do in the friendship network was, however, unexpected. That they do not might reflect the fact that, in modern industrial societies, individuals often live too far from their immediate kin to be able to use them for help in times of imminent crisis. Unfortunately, we did not ask individuals whether they lived near their kin (our concern was simply with whether or not they *contacted* them), so we are unable to determine whether those who preferred friends as sources of help did so because they lacked nearby kin. Although the ethnographic literature suggests that kin are still widely seen as a primary source of unstinting support because "blood is thicker than water" (see, for example, Bott 1971; Dunbar et al. 1995; Larson and Bradney 1988), the mobility typical of modern society may make it difficult for individuals to be as intimate with geographically distant relatives as they are with unrelated friends whom they see regularly. Indeed, Bott (1971) noted a tendency for kinship ties to weaken when relatives moved away (especially when they were perceived as doing so in order to better themselves socially).

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