THE RELATIONAL STRUCTURE OF FORMAL ORGANIZATIONS: SELECTION CRITERIA AND EMPLOYEE RESPONSES*

Michael K. Noch, Assistant Professor of Business Administration

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Summary:

Recent structural analyses of formal organizations have tended to view structure in terms of organizational level scores on such dimensions as formalization, centralization, standardization, and specialization. In the process a great deal of earlier work on organizational structure plus research in social psychology, anthropology, and communication has been ignored. This paper recasts structure in relational network terms and identifies several structural determinants of employee responses (satisfaction). As expected, employee positions in work, interaction and friendship structures are differentially associated with ascribed (race and sex) and achieved (education and seniority) characteristics. Racial homogeneity and the heterogeneity of seniority of employees' work relationships are associated with employee satisfaction, as is the degree of homology (overlap) between employees' work and interaction relationships. It appears that work-related relationships are more important than socially-based relations in determining employee satisfaction. It is concluded that the network perspective on organization structure provides an important but overlooked tool for understanding the antecedents and consequences of individual integration into social systems.

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The Relational Structure of Formal Organizations: Selection Criteria and Employee Responses

The last fifteen years of research on organizational structure has focused considerable attention upon formal characteristics such as formalization, standardization, and centralization. (Blau, Heydebrand and Stauffer, 1966; Blau, 1958; Pugh et al., 1968; Blau and Schoenherr, 1971; Child, 1972; Blau, 1973). This work stressed quantifiable characteristics and generally used large-scale comparative methods. In the process, much earlier work documenting the importance of the informal structure (e.g., Whyte, 1948; Homans, 1950; Jacobson and Seashore, 1951; Massarik, Berkowitz, and Moyer, 1953; Lipset, Trow, and Coleman, 1956; Gouldner, 1958; Dalton, 1959; Roy, 1960) tended to be overlooked. Simultaneously, the conceptualization of structure itself underwent a subtle but significant change. Previously conceived as patterns of relationships among individuals or groups, structure in formal organizations came to be viewed by organizational sociologists in terms of scores on predetermined dimensions thought to characterize bureaucracies.

While this perspective became pervasive among organizational sociologists, social psychologists continued to make progress toward understanding how patterns of relationships among individuals are associated with attitudes, perceptions, and behavior (Newcomb, 1956; 1961; Cartwright and Harary, 1956; Festinger, 1957; Heider, 1958; Harary, Norman and Cartwright, 1965; Byrne, 1971; Triandis, 1977). Simultaneously, anthropologists, after Radcliffe-Brown (1952), began formulating what they called a network perspective on social relations in order to overcome some of the limitations of the structural functionalist paradigm.
(Mitchell, 1969; Barnes, 1972; Boissevain and Mitchell, 1973; Whitten & Wolfe, 1973). Communications researchers have investigated interpersonal and inter-group relations in order to understand group and organizational behavior (Rogers and Rogers, 1976; Farace, Moje, and Russell, 1977). Sociologists studying occupations (White, Boorman & Brieger, 1976), communities (Laumann, 1973; Laumann and Pappi, 1976) and interorganizational relations (Rogers, 1974; Turk, 1977; Aldrich, 1979) successfully have applied such a perspective. Mullins (1973) has argued that the network perspective constitutes an entire school of sociological thought. The relational perspective has been applied to study the structure of formal organization (e.g., Jacobson & Seashore, 1951; Weiss & Jacobson, 1955; Davis, 1963; Friedell, 1967; Payne and Pheysey, 1971; Tichey, 1973; Evans, 1975; O'Reilly & Roberts, 1977; Schwartz and Jacobson, 1977), but these studies are the exception rather than the rule. Little recently has been added to what we know about how formal and informal relationships affect people at work.

The research reported here has been designed to locate individuals within networks of social relationships at work and to assess the impact of these positions on the degree to which employees are satisfied or dissatisfied. Some propositions are generated which predict determinants of employees' positions in networks of work, interaction, and friendship relations. Other propositions specify how different positions are likely to lead to greater or lesser satisfaction. These propositions then are tested against data gathered from 522 employees of an assembly and packaging plant. The data document previously untested relationships between social structure and employee responses. In addition the results provide
evidence for the utility of a relational approach to social structure. They suggest that traditional analyses of the structure of organizations could be supplemented by one which views structure as composed of overlapping sets of interpersonal networks.

**Formal Structure, Social Structure, and Employee Satisfaction: Some Propositions**

Most of the research which takes the network or relational approach to structure considers a single type of relationship (e.g., political: Barnes, 1969; work: Kapferer, 1969; friendship: Laumann, 1973; kinship: Boswell, 1969; communication: Coleman, Katz, and Menzel, 1956). Some investigations attempt to assess the degree of homogeneity among holders of similar positions in the structure, because homogeneity is thought to have implications for system functioning. The degree of individual similarity and dissimilarity has been studied extensively (e.g., Rogers and Snow, 1970; Simons, Berkowitz, and Moyer, 1970). Similarities and differences across individuals are central to formulations of the process of interpersonal attraction (Newcomb, 1961; Byrne, 1971). Sociologists have concerned themselves with homogeneity and heterogeneity. To the extent that parameters of social structure (e.g., race, sex, education: Blau, 1977) converge to determine individuals' positions in the social structure, the system is thought to be poorly integrated and thereby unstable. For example, if the higher positions in the status structure are all allocated to individuals of the same race, sex, or education, little cross-fertilization is likely to occur. Groups of intermediate or even inconsistent status are unlikely, and change may come about more through periodic mass movements than through gradual or incremental adjustments (Kornhauser, 1959).
Sin these networks composed of status, communication, kinship, or friendship relationships only partially describe the system of relations which surround members of organizations. These networks must be considered simultaneously if a more complete picture is to emerge. Geutzkow (1965) has suggested that organizations may be viewed as being composed of authority relations, and relations characterized by the exchange of information, expertise, friendship, or status. These networks of relations operate simultaneously and may be only partially homologous (overlapping). People who are central in one net may be peripheral in others. The patterns of linkages which characterize one net may only partially map onto the links which characterize another. Some dyads may be directly connected in all nets; their relationships are therefore “multistranded” (Mitchell, 1969), “complex” (Gluckman, 1962:27), or “polythetic” (Farce and Mabee, 1977). On the other hand, other dyads may be related in quite different ways in different nets. In this case there would be little “interpenetration” (Blau, 1977) across nets.

Several researchers have distinguished among work, friendship and interaction relations and have dealt with them simultaneously. Homans (1950) suggests that work relationships can lead to interaction and thereby to friendship. Whyte (1969:225) argues that work relations can lead to interaction and that interaction can lead either to friendship or to hostility. His perspective is consistent with Newcomb (1956) who found that similarity had to precede proximity for friendship to emerge.

Despite theoretical distinctions among different networks, several empirical studies report a high degree of convergence across different types of relationships (Bonney, Hoblet, and Dreyer, 1953; Kipinis, 1957;
Berkun and Meeland, 1958; Hill, 1963). Those chosen as work partners therefore might be expected also to be selected as interaction and as friendship choices. Work relationships, however, tend to be assigned. They are seldom voluntary. Likewise, those with whom one interacts in the work setting are likely to be determined as much by organizational factors such as reporting procedures, shift assignments, and workflow as by personal preference. Two of the more established relationships in social psychology, those between proximity and friendship choices (e.g., Festinger, Schechter and Back, 1950) and between interaction and friendship choices (Weick, 1969:14), therefore may hold less strongly in work settings than in situations where relations are more voluntary. The degree of convergence or homology across work, interaction, and friendship choices, therefore, is likely to be less in formal organizations than in other settings, and the interplay among these three types of social networks may be an important determinant of how well or poorly employees are integrated into the organization.

It is possible to view the degree of homology across different networks of social relations as having an impact similar to that of homogeneity within nets. Network homology may result in more efficient and effective communications, because of the high degree of redundancy in relationships across different types of networks. Overlaps between work and friendship relations or between friendship and interaction relations also can facilitate cooperation and mutual understanding. However, homology across social networks also may be costly. It can constrain change. Because of the redundancy characteristic of homologous networks, new inputs are less likely. Also, since different types of
relationships merely replicate one another, there are only a limited number of channels through which problems can be solved or dissatisfactions expressed. A system with less interpenetration, on the other hand, might have a great number of alternative routes available. There will be people without power who have recourse to expertise. There will be people without status who frequently communicate with those who do. Such systems may be more conducive to incremental change and thereby be less vulnerable to more revolutionary alterations.

Homogeneity across individuals in networks and homology across networks may be associated with system functioning (positively or negatively) and thereby with employee responses (satisfaction). It remains to be seen whether all characteristics and all types of networks are equally important.

The relationship between individual homogeneity and attraction has been well established in social psychology. However, it is not at all clear that all individual attributes are equally salient (Newcomb, 1956). Homogeneity on some characteristics may lead to attraction while homogeneity on others may be irrelevant. Race, sex, and education frequently are identified as relevant parameters (Lindsey and Byrne, 1968; Byrne, 1971; Byrne and Griffitt, 1973; Triandis, 1977). These traits distinguish among individuals who share beliefs and values and who attribute similar meanings to events (Rokeach, 1960; Byrne and Wong, 1962; Duck and Spencer, 1972). Relations among individuals of the same sex or race therefore are likely to be more rewarding (Nelson, 1965; Byrne and Clore, 1970; Byrne and Griffitt, 1973). They also are likely to facilitate social comparison processes (Festinger, 1954).
Race, sex, education, age or other individual attributes, however, are not likely to be accurate indicators of beliefs or values under all conditions. Likewise, homogeneity along these lines may not be rewarding under all circumstances. Characteristics such as race, sex, education and age may be common precisely because they apply to a wide variety of situations. Even these, however, are unlikely to be universal. The social psychology literature unfortunately has little to say concerning the relative salience of these different traits.

Sociologists who deal with this problem often seek to identify attributes of individuals which are associated with different positions in social structures. They distinguish between ascribed traits such as sex and race and achieved traits such as education and experience. Achieved characteristics are likely to be more salient than ascribed traits in situations which place greater importance on individual skills and performance. Moreover, formal organizations are characterized by a functional division of labor. Differences among people (organic solidarity) may outweigh similarities (mechanical solidarity) as the basis for interpersonal attraction (Durkheim, 1933). A sociological perspective, therefore, provides a distinctive addition to the social psychological prescription that similarity breeds attraction.

Homogeneity of ascribed traits may facilitate efficient communication and mutual understanding for all types of relations. This may be particularly important for networks of friendship relations. These relations direct and channel social comparison processes. Individuals are likely to select their friends on the basis of traits which indicate shared values, beliefs, and meanings. They also are likely to be satisfied to the extent
that homogeneity along these dimensions is realized. This homogeneity in the case of work relationships, however, may be costly. Communication channels would become redundant, limiting variety and new inputs. The system of work relations would be inflexible, and needed change would be constrained. Effective division of labor would be difficult since there may be insufficient variation in ability and skills. Employers, therefore, are likely to make assignments of work relationships on the basis of achieved criteria such as education and seniority, and employee satisfaction may be a function of the extent to which heterogeneity rather than homogeneity along these lines is achieved.

Selection criteria for interaction relationships are somewhat more difficult to specify. These networks are based upon communication behavior rather than affect (friendship networks) or the organization of work (work networks). It seems plausible to expect that ascribed criteria will apply to the extent that the content of the interaction is social and that achieved criteria will apply to the extent that the content is work-related. Likewise, individuals' satisfaction should be a function of ascribed homogeneity of social interaction networks and of achieved heterogeneity of work-based interaction networks.

These expectations along with those presented earlier may be formally stated as follows:

Selection Criteria for Different Networks:

\[ H_1: \] Employee sex and race will be associated with membership in different friendship groups.

\[ H_2: \] Employee education and seniority will be associated with membership in different work groups.
**H₃:** The factors associated with membership in different interaction groups will be a function of the content of communication. Sex and race will play a role to the extent that the content is social, and education and seniority will play a role to the extent that the content is work-related.

**Determinants of Employee Satisfaction**

**H₄:** Employees will express satisfaction to the extent that they are in friendship groups which are homogeneous with respect to ascribed characteristics such as race and sex.

**H₅:** Employees will express satisfaction to the extent that they are in work groups which are heterogeneous with respect to education and seniority.

**H₆:** Employees will express satisfaction to the extent that they are in racially or sexually homogeneous social interaction groups or in technical interaction groups which are heterogeneous with respect to education and seniority.

As noted earlier, homology across networks may have an effect similar to that of homogeneity within networks. Networks of relationships which simply replicate each other are likely to narrowly constrain information flow. Networks with no overlap, however, may be unmanageable. People would not interact or form friendships with their work partners. Interaction among friends would be restricted. Unlike the impact of homogeneity within networks, therefore, the impact of homology on employee satisfaction is likely to be curvilinear. In moderate amounts, it is likely to facilitate satisfaction. Too much or too little, however, may inhibit coordination or flexibility.

As discussed earlier, it is unlikely that there would be too much homology across networks in formal organizations. Employees may wish to work and interact only with their friends; however, it is in management's interest to insure that work and interaction relations are determined by such things as the workflow, employee abilities, and formal reporting procedures. For
all practical purposes, therefore, the degree of overlap across networks most likely will range from very little to a moderate amount. Relationships between network homology and employee satisfaction therefore may be expected to be positive.

This expectation is consistent with previous research. Smith (1963) asked subjects to rate others on the basis of liking, on the extent to which they were leaders, and on the quality of their ideas. Subjects reporting the greatest degree of overlap among those selected for the three categories reported greater attraction to the group. Husband (1940), Van Zelst (1952a, 1952b), and Bjerstedt (1961) reported that work groups which were designed to include friends showed higher levels of productivity. To the extent that productivity leads to satisfaction (Lawler and Porter, 1967), such overlapping could lead to more positive employee attitudes.

The degree to which at least a moderate degree of overlap across different pairs of networks is associated with employee satisfaction would support three complimentary theoretical positions. First, association between satisfaction and overlap between work and interaction choices would suggest that exigencies of work are important determinants of employee attitudes. Employees who feel restricted from talking to those with whom they work (perhaps because of impediments such as high noise levels, or physical barriers) would not be in an advantageous position to manage work related interdependencies. Second, association between satisfaction and overlap between friendship and interaction relations would suggest that social factors are important determinants of employee attitudes toward the organization. Simply put, those who are restricted
from talking with their friends or who have difficulty making friends with those with whom they interact may feel less positive toward the organization than those who are not so constrained. Finally, association between satisfaction and overlap between work and friendship relations would suggest that the interface between social factors and work exigence is an important determinant of employee attitudes. Those who are able to form friendships with their fellow workers (or are assigned to work with their friends) may be more positive toward the organization than those who are unable to form such friendships (or who are not assigned to work with their friends). This and the previous two hypotheses may be more formally stated as follows:

H₇: Employees who work with their friends will have more positive attitudes toward and perceptions of the organization than employees who do not work with their friends.

H₈: Employees who interact with those with whom they work will have more positive attitudes toward and perceptions of the organization than employees who do not interact with those with whom they work.

H₉: Employees who interact with their friends at work will have more positive attitudes toward and perceptions of the organization than will employees who do not interact with their friends at work.

**Summary**

Hypotheses 1-9 specify a general model which identifies criteria for selection into different positions in social networks and several structural determinants of employees' attitudes toward the organization. It posits that new employees will be attracted to similar others once they enter the organization. Friends will be selected on the basis of their presumed attitude or belief similarity. Indicators of this similarity will be ascriptive characteristics such as sex and race. Fellow
workers will be assigned rather than chosen and will be determined on the basis of achieved criteria such as education and seniority. Interaction partners will be homogeneous by race and sex to the extent that communication is social and homogeneous by education and seniority to the extent that communication is work-related.

Once primary groups are formed, ascriptive homogeneity of friendship and social interaction groups will lead to employee satisfaction by facilitating communication and social comparisons. Heterogeneity in achieved traits among members of work groups or task-based interaction groups will lead to employee satisfaction by facilitating cooperation and the division of labor. Finally, the frequency of social expression made possible by overlaps between friendships and interaction groups will lead to positive attitudes toward the organization. Overlaps between work and interaction groups will stimulate positive attitudes because such overlap will facilitate task coordination. Overlap between friendship and work groups will lead to more positive attitudes, because it harmonizes social and work relations.

The Study

Hypothesis 1, 2, 4, 5, 7, 8, and 9 were tested against data gathered from 522 employees of an assembly and packaging plant. Hypotheses 3 and 6 require that the content of communications passing through the network of interaction relations be identified. Only content-free interaction relations were identified; however, it was possible to identify selection criteria for these relations and, as will be seen, to speculate about the importance of content as a determinant of criteria for selection into interaction groups.
Patterns of social relations were well established in the plant. It had been in operation at the site for thirty years, and many employees had known each other for this entire period. There were many family ties established through employee marriages and selective hiring. Consistent patterns of interaction relationships were evident in the seating behavior in the lunchroom. White and Mexican American males ate at separate tables from White and Mexican American females. Blacks of both sexes ate together. The seating behavior also mirrored work group identification. Assemblers, mostly males, generally ate together and packagers, mostly females, ate together. Two exceptions to this pattern were that supervisors from different work areas often ate together and Blacks from all areas, levels, and of both sexes ate together.

Interaction relations, of course, were not confined to the lunchroom. Employees who worked together could interact, but this often proved to be difficult. The noise level in the plant precluded all but face-to-face communication, and conveyor belts, walls, and machinery separated employees on the shop floor. There also were rules limiting interaction with trainees. Work relationships, therefore, were relatively distinct from those based upon interaction.

Friendship networks also were likely to be distinctive. Many of the more senior employees had been friends since the plant began operation. Yet there had been many transfers across departments. Even within departments, employees were moved from line to line and from shift to shift. Thus, friendships were as likely to exist across work groups as within them. Patterns of interaction observed in the lunchroom, moreover, did not reflect daily work assignments. With the exception of shift assignments,
seating behavior remained fairly constant despite alterations in work activities. The plant, therefore, offered an excellent opportunity to study the interplay between work, friendship, and interaction networks.

Groups of friendship, work, and interaction partners were identified using a procedure developed by Richards (1975). This procedure identifies groups on the basis of matrices of sociometric choices. The second part of the research task, measuring employee satisfaction, was accomplished using procedures and scales developed for the Michigan Organization Assessment Package (Seashore & Mirvis, 1978).

**Identifying Positions in Social Networks.** Employees in the organization were given the opportunity to complete a questionnaire in which they were asked to list (1) the names of those with whom they worked most closely day-to-day; (2) the names of those with whom they most frequently interacted, and (3) the names of those whom they felt closest to as friends. This questionnaire was filled out by 522 of the plant's 756 employees, a response rate of 68%.

Richards' algorithm (1975) uses matrices of sociometric choices together with weights describing the importance or salience respondents assign to each link. The criteria for identifying distinct groups are as follows:

1. There must be at least 3 members.
2. Each member must have at least 50% of his or her choices be with other members of the same group.
3. There must be some path, lying entirely within the group, from each member to each other member.
4. There may be no single individual which, when removed from the group, causes the rest of the group to fail to meet any of the above criteria.

5. There must be no single link which, if cut, causes the group to fail to meet any of the above criteria.

The three types of networks identified by Richards' procedure showed distinctive patterns of relationships. The groups and their interconnections are diagrammed in Figures 1-3. Groups are numbered and located within their respective departments. Arrows among groups represent sociometric choices between employees in one group and employees in other groups. These "boundary spanners" are represented by numbers within the circle defining their group. The work group network is densely interconnected within departments but only loosely linked between departments. This reflects the administrative organization of the plant which set up work group identification orthogonally to the flow of work dependencies. Employees in identical departments were physically placed in a line across each of seven conveyors. The extent of interconnections among work groups within departments is not surprising, since work group assignment was often done on a week-by-week basis. Consistencies in selection of work group members reflects weekly job assignments which tended to maintain fairly stable work groups. In all, there were 248 work groups members. In the friendship network there were 104 group members and the interaction network contained 80 group members.

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Groups varied considerably in size, and some analyses required several members per group. Eight members was taken as the cutoff point, and work groups 6, 7, 10, 13, 14, 21, 26, and 28; friendship groups 5, 9, 11, and 23; and interaction groups 4, 16, 19, and 23 met this criterion. Unless otherwise stated, analyses of group differences are based upon these groups.

Measuring Individual Perceptions. The dependent variable chosen for this study was developed from a set of satisfaction scales generated by the University of Michigan's Survey Research Center (Seashore & Mirvis, 1978). The measures were included in the questionnaire filled out by the 522 employees. Average interitem correlations, and correlations among the satisfaction scales are presented in the appendix along with measures of the demographic variables used in the study. Because of the high degree of association among the measures of employee satisfaction, they were combined in linear fashion to provide a general measure of satisfaction.

Results

Correlations among demographic variables are presented in Table 1. They reveal that males tended to have slightly greater education than females. Blacks tended to have more education and more seniority than non-Blacks. More senior people tended to be less well educated.

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Correlates of Membership in Different Friendship, Work and Interaction Groups. Membership in each of the four friendship groups varied significantly by sex ($X^2 = 20.01; p < .001$) and by race. Friendship groups, however, also varied on average education (ANOVA $F = 3.10; p < .03$). Friendship groups did not vary in average seniority. Work groups, as expected, varied considerably in average education (ANOVA $F = 5.19; p < .0001$) and in average seniority (ANOVA $F = 13.30; p = .0001$). Work groups, however, also varied by sex and race. It seems that these ascribed characteristics were perhaps as important as education and seniority in determining work group assignments.

Membership in interaction groups was not significantly associated with either the level of employees' education or with their seniority. Race and sex, however, were associated with interaction group membership.

Dimensions composed of weighted linear combinations of employees' seniority, education, race, and sex were generated by discriminant function analysis. These dimensions maximally distinguish among employee groups and are presented in Figures 4-6. Only dimensions which significantly discriminate among groups (ANOVA $p < .05$) are presented. Correlations between the component variables and the generated dimensions are presented to demonstrate the relative discriminating power of the component variables.

In Figure 4 it can be seen that the most important factors determining membership in friendship groups are sex and education. Race and seniority are relatively less important. Work group membership is determined by two significant dimensions, one reflecting sex, education, seniority, and race, and the other reflecting sex, seniority, and race. Groups falling into the upper right hand quadrant of Figure 5 tend to
be male, senior, or Black. Those falling to the right of axis II tend to be composed of members with relatively more education. Groups 7 and 14 tend to have female non-Black members with moderate seniority and low education. Members of group 26 tend to be female, non-Black and to have low seniority.

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Insert Figures 4-6 about here

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Figure 6 indicates that race is the most important discriminator among members of different interaction groups. Sex is second. Education seems to have some association with interaction group membership, but seniority has no impact. Group 4 is composed of Black female members. Group 16 has non-Black members, but they also are female. The single most important correlate of interaction group membership, therefore, is race.

It was expected that race and sex would be important determinants of membership in friendship groups. This expectation was confirmed; however, sex was found to be more important than race. Education also was more highly associated with friendship group membership than race. It also was expected that education and seniority would be significantly associated with membership in work groups. This expectation was also confirmed; however, sex and race also played a role. Sex, in fact, was slightly more highly associated with work group membership than education.

Thus, it seems that achieved factors play a role in determining membership in friendship groups and that ascribed criteria play a role
in determining membership in work groups. Mayhew (1958) has argued that ascriptive bases of group solidarity may be functional. Employees may be assigned to work groups on the basis of ascriptive criteria because these characteristics facilitate cooperation and coordination at work. Likewise, education may be a salient criterion for determining comparability in social comparison processes. Education also may be an indicator of income, and income can facilitate friendship links by allowing for reciprocity in exchange relations (Blau, 1964; Laumann, 1966:133-134).

Mixing of achieved and ascribed criteria for group membership did not occur in the case of interaction relations. Whereas education and tenure were important determinants of work group selection, interaction patterns seem determined primarily by race. This is particularly interesting, since race played a relatively marginal role in determining friendship links or work group membership. Consistent with the observations in the cafeteria, Blacks interacted with one another more than with non-Blacks. They were not as tightly clustered, however, in terms of work group affiliation or friendship. It is possible that social norms determine interaction patterns, even when they strain against personal feelings of attraction or work demands. Interaction is highly visible, and restrictive norms may continue long after their affective basis or foundation in work interdependence has evaporated.

**Homogeneity, Heterogeneity, and Satisfaction.** Hypotheses 4 and 5 stated that employee satisfaction would be associated with ascriptive homogeneity of friendship groups and achieved heterogeneity of work groups. It therefore was expected that work groups which were heterogeneous in education and seniority would have members who are particularly satisfied.
To assess this, work groups were divided at the median in terms of their variance on their members' education and seniority. Splits by variance on sex and race were also introduced for contrast. The results of tests for mean differences across the resulting classifications are presented in Table 2. As expected, work groups which have members with varying degrees of seniority report significantly higher average member satisfaction. Heterogeneity in education also appears to be associated with member satisfaction, but the level of significance only approaches $p = .05$. In contrast, racial homogeneity is significantly associated with satisfaction.

It had been predicted that this would occur for friendship groups, but the data suggest that the theoretical underpinnings for this expectation might apply to work groups as well. Racial homogeneity might facilitate the generation of shared meanings, given shared experience at work. This would occur to the extent that race reflects common beliefs, values or meanings. This phenomenon, however, does not extend to all ascriptive traits. Table 2 indicates that sexual heterogeneity rather than homogeneity may be associated with employee satisfaction. The difference here, however, only approaches an acceptable level of statistical significance.

Average satisfaction levels for homogeneous and heterogeneous friendship groups are compared in Table 3. As was the case with work groups, racial homogeneity seems to be associated with employee satisfaction. This relationship, however, only approaches the $p = .05$ level.
Sexual homogeneity, however, is not associated with satisfaction. In fact, the trend suggests the opposite pattern. As expected, member heterogeneity in either education or seniority is not associated with employee satisfaction.

Network Homology and Satisfaction. It was hypothesized that overlapping memberships would be conducive to positive attitudes about the organization. Those who worked with their friends, frequently interacted with those with whom they worked, or interacted with their friends were expected to be more satisfied. To assess these expectations, overlapping groups were identified and the responses of employees in these groups were compared with those of employees who were not in overlapping groups. First work group members who shared a friendship group with at least two other members of their work group were identified, and their responses were compared with those of the other members of work groups. An identical procedure was followed to identify employees who shared work and interaction groups. Finally, members of friendship groups who shared an interaction group with at least two other members of their work group were identified and their levels of satisfaction where compared to those of other members of friendship groups. The results of these analyses are presented in Table 4.
From this table it is clear that only homology across work and interaction networks is associated with employee satisfaction. Those who work with their friends are not significantly more satisfied than those who do not. Those who interact with their friends at work are, if anything, less satisfied than those who do not. Those who interact with their fellow workers, however, report higher levels of satisfaction than those who, for one reason or another, do not or cannot. Hypothesis 8, therefore, is confirmed. Hypotheses 7 and 9, however, do not receive support from the data.

Summary and Discussion

The model identifying some of the social determinants of employee satisfaction specified that 1) ascriptive traits would be associated with selection into friendship and social interaction groups and achieved traits would be associated with membership in work and task-based interaction groups; 2) homogeneity of ascriptive characteristics in friendship and social interaction groups and heterogeneity of achieved traits in work and task-based interaction groups would be associated with satisfaction; and 3) homology across each of the three types of networks—work, friendship, and interaction—would be associated with satisfaction expressed by employees.

The data indicate that the theoretical perspective underlying these hypotheses is basically sound but must be altered in significant ways. First, the distinction between ascribed and achieved determinants of employee membership in various types of groups is not as clear as was originally supposed. Education is likely to be a criterion for determining appropriate
social comparison groups, and race and sex can play a role in facilitating communication and understanding among employees whose relationships are primarily task-based. Second, ascriptively homogeneous friendship groups did not seem to have more satisfied members than did more heterogeneous groups. Racially homogeneous friendship groups tended to have more satisfied members; however, this trend was only significant at the p = .07 level. Members of sexually homogeneous friendship groups clearly were not more satisfied than their counterparts in more heterogeneous groups.

Third, homology across work and interaction networks was associated with employee satisfaction. Social considerations involved with interaction and friendship network overlaps, however, had no effect. The greater integration between work and social factors inherent in work and friendship network overlaps likewise were not associated with satisfaction at work. Only factors associated with the work itself—overlaps between work and interaction networks—had the expected effect.

A final consideration involves the antecedents and consequences of position in interaction networks. It had been expected that the antecedents and consequences of interaction network position would depend on the content of the communication conducted between interaction partners. The data did not distinguish networks on the basis of communication content; yet race turned out to be a potent predictor of employee position in interaction relationships. This is not surprising, given the seating patterns in the plant lunchroom. It is interesting, though, that there was so little overlap between interaction and friendship relations. Only ten employees were members of interaction groups with two or more of their friends. Interaction groups were determined primarily by race;
however, employees were more likely to choose their friends on the basis of sex and education than on the basis of race. Employees frequently voiced the opinion that racial barriers to social relations were coming down. The plant had desegregated its eating and washroom facilities in 1958. But changing friendship ties clearly cannot be explained by changing interaction patterns. Regardless of communication content, interaction seemed channeled by race while friendship ties were determined primarily by other factors.

This suggests that the traditional view specifying that work activities lead to interaction which leads in turn to liking (e.g., Homans, 1950; Whyte, 1969) may need some revision. The data presented here are consistent with the contention that work relationships establish interdependencies and that meeting these work obligations leads to positive affect. However, this may occur regardless of the overt interaction patterns among the participants. Interaction patterns, as observed in the plant lunchroom, may be determined more by social norms than by work relationships. Interaction behavior governed by norms based on factors like race, might even constrain the development of friendship relationships at work. There is a tendency to want to interact with one's work partners. The data show that employees who work with people with whom they do not or cannot interact are less satisfied than those who do or can. But group interdependencies may not easily lead to the development of friendship ties when social norms constrain interaction among work group members. With time, friendship may develop from trust which comes from fulfilling work obligations. Eventually, interaction relationships across races may flourish, but perhaps only after the social norms which constrain them have been surpassed by the realities of affect and interdependencies at work.
These modifications of the initial model seem warranted by the data. The primary emphasis of the theory, however, received considerable support. Achieved traits were associated with employee position in the network of work relationships. Ascribed criteria were associated with membership in different friendship groups, and one ascribed trait, race, was associated with membership in different interaction groups. In addition, heterogeneity in seniority and, almost significantly, education, were associated with satisfaction. Racial homogeneity of work group members also was associated with employee satisfaction. This was not hypothesized, but it is consistent with the theoretically grounded expectation that social comparison processes and communication are facilitated by shared beliefs, values, and meanings. This can be true of work as well as of friendship relations. Finally, homology across work and interaction networks was associated with employee satisfaction. Other forms of network homology—work and friendship and friendship and interaction—were not so associated. The data are consistent with the contention that work-based relations require interaction—either task-related or social—and that employees who are constrained from interacting with other members of their work group respond less positively to their experience in the organization.

The observed differences in the antecedents and consequences of employee position in various networks of relations indicates that organizational structure as relationally defined is ontologically real (Goddard, 1965). Employees are constrained and/or facilitated by their relationships with others, and these relationships are not simply impressions of the mind. Employees' positions in the networks studied here were
determined not only by their own perceptions but by the perceptions of others. Isolates not only did not select others; they were not selected by others.

The reality of social structure in organizations and its significant impact on employee satisfaction suggests that the usual conceptualization of organization structure might well be expanded to include a variety of relational concepts. Variables such as individual centrality, integratedness, and the range of relationships might be important determinants of responses to the organization (Moch, Feather, and Fitzgibbons, 1978). Also relational analyses might be useful in helping us understand the processes which underlie organizational behavior. Power, communication, and a variety of other activities are inherently relational, and an approach which is more conducive to understanding these dynamics may help move organizational studies out of its recent focus on static qualities (Benson, 1977). As the current study indicates, relational analysis also may help bring organizational studies out of its relative isolation from more general sociological and social psychological theories. It views organizational behavior as social behavior in a distinctive context rather than as a distinct form of behavior.

Much more work needs to be done to realize the available potential of a network perspective on organizational structure. Additional concepts must be developed and older ones must be refined. Additional networks must be introduced and traditional concepts such as influence might usefully be measured and analyzed in relational terms (Emerson, 1962). Finally, the process of attitude formation needs to be investigated
to better understand how differential network positions lead to differential perceptions. This is an ambitious agenda; however, the relative infertility of traditional structural analysis and the need to better understand the relationships between organizational context and individual behavior more than warrant it.
FOOTNOTES

1 Weighting schemes generally do not improve the accuracy of group identification (Lindsey and Byrne, 1968). In the current research, however, weights were inferred from the order in which names were listed. The first person named was given maximum weight, the second person named was given the second most weight, etc. This procedure resulted in a more detailed identification of group structure than was obtained when no weights were used. There were significantly more groups and more group members for each network. For a more detailed discussion of the procedure see Moch, Feather and Fitzgibbons (1978).

2 These criteria, though somewhat arbitrary, are quite conservative and probably err in excluding individuals from groups to which they are in fact attached. These criteria, therefore, reduce the number of employees per group and the number of groups and individuals available for analysis. The implications of less stringent criteria should be a topic for future research. For the purpose of the research reported here, however, it was decided to accept Richards' criteria.

3 Loomis (1948) and others have warned that sociometric diagrams are in many respects arbitrary and can therefore be misleading. While those presented in Figures 1-3 must be considered with caution, an attempt was made to minimize the length of the lines and the number of arrows in lines. Use of such conventions is helpful in reducing the degree of arbitrariness in sociometric diagrams (Wright and Evitts, 1961).

4 Directionality was disregarded in the present analysis. It was assumed that if employee A interacted with, worked with, or was friendly with employee B, that employee B interacted with, worked with or was friendly with employee A. Some may object to these assumptions. However, they considerably simplify the analysis and appear to be appropriate given the coherence of the results.

5 Tests for the level of significance of functions discriminating among work groups on the basis of seniority, education, sex and race were ANOVAS. These required at least several cases per cell. Eight, while somewhat arbitrary, was felt to be the minimum that should be tolerated.

6 Only eight Blacks were in any of the four friendship groups. They all were in group 5. Group 5 was 100% female. Group 23 was 100% male and non-Black. Group 9 was predominantly female (69.2%) and all non-Black. Group 11 was 54.5% female and 100% non-Black.

7 Group 9 had the highest education level followed by groups 23, 11, and 5.

8 Work group 13 scored highest on education, followed by groups 10, 23, 6, 21, 26, 7 and 14. Group 14 had the most senior members, followed by groups 7, 21, 10, 13, 28, 26, and 6.
Small N's expected in several cells precluded a statistical test of independence; however, considerable covariance was evident by inspection. Thirty-seven percent of the members of the eight work groups were male, yet males constituted only 5.9% of group 6, 21.1% of group 7, 0% of group 14 and 11.1% of group 26. On the other hand, groups 10, 13, 21, and 28 were respectively 100%, 63.6%, 61.5%, and 100% male. Likewise, 20.4% of the members of the eight work groups were Black, yet Blacks constituted a majority of group 6 (88.2%) and 30.8% of group 21. Groups 7,13,14,26, and 28 were respectively 8.8%, 0%, 0%, 11.1% and 0% Black.

All members of group 19 were male and all but one member of group 23 were female. All members of group 4 and 16 were female. Likewise, 30.6% of the members of interaction groups were Black, yet 72.7% of the members of group 4 were Black while none of the members of groups 16 or 19 were Black. Group 23 had a proportionate representation (33.3%) of Blacks.

Median breaks were only possible for variance on sex. The variance on education was much higher for group 11 (1.69) than for groups 9,5, and 23 (.74, .45, and .58, respectively). Only group 5 had any Blacks, and variances in seniority for groups 9,5,11, and 23 were 71.40, 1.88, 312.94 and 75.17 respectively. Group 5 therefore was taken as homogeneous and group 11 was taken as heterogeneous. Groups 9 and 23 were excluded in this analysis; however, when they were included as a middle group in an ANOVA comparison, the results were not altered.

It was felt that three member overlaps should be taken as minimum, because one person can act as a social control agent for the other two (Simmel, 1950; Asch, 1956; Caplow, 1968). Dyads might be more likely to shift response patterns to accommodate altered situations, and the same employees could relate differently to each other in the work interaction, or social contexts. This is less likely to occur in triads or in larger groupings.
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Correlations between demographic variables and the generated dimension:

- 
  - Sex: 0.46 (female), -0.43 (male)
  - Education: 0.21
  - Seniority: 0.24
  - Race: 0.46 (other), 0.23 (Black)
FIGURE 5
WORK GROUP MEMBERSHIP
AND DEMOGRAPHIC CHARACTERISTICS

Correlations between demographic variables and generated dimensions:

<table>
<thead>
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<th>II</th>
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<td>.55</td>
<td>-.04</td>
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<tr>
<td>(2=male)</td>
<td>.77</td>
<td>.49</td>
</tr>
<tr>
<td>race</td>
<td>.41</td>
<td>-.48</td>
</tr>
<tr>
<td>(l=other)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2=Black)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
FIGURE 6
INTERACTION GROUP MEMBERSHIP
AND DEMOGRAPHIC CHARACTERISTICS

| Low Score | 16 |  |
| High Score | 23 | 19 | 4 |

Correlations between demographic variables and the generated dimension:

- .25 sex (1=female), (2=male)
- .18 education
- -.05 seniority
- .82 race (1=other), (2=Black)
TABLE 1

CORRELATIONS AMONG DEMOGRAPHIC CHARACTERISTICS (N=463)

<table>
<thead>
<tr>
<th></th>
<th>1. Sex (1=female) (2=male)</th>
<th>2. Education</th>
<th>3. Seniority</th>
<th>4. Race (1=other) (2=Black)</th>
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<tr>
<td>1</td>
<td></td>
<td>.21*</td>
<td>+.04</td>
<td>-.08</td>
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<tr>
<td>2</td>
<td></td>
<td></td>
<td>-.31*</td>
<td>.29*</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>.44*</td>
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<tr>
<td>4</td>
<td></td>
<td></td>
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*p < .01
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<thead>
<tr>
<th>Homogeneity/ Heterogeneity with respect to</th>
<th>Homogeneous Groups: Mean Satisfaction/N</th>
<th>Heterogeneous Groups: Mean Satisfaction/N</th>
<th>t</th>
<th>p&lt;*</th>
</tr>
</thead>
<tbody>
<tr>
<td>sex</td>
<td>5.51/47</td>
<td>5.92/89</td>
<td>1.53</td>
<td>.128</td>
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<tr>
<td>race</td>
<td>6.15/84</td>
<td>5.16/52</td>
<td>3.99</td>
<td>.001</td>
</tr>
<tr>
<td>education</td>
<td>5.48/49</td>
<td>5.94/87</td>
<td>1.77</td>
<td>.079</td>
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<tr>
<td>seniority</td>
<td>5.00/48</td>
<td>6.19/88</td>
<td>4.75</td>
<td>.001</td>
</tr>
</tbody>
</table>

*2-tailed test
**TABLE 3**

FRIENDSHIP GROUP HOMOGENEITY–HETEROGENEITY & AVERAGE EMPLOYEE SATISFACTION

<table>
<thead>
<tr>
<th>Homogeneity/ Heterogeneity with respect to</th>
<th>Homogeneous Groups: Mean Satisfaction/N</th>
<th>Heterogeneous Groups: Mean Satisfaction/N</th>
<th>t</th>
<th>p&lt;*</th>
</tr>
</thead>
<tbody>
<tr>
<td>sex</td>
<td>5.49/19</td>
<td>6.09/24</td>
<td>1.351</td>
<td>.184</td>
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<tr>
<td>race</td>
<td>6.06/32</td>
<td>5.15/11</td>
<td>1.841</td>
<td>.073</td>
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<tr>
<td>education</td>
<td>5.85/32</td>
<td>5.76/11</td>
<td>0.163</td>
<td>.871</td>
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<tr>
<td>seniority</td>
<td>5.15/11</td>
<td>5.76/11</td>
<td>0.95</td>
<td>.353</td>
</tr>
</tbody>
</table>

*Two-tailed test*
<table>
<thead>
<tr>
<th>Overlap Type</th>
<th>Mean Satisfaction/(N) overlapping</th>
<th>Mean Satisfaction/(N) non-overlapping</th>
<th>(t)</th>
<th>(p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work &amp; Friendship</td>
<td>(5.83/41)</td>
<td>(5.71/206)</td>
<td>0.48</td>
<td>.623</td>
</tr>
<tr>
<td>Work &amp; Interaction</td>
<td>(6.48/25)</td>
<td>(5.65/222)</td>
<td>2.67</td>
<td>.008</td>
</tr>
<tr>
<td>Friendship &amp; Interaction</td>
<td>(5.20/10)</td>
<td>(5.75/94)</td>
<td>1.19</td>
<td>.236</td>
</tr>
</tbody>
</table>

*Two-tailed test*
MEASUREMENT APPENDIX

This appendix presents measures and, where appropriate, average inter-item correlations among measures of the same variable.

1. Measures of Demographic Characteristics

a. Sex

Are you - (check one)
(1) Male
(2) Female

b. Education

What is your educational level? (indicate highest completed)
(1) Some elementary school (grades 1-7)
(2) Completed elementary school (8 grades)
(3) Some high school (grades 9-11)
(4) Graduated from high school or G.E.D.
(5) Some college or technical training beyond high school (1-3 years)
(6) Graduate from college (B.A., B.S., or other Bachelor's degree)
(7) Some graduate school

c. Race

Are you - (check one)
(1) Black
(2) Oriental
(3) American Indian
(4) Spanish surnamed American
(5) White
(6) None of the above

Answers to this question were grouped to assess non-Black (1) and Black (2).

d. Tenure

The number of years the respondent had been employed by the company.

2. Measures of Employee Satisfaction

a. Satisfaction with Extrinsic Rewards

1. How satisfied are you with the fringe benefits you receive?
2. How satisfied are you with the amount of pay you get?
3. How satisfied are you with the amount of job security you have?
4. How satisfied are you with your chances for getting a promotion?
b. Satisfaction with Interpersonal Relations
1. How satisfied are you with the friendliness of the people you work with?
2. How satisfied are you with the respect you receive from the people you work with?
3. How satisfied are you with the way you are treated by the people you work with?
4. How satisfied are you with the way your superior treats you?

Average Inter-Item Correlation = .40

Satisfaction with Interpersonal Relations

General Job Satisfaction
1. All in all, I am satisfied with my job.
2. In general, I don't like my job. (reversed)
3. In general, I like working here.

Average Inter-Item Correlation = .6020

c. General Job Satisfaction
1. All in all, I am satisfied with my job.
2. In general, I don't like my job. (reversed)
3. In general, I like working here.

Average Inter-Item Correlation = .3688

d. Satisfaction with Intrinsic Rewards
1. How satisfied are you with the amount of freedom you have on your job?
2. How satisfied are you with the chances you have to learn new things?
3. How satisfied are you with the chances you have to accomplish something worthwhile?
4. How satisfied are you with the chances you have to do the things you do best?
5. How satisfied are you with the chances you have to do something that makes you feel good about yourself as a person?
6. How satisfied are you with the chances you have to take part in making decisions?
7. How satisfied are you with the opportunity to develop your skills and abilities?

Average Inter-Item Correlation = .5846

Correlations Among Satisfaction Scales:

(b) .57  (c) .48  .47
(d) .72  .66  .61
(a)  (b)  (c)

Satisfaction Scale = unweighted linear combination of satisfaction with extrinsic rewards and with interpersonal relations, general job satisfaction, and satisfaction with intrinsic rewards.