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NETWORKS IN LATER LIFE: AN EXAMINATION OF RACE DIFFERENCES IN SOCIAL SUPPORT NETWORKS*

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ABSTRACT

Although there has been considerable interest in the effects of social support networks on various health outcomes for older adults, there has been little research directed toward the predictors of networks. In this study, we examine race differences in the determinants of social support network characteristics (size, frequency of interaction with network members, proportion of kin, and amount of support received and given to network members) using data from an older community sample drawn from the North Carolina site of the Established Populations for Epidemiologic Studies of the Elderly (EPESE) focusing on adults sixty-five and older (n = 4124). This research focuses on the extent to which race differences in network dimensions are present and whether these variations can be attributed to varying social structural positions held by African Americans and Whites. The results indicate that several race differences persist even when controlling for social structural variables. The structural argument and future implications are discussed.

Researchers have established the importance of social networks of individuals, or the direct and indirect ties linking people together through such relationships as

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kinship or friendship, in providing many important services (e.g., Lin, Ensel, & Vaughn, 1981). Furthermore, examinations of properties of social networks (i.e., size, frequency of contact, proportion of kin) have indicated the effects of networks on numerous outcomes, including social support (Haines & Hurlbert, 1992; Kadushin, 1982; Lin & Peek, in press), occupational status and employment (Granovetter, 1973, 1982; Lin, 1982; Marsden, 1987), power and influence in organizations (Cook & Emerson, 1978), both physical and mental health (Berkman, 1984; Berkman & Syme, 1979; George, Blazer, Hughes, & Fowler, 1989; Haines & Hurlbert, 1992; Liu, Liang, Muramatsu, & Sugisawa, 1995; Peek & Lin, in press; Sugisawa, Liang, & Liu, 1994), and health care utilization and help seeking behaviors (Burton et al., 1995; Horwitz, 1977; Pescosolido, 1991, 1992, 1996).

Social networks have become especially relevant for the older population. Networks not only provide opportunities for contact but also furnish the context through which both instrumental and emotional support are received. Furthermore, researchers have extensively documented the importance of social networks in the provision of care to the aging population (Burton et al., 1995; Peek, Coward, & Peek, 2000; Silverstein & Waite, 1993; Stoller & Pugliesi, 1991). As health declines in later life and care issues for older adults become more prevalent, social networks, especially social support networks (a type of network that includes people who individuals feel that they are close to or who are perceived as being available for support), become increasingly important in influencing the type and amount of care received (i.e., Angel, Angel, & Himes, 1992; Peek, Zsembik, & Coward, 1997; Stoller & Pugliesi, 1991; Sugisawa et al., 1994).

Social networks also provide social contact and social support, which are both associated with positive physical and mental health outcomes (e.g., Berkman, 1984; Berkman & Syme, 1979; George et al., 1989; Haines & Hurlbert, 1992; Lin & Ensel, 1989; Lin & Peek, 1999; Peek & Lin, 1999). Furthermore, although networks are not necessarily synonymous with support (House, Umberson, & Landis, 1988), older people with greater network resources (i.e., larger networks and higher frequency of contact) may be better able to mobilize their networks when illnesses or hardships occur. A larger network increases the chance of receiving help, while decreasing the likelihood of exhausting social support resources (Seeman & Berkman, 1988). This example illustrates the idea that characteristics of the social network become important in influencing availability of resources for care for older adults as well as affecting both physical and mental health.

There is a long-standing tradition in the social sciences of depicting older African Americans as having strong network resources (i.e., larger networks, higher proportions of kin, and frequency of contact) that are indicative of an active support network (Burton et al., 1995; Chatters, Taylor, & Jackson, 1985; Silverstein & Waite, 1993; Taylor, 1985, 1986; Taylor & Chatters, 1991). However, Silverstein and Waite (1993) emphasize that the evidence indicating high rates of support within the social networks of African Americans "rest(s) on a

weak empirical base" (pp. S212-213). Studies examining the social networks of African Americans often focus only on African Americans, which clearly limits the extent to which the results can be compared (Silverstein & Waite, 1993). Very little research has investigated *race differences* in the characteristics of informal social support networks (e.g., Burton et al., 1995; Silverstein & Waite, 1993). Though several researchers have focused on aspects of social networks among African-American older adults, they have not systematically examined potential race differences in important social support network characteristics (Chatters et al., 1985; Gibson & Jackson, 1987; Hofferth, 1984; Taylor, 1985, 1986; Taylor & Chatters, 1991; Taylor, Chatters, Tucker, & Lewis, 1990). Given the importance of the effects of both social support networks and race on the structure of informal care, it is important to examine variations by race in social network characteristics. The purpose of this investigation, therefore, is to examine race differences in five aspects of informal social support networks (size, frequency of contact, proportion kin, amount of help given, and amount of help received) among a community sample of African-American and White adults age sixty-five and older (n= 4,162).

BACKGROUND IN RACE DIFFERENCES IN NETWORK STRUCTURE

One widely held generalization in the social sciences is that older African Americans have relatively large and strong extended kin networks compared to Whites and, as a consequence, are more likely to receive informal care during times of need (e.g., see Choi, 1995; Hatch, 1991; Mutran, 1985; Silverstein & Waite, 1993; Taylor, 1985). For instance, there is strong evidence of race variation in health service use among older people, such that older African Americans are less likely to use formal services than their White counterparts (i.e., Burton et al., 1995; Miller, McFall, & Campbell, 1994), and this race difference is often attributed to differences in the social network characteristics of older African-American and White adults (Burton et al., 1995). However, the empirical foundation for such generalizations is less than perfect. Most of the research that focuses on aspects of the social networks of African Americans uses samples that are homogenous with respect to race or that are unrepresentative of the population, which limits the extent to which the findings can be compared or generalized (Silverstein & Waite, 1993).

For example, several studies that examined the social networks of older African Americans used the National Survey of Black Americans, which contains information only on African Americans (Chatters et al., 1985; Gibson & Jackson, 1987; Taylor & Chatters, 1991). These researchers found that older African-American adults had high levels of interaction and strong emotional bonds with their extended families (Chatters et al., 1985; Taylor & Chatters, 1991). Other findings included the majority of respondents who had social networks that comprised only

immediate family, while others had a mixture of family and friends, and a small proportion had exclusively non-family members in their social networks. Their results also indicated that unmarried and childless African Americans had disadvantaged network resources due to reduced network sizes. These studies provide important descriptions and predictors of network characteristics for older African Americans. However, whether the predictors of social network properties or the social network characteristics varied by race was not addressed in these investigations.

There are two other studies that compared the caregiving support networks of African Americans and Whites. Both studies utilized the National Long Term Care Survey. In one study (Burton et al., 1995), the researchers found no race differences in size of caregiving networks for older people with disabilities. However, there was a difference by race in the composition of the caregiver network such that older African Americans were more likely than their White counterparts to have at least one caregiver who was not part of the immediate family. Finally, in the second study (Thornton, White-Means, & Choi, 1993), results indicated that African-American networks were marginally larger and were more likely to contain relatives outside of immediate family than White networks. These are two important investigations that have begun to examine potential race differences in network structure. However, the focus of these examinations was primarily on informal caregiving networks, rather than on the larger and more general social support network. The reason that the larger social support network is important is that it provides the context through which the informal caregiving network is determined.

PERSPECTIVE ON RACE DIFFERENCES IN NETWORK STRUCTURE

Position in the social structure may account for race differences in social support network characteristics. This approach, or the *structural* perspective, is based on Blau's assumption that asocial associations depend on opportunities for social contact" (1977, p. 281). The main premise behind this argument is that networks are formed within an opportunity context that precludes or makes possible certain kinds of contact. For instance, in her examination of gender differences in networks, Moore (1990) argued that structural opportunities, particularly jobs outside the home and higher income, occurred more often for men than women, while women experienced structural constraints more often, such as responsibility for housework and child care. Indeed, Moore found significant gender differences in network composition such that the social networks of women included a higher proportion of kin. However, when structural variables relating to work and family were controlled, most of the gender differences disappeared or were significantly reduced.

Moore (1990) argued that important structural variables include measures relating to work, family, and age. Work-related variables can refer to factors such as employment history (i.e., type of employment, whether respondent had employment outside the home), income, and educational attainment due to their effects on network size and proportion of kin in the network. These structural dimensions influence the opportunities to form ties outside the family (Marsden, 1987). Family structure and age are also factors that affect network characteristics. Factors such as household composition and number of children likely influence the formation of support network ties. For instance, people who are married tend to have more ties to family and neighbors than do those who are not married. Finally, age also has effects on network characteristics. Past research has indicated that ties to nonkin in the network peak in the early thirties and then start to decline (Marsden, 1987).

Illustrated above, the structural perspective has been typically applied to gender differences in networks (as well as an emphasis on the "younger" working population) and attributes these variations to the dissimilar social structural locations of women and men (Fischer & Oliker, 1983; Moore, 1990). This research will expand the structural perspective to examine race differences in dimensions of social support networks of older adults. Since, on average, African Americans and Whites tend to be in different social structural locations (e.g., Mutran, 1985; Silverstein & Waite, 1993), the structural approach is relevant for the examination of race as well as gender differences in social support network dimensions. For instance, older African Americans have, on average, lower income and educational attainment than older Whites. This difference leads to varying social structural positions and could indicate higher proportions of kin in African-American networks due to less of an opportunity for older African Americans to develop ties outside the family and extended family. The data for the present study provide an opportunity to examine race differences in the social support networks of an older community-dwelling sample. In addition, the data include structural variables not examined previously in the literature pertaining to networks that may be an important resource for social networks in later life. For example, household composition, or whether the older individuals live alone or with others, could be very important for determining social support network characteristics. Respondents who live alone may have more contact with neighbors, friends, and community, while respondents who live with an extended family may have higher proportions of kin in their support network.

RESEARCH QUESTIONS

The objective of this study is to investigate race differences in five social support network characteristics, including size, frequency of interaction with network members, proportion of kin in the network, amount of help received from network members, and amount of help given to network members. This research

examines these five characteristics due to their potential importance for physical and mental health outcomes (i.e., size and proportion kin, Berkman & Syme, 1979; Haines & Hurlbert, 1992; Lin & Peek, 1999; Peek & Lin, 1999) and effects on, or indicators of, patterns of informal care and intergenerational exchange (i.e., frequency of interaction with network members, amount of help received from social network members, and amount of help given to network members) (Burton et al., 1995; Chatters et al., 1985; Peek, Henretta, Coward, Duncan, & Dougherty, 1997; Silverstein & Waite, 1993; Taylor, 1985; Taylor & Chatters, 1991).

Based on past research, we expect race differences in each of these social support network characteristics for older adults. Results from previous investigations suggest that older African Americans will have social support networks that are greater in size, have a higher proportion of kin, higher contact frequency with network members, and greater amount of help both given and received than will older White adults. However, these expectations are based on previous findings, many of which are inconsistent or based on results from data that focus on African Americans only. For instance, Thornton et al., (l993) found that older African Americans had caregiving networks that were marginally larger (although Burton et al., 1995, found no race differences in the size of caregiving networks for older disabled adults). Furthermore, the results from the study conducted by Burton et al. (1995) suggest that older African Americans were more likely to have relatives outside the immediate family in their caregiver network, potentially indicating higher proportions of kin in the social network (see also findings from Taylor & Chatters, 1991). The evidence regarding interaction frequency and help received and given is more inconsistent. Older African Americans are more likely than older Whites to live in multi-generational households (Angel et al., 1992), which would serve to increase contact frequency for family network members, though some researchers have indicated that there are no race differences in interaction frequency (Mitchell & Register, 1984). Finally, researchers focusing only on older African Americans cite evidence to suggest that there is a high amount of support both given and received to older adults (e.g., Taylor & Chatters, 1991). However, Silverstein and Waite (1993) found few race differences in support given and received in their examination of support activities *outside* the household. Thus, there is contrasting and inconsistent evidence at best with regards to race differences in social network characteristics.

Attention to the structural argument and lack of consistent findings from past research leads to two research questions: 1) are there differences, by race, in the social support network size, interaction frequency, proportion kin, amount of help received, and amount of help given among a sample of older adults, and 2) if these differences exist, can social structural factors account for the race variations? Again, the basic argument from the structural approach is that varying social structural locations account for race differences in social support network characteristics. Furthermore, though there is some evidence of race differences

in components of networks, these differences have not been examined systematically (i.e., even the Burton et al., 1995, and the Thornton et al., 1993, studies focused primarily on the caregiver network as opposed to the larger social support network).

METHOD

Participants

The data for this research are from the Duke site of the Established Populations for Epidemiologic Studies of the Elderly (EPESE), which is a multisite research program initiated by the National Institute on Aging to investigate the physical, social, and cognitive functioning of adults aged sixty-five and older. The Duke sample consists of 4,162 community residents from five contiguous counties in north central North Carolina (one county was predominantly urban, and the others were primarily rural). The population of the urban county is approximately equal to the four rural counties.

In order to optimize the comparison of both racial and urban/rural difference, the Duke EPESE sample was designed to include approximately equal numbers of respondents from urban and rural areas with comparable numbers of African Americans and non-African Americans. Sample weights were developed that allowed redistribution of the sample to reflect accurately the racial and residential distribution of the population (for more detail on the sampling and sampling design, see Blazer, Burchett, Service, & George, 1991).

The sampling design entails a four-stage stratified probability-sampling design. First, primary sampling units consisting of 450 zones of approximately equal population size were selected from each 1980 census block, block cluster, and enumeration district (e.g., see Blazer, Hays, Fillenbaum, & Gold, 1997). Next, one listing area was selected from each zone on the basis of population density (n = 26,183). The housing units were stratified by race. The third stage included selecting households within the listing areas and screening for residents aged sixty-five and older. Finally, one person aged sixty-five and older was selected from each eligible household. Sampling weights were developed to adjust sample distributions for the probability of selection within households of different sizes, varying non-response, and the oversampling of African-American respondents (Cornoni-Huntley, Brock, Ostfeld, Taylor, & Wallace, 1990).

The 4,162 respondents who were interviewed at baseline were drawn from a total sample of 5,223 (80% response rate). Older individuals who were not African American or White were omitted from the analyses due to the focus on African American-White differences in social networks (n = 26). Furthermore, respondents with a non-response on the work history question were also omitted (n = 12). Thus, the final sample size for these analyses was 4,124.

Sample weights were created to adjust sample distributions for the oversampling of African Americans. These weights are especially important because they redistributed responses to the racial-distribution of the population. The proportion of African Americans oversampled was 54 percent compared to 35 percent older African Americans in the actual population. The oversampling of African Americans requires weighting the data up to the target population and then downweighting the data to reflect the actual sample size (Hays & Landerman, 1993). Results presented in this article are based on weighted data in order to permit population estimates. Sample and subgroup sizes/analyses, however, are reported in unweighted form.

Materials

Dimensions of Social Networks

This research examines five characteristics of the social support networks of older community-dwelling African-American and White adults. These characteristics include: size, frequency of interaction with network members, proportion of kin in the network, amount of help given to others, and amount of help received. As mentioned previously, the rationale for examining these specific characteristics are their significant effects on health-related outcomes as well as on patterns of informal care and exchange among older adults. *Support network size* is a continuous indicator and measures the number of friends and relatives (excluding spouses and children) that the respondent feels close to as well as the respondents' total number of children. The specific variables that compose this measure are the number of relatives and friends the respondent cites as feeling close to as well as the number of natural and adopted children that the respondent has and who are still living. Support network size ranges from 0 to 48, with a mean of 11.45 (SD = 6.65). Marital status is not a component of the measure of support network size, but is instead conceptualized as a structural measure influencing the types of contact an older individual has access to.

Frequency of interaction with network members is a continuous measure and assesses the amount of social interaction the respondent has with friends, relatives, and children. This measure is developed from three variables that ask the respondent how many relatives, friends, and children they see at least once a month. The range of this variable is 0 to 30, with a mean of 8.36 (SD = 5.76). One important note about this variable is that it refers to the number of network members seen rather than how often respondents see their support network members. In other words, a value of ten for the measure would indicate that respondents see ten of their network members at least once a month rather than seeing network members ten times in one month.

Kin composition or proportion of kin or family in the support network is a continuous indicator and measures the amount of kin in the network proportionate

to the total network size. This measure was developed by adding the number of children the respondents have and the number of relatives that they cited as feeling close to and dividing this total kin number by the total network size. There were sixty-eight people (1.6% of the sample) who indicated that they had no people in their support network (excluding spouses). These people were coded as having zero percent kin in their network (the majority of the individuals who had a score of 0 on the size component also did not have a spouse). The range of the kin composition variable is 0 to 100 percent kin, with an average proportion of 60 percent kin in the support network.

Amount of help given to others is the sum of thirteen different types of support that the respondents give to their friends and family. This summary measure is based on a set of questions that ask the respondents if they ever helped their friends and/or family in the last year with thirteen different types of problems or support including both emotional support (i.e., listening to problems, giving advice) and instrumental support (i.e., providing transportation, helping out with money). For a full list of problems and supportive behaviors, see Appendix A. The range of help given to others is 0 to 13, with a mean of 7.16 ($SD = 3.34$, Cronbach's alpha = .83).

Finally, *amount of help received* measures the total amount or types of support the respondents received over the last year. This summary measure is based on the same set of questions as the "amount of help given" variable. The only difference is that respondents are asked, "in the past year, did your family and/or friends ever help you in the following ways?" These problems are identical to the amount of help given variable, with one exception. In the amount of help given measure, respondents are asked if they help take care of anyone's children. This support is omitted from the help received variable due to the older ages of the respondents. This measure ranges from 0 to 12, with a mean of 8.66 ($SD = 2.85$, Cronbach's alpha = .81).

Design and Procedure

Independent Variables

In this study, we include both control variables and structural measures to address the social structural position of respondents. The structural variables include age, marital status, a measure of household composition that addresses whether the respondents live alone, a variable that assesses if the respondents have any children, participation in any type of club, as well as frequency of church attendance, employment history, educational attainment, and income. The analysis focuses on these particular structural variables to be consistent with past investigations on the effects of social structural location on network characteristics (Marsden, 1987; Moore, 1990). However, the analysis also includes church attendance as a structural variable because of the potential importance

of this factor on race differences in networks. Older African Americans have, on average, higher frequencies of church attendance, which could influence social support network characteristics (Taylor et al., 1990). Finally, participation in any type of club is included because of the possible effects of club membership on opportunities for contact, particularly with nonkin.

Age is a continuous measure ranging from 64 to 97; *marital status* compares those respondents who have never been married, are divorced or separated, and respondents who are widowed with respondents who are currently married; one aspect of *household composition* is measured as a dichotomous variable and addresses whether the respondent lives alone or with others ("1" indicating living alone); and a dummy variable that addresses whether or not the respondents have any living children is included to determine the effects of *presence of children* on network characteristics ("1" indicating having at least one child alive). The variable that addresses *club membership* asks respondents, "are you a member of any clubs or organizations such as church-related groups, labor unions, farm organizations, or recreational groups?" This is a dichotomous variable with "1" indicating an affirmative response. *Church attendance* is measured as the frequency of church attendance on a scale ranging from never/almost never to more than once a week (range is 1 to 6 with the higher score indicating more frequent church attendance). Finally, *employment history* is a dichotomous variable that assesses a basic measure of past work experience with "1" indicating the respondent ever worked outside the home; *education* is a continuous measure and indicates the highest grade of school or year of regular school that respondents completed, and *income* refers to a recoded version of the questionnaire item requesting total income with values recoded to category midpoints to reflect actual yearly income (range is 999.50 to 44,529.80) (Landerman & Wagner, 1993).

The control variables address basic demographic characteristics that are not necessarily structural variables but are important to account for in analyses focusing on network characteristics. These factors include *race* (dichotomous measure where "1" is African-American), *gender* ("1" is female), and two health measures. Research has indicated race differences in health in later life, and these factors are important to control for in analyses on support networks (e.g., Johnson & Wolinsky, 1994). This study addresses *self-rated health* through a question that asks respondents how they would rate their overall health, with responses ranging from poor to excellent (higher scores indicate better health). Finally, we measure *total disability* as the number of activities of daily living (ADLs such as bathing, dressing, and eating) and instrumental activities of daily living (IADLs such as needing help with grocery shopping, cooking, and managing money) with which respondents need help. This variable is a dichotomous measure where "1" indicates any disability (37.9% of respondents have at least one disability).

Analysis

Ordinary Least Squares regression will be used to address: 1) extent to which race differences exist across support network size, frequency of interaction, kin composition, and amount of help given and received; and 2) if these differences persist once structural variables are accounted for in the multivariate models. Furthermore, structural factors may affect older African Americans and Whites differently. As a result, race and social structural variables can be expected to interact. Thus, this research also examines race interactions with the structural variables in the models. The first set of multivariate analysis estimates two models per dependent variable. In order to determine the effects of race on support network characteristics, we first estimate models that predict the effects of race on the support network dimensions including the control variables. Then, to examine the influence of the structural variables as well as race on network dimensions, the second set of models estimate the effects of race, the structural variables, and the control measures on support network dimensions. The second set of multivariate models focuses on interaction terms between race and the structural variables (there are ten interaction terms—race with each of the ten structural variables).

RESULTS

Table 1 presents the descriptive statistics for the social support network, structural, and control variables across the race-stratified sample. Overall, African Americans and Whites cited similar numbers of persons in their networks. There is no significant race difference in support network size. Furthermore, frequency of interaction shows only marginally significant race differences in that older African Americans have a slightly lower average interaction frequency with network members than do older Whites. However, for kin composition, the support networks of older African Americans include a significantly higher percentage of kin than do the networks of older Whites. There are also significant race differences for both amount of support received and amount of support given, such that older African Americans receive more support and provide less support than do older Whites. In the analyses that follow, multivariate models predicting network size will not be examined due to the lack of any significant race differences in this factor.

Other significant race differences include a higher percentage of older African-American adults being disabled, widowed, divorced, separated, or never married than older White adults. Older African Americans also have a slightly lower self-rated health score, less education, and lower income than Whites. Older White adults have a significantly lower frequency of attending church than older African Americans, are less likely to have been employed outside the home, are more likely to be married, and are more likely to be living alone.

Table 1. Descriptive Statistics for the Race-Stratified Sample[a,b]

Model Variables	African Americans (n = 2251)	White (n = 1873)
Control/Sociodemographic		
% Female	62.61	62.47
% Having a disability	41.43	31.72**
Self-Rated Health (mean, s.e.)	2.46 (0.02)	2.63 (0.02)**
Structural		
Age (mean, s.e.)	73.41 (0.18)	73.40 (0.13)
% Widowed	42.11	37.08**
% Never married, divorced, or separated	13.30	7.72**
% Married	44.25	54.94**
% Living alone	26.99	30.40*
% With no children	15.67	14.66
% Participating in any club	60.37	61.41
Frequency of church attendance (mean, s.e.)	4.20 (0.05)	3.84 (0.03)**
% Ever employed outside home	91.64	80.28**
Education (mean, s.e.)	7.57 (0.10)	10.19 (0.07)**
Income (mean, s.e.)	7581.85 (281.42)	15400.73 (208.80)**
Social Support Network		
Size (mean, s.e.)	11.44 (0.17)	11.23 (0.13)
Frequency of interaction (mean, s.e.)	8.15 (0.15)	8.48 (0.11)$^{+}$
Proportion of kin (mean, s.e.)	63.92 (0.01)	55.45 (0.01)**
Amount of support received (mean, s.e.)	8.85 (0.07)	8.52 (0.05)**
Amount of Support Given (mean, s.e.)	7.13 (0.09)	7.47 (0.06)**

[a]Means presented (standard error).
[b]Results based on weighted data.
$^{+}p < .10$, two-tailed t-test
$^{*}p < .05$, two-tailed t-test
$^{**}p < .01$, two-tailed t-test

Determinants of Social Support Network Characteristics

The remainder of the analyses focuses on the influence of race, structural variables, and control measures on frequency of interaction, kin composition, and amount of support given and received. Table 2 shows the Ordinary Least Squares regression results for two models across the four support network dimensions. This table indicates that the effects of race vary across the four network

Table 2. Ordinary Least Squares Regression Predicting Social Support Network Dimensions, Standardized Betas Presented[a] (n = 4124)

	Frequency of Interaction		Proportion Kin		Support Received		Support Given	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Control/Sociodemographic								
African American	−.020	−.090**	.145**	.135**	.034*	.030	−.007	−.016
Female	−.046**	−.064**	.045**	.057**	.059**	.074**	−.097**	−.052**
Self-rated health	.024	.046**	−.039*	.002	−.073**	−.071**	.093**	.078**
Having a disability	−.049**	−.014	.068**	.020	.158**	.170**	−.333**	−.189**
Structural								
Age		−.039*		.017		−.003		−.217**
Widowed		−.002		.050*		−.019		−.064**
Never married, divorced, or separated		−.016		.057**		−.060**		−.065**
Living alone		−.046*		−.071**		−.114**		−.034*
No children		−.152**		−.317**		−.095**		−.082**
Club participation		.030		−.031*		.097**		.065**
Frequency of church Attendance		.178**		−.128**		.005		.198**
Ever employed Outside home		−.051**		−.012		−.012		.016
Education		−.129**		−.051**		.043*		.019
Income		−.062**		−.033		−.070**		.038*
F Value	6.872**	29.213**	36.361**	56.747**	47.561**	27.924**	183.882**	116.812**
R-Square	.007	.091	.034	.162	.044	.087	.152	.285

[a]Results based on weighted data.
*$p < .05$
**$p < .01$

characteristics. First, though the bivariate analysis of race and frequency of interaction with network members was only marginally significant ($p < .07$), we were still interested in predicting the effects of race on this dimension. Focusing on the first two columns in Table 2, race is not significant in the first model when control variables are included. In this model, both gender and disability account for the race differences in frequency of interaction with network members. Being female and having any disability is associated with lower frequency of interaction. However, in the second model race becomes significant when structural variables are included in the models. This finding implies that, in these data, older African Americans and Whites of similar social structural locations have different levels of frequency of interaction. Older African-American adults have a lower frequency of interaction than do older White adults. This finding does not support the implications from previous studies that suggest that older African Americans have more contact with their network members. However, most of the research that had been conducted on frequency measures had only focused on African Americans, not on a comparison between races. Almost all of the structural variables have a significant influence on frequency of interaction, with the exception of marital status and club participation.

In a side analysis (tables not shown), we estimated OLS models for each component of the frequency of interaction dimension (i.e., interaction with children, family, and friends). The only significant race difference was at the level of association with friends. Older African Americans had a lower frequency of seeing their friends at least once a month than did older Whites.

Focusing on proportion of kin in the support network, Table 2 indicates that there are significant race differences even when accounting for control and structural variables. Older African Americans have higher proportions of kin or family in their support networks than do older Whites. This finding is consistent with past research suggesting that African Americans have support networks with high proportions of kin. Furthermore, though control variables (primarily gender) and structural factors (especially having no children and frequency of church attendance) have significant effects on kin composition, race remains a significant predictor of this network dimension. Other significant effects include gender, marital status, household composition, and education. Women, respondents who are widowed, divorced, separated, or never married have higher proportions of kin in their support networks. These results are also consistent with past research (e.g., Moore, 1990). Living alone, having no children, participating in any club, having higher church attendance frequency, and having higher education are all indicative of lower proportions of kin or family in the support network.

Though race has significant effects on the frequency of interaction and proportion of kin in the support network, there are no significant effects of race on either support received or given once sociodemographic and structural factors are accounted for in the models. Table 2 indicates that being African American is a significant predictor of a greater amount of support received in the first model

when race and demographic control variables are included. However, once structural variables are accounted for, race becomes non-significant. All of the control variables and most of the structural measures are significant predictors of amount of support received. Being female, having a disability, participating in a club, and education are all indicative of a larger amount of support received, while having poorer self-rated health, being divorced, separated, or never married, living alone, having no children, and having higher income are predictive of lower amounts of support received.

Focusing on amount of support given to others, race is not significant in either model. Once demographic variables are accounted for in the models, race is not a significant predictor of amount of support given to others. Furthermore, race does not become significant once structural measures are accounted for in the models. Similar to amount of support received measure, almost all of the control and structural variables are significant predictors of amount of support given to others. Being female, having a disability, being divorced, separated, or never married, being widowed, living alone, and having no children are indicators of decreased support given to others. However, having higher self-rated health, being a member in any club or organization, attending church more frequently, and income are indicators of higher amounts of support given to others.

The findings that there are no race differences with respect to amount of support given or received are not consistent with previous research that suggests that African Americans have especially active support networks and engage in more frequent supportive activities than do older Whites (e.g., see discussion by Silverstein & Waite, 1993). However, these findings are consistent with a study conducted by Silverstein and Waite (1993) examining African American-White differences in social support transfers in later life. These researchers found that African Americans were no more likely to receive and provide support than older Whites.

Interaction Effects of Race and Structural Measures on Support Network Dimensions

To further examine race-specific effects on social support network characteristics, interactions between race and the structural variables were systematically tested in all equations. Past research has suggested that social structural variables and gender interact in the formation of networks; however, race interactions have not been examined (Moore, 1990). Table 3 indicates the OLS results of examining the ten potential interaction effects on the four dimensions of support networks. The table shows only the interaction term results. In other words, each interaction term was tested separately for each support network characteristic, and Table 3 presents the results for the interaction terms tested in the full model. For frequency of interaction with network members, the analysis indicates that two cross-product terms are significant. Race interacts with frequency of church attendance such that

Table 3. Ordinary Least Squares Regression Estimates for Interaction Terms between Race and Structural Variables Predicting Social Support Network Dimensions, Standardized Betas Presented[a,b] (n = 4124)

Interaction Terms	Frequency of Interaction	Proportion Kin	Support Received	Support Given
Race Age	ns	ns	ns	.031*
Race Widow	ns	ns	−.043**	−.046**
Race Never married, divorced, separated	ns	−.031*	ns	ns
Race Living alone	ns	−.039*	−.051**	−.050**
Race Having no children	ns	−.072**	ns	ns
Race Club membership	ns	ns	ns	.043**
Race Frequency of church attendance	−.051**	ns	ns	.075**
Race Ever employed outside home	ns	ns	ns	ns
Race Education	.043**	ns	ns	ns
Race Income	ns	ns	ns	.089**

[a]Results based on weighted data.
[b]Interaction terms are based on full models run separately (10 interaction terms 4 dependent variables = 40 models).
ns = not significant
*$p < .05$
**$p < .01$

older African Americans who attend church more often have lower frequency of contact with their network members. While this seems counter-intuitive at first, when the frequency measure is broken into its components (analysis not shown), the results indicate that the only significant race interaction with church attendance is frequency of contact with family. Thus, this analysis implies that older African Americans who attend church more frequently are actually having less contact with family members. The other cross-product term that is significant is race and education. Higher levels of education increase frequency of interaction for older African Americans. One explanation based on the structural argument for this finding is that higher levels of education for African Americans place them in more similar social structural locations to Whites.

The interaction terms that are significant for proportion of kin in the network indicate that older African Americans who are divorced, separated, or never married, who have no children, or who live alone have lower proportions of kin or family in their social support networks. These findings are consistent with research that suggests that African-American support networks are, to a large extent, shaped by their household composition. In other words, older African Americans

are more likely to be living in extended family households than are Whites (e.g., Hofferth, 1984). When household composition factors are examined more closely, it appears that older African Americans who do not live in extended households may be disadvantaged when compared to Whites with respect to kin composition in the support network and potential providers of informal care.

Amount of support received indicates similar results in that being widowed or living alone significantly decreases the amount of support received by older African Americans. These conditional effects of race are very important to consider. One implication from the results is that older African Americans who do not have the advantage of a large family network may not be able to get the support that they need. Finally, several cross-product terms are significant in the analysis that focuses on amount of support given to others. Being older, being a member of any club or organization, or attending church more often significantly increases the amount of support that African Americans give to others. However, older African Americans who are widowed or who are living alone give less support to others. These interaction effects indicate that structural measures have differential effects on older African-American and White adults. The effects of club and church participation and attendance on support given to others are consistent with past research that indicates the importance of non-kin members and religion on support networks (e.g., Taylor et al., 1990). Furthermore, the influence of widowhood and living alone continue to suggest that older African Americans with these characteristics may be at a particular disadvantage.

DISCUSSION

The purpose of this research was to systematically examine if there were race differences in key dimensions of social support networks, including size, frequency of interaction with network members, proportion of kin in the network, amount of help received, and amount of help given among a sample of older adults. Another goal of this study was to determine if race differences did exist, could social structural factors account for the race variations in network characteristics. To summarize the findings, race differences remained significant for both frequency of interaction with network members and proportion of kin in the network, even when accounting for demographic and structural measures. However, structural factors explained the race difference in the amount of support received from the support network, and demographic control factors accounted for the race difference in amount of support given. Furthermore, there was no significant race difference in size of the support network.

Though race differences remained significant in some of the models even when accounting for structural variables, a general conclusion can still be drawn that the structural perspective is relevant for the examination of race differences in social support network characteristics among the older population. First, the structural factors did account for race differences in the model focusing on the amount of

support received from network members (accounted for primarily by living alone), and two structural factors (age and frequency of church attendance) had relatively strong effects on amount of support given. Second, when the analysis focused on interaction terms with race and each structural measure, several significant effects indicated that the influence of structural measures vary by race. Clearly, structural factors that affect opportunities for contact such as presence of children, marital status, frequency of church attendance, and education significantly influence characteristics of support networks. However, the support for the structural perspective is limited in that race differences remained significant for interaction frequency and proportion of kin in the network.

Furthermore, not all of the findings of race differences in network characteristics followed the expected directions or were consistent with past research. For instance, results from some research suggested that older African Americans have larger support networks. We found no significant race difference in size of social support network at the bivariate level. Moreover, for frequency of interaction with network members and amount of support received and given, we expected older African Americans to have higher levels of each of these characteristics. For amount of support received and given, there were no significant race differences in the multivariate models. However, this finding is consistent with recent research that focused on African-American White differences in social support (Silverstein & Waite, 1993). Finally, African Americans had significantly lower levels of frequency of interaction than did older Whites. As mentioned earlier, when this variable is broken into its components, race differences indicated that older African Americans actually have a significantly higher interaction frequency with their children, no significant effects among family, and a significantly lower interaction with friends. Thus, the frequency of interaction variable is likely being driven by the component of interaction with friends.

An important consideration to focus on with respect to the models examining race differences in support network characteristics is the lack of explanation provided by some of the models. The control and structural variables in conjunction with race explained less than 10 percent of the variance for both frequency of interaction and amount of support received. There are clearly factors that we did not account for in these models that may explain race differences. Another consideration is the extent that these findings can be generalized to the larger aging population. This sample of older adults was drawn from North Carolina, and a significant proportion came from rural areas. The factors that affect the support networks of African Americans in the south may not be the same in different areas of the country or in areas of different population density. For instance, it would be very interesting to examine the effects of frequency of church attendance on African-American support networks in more heavily populated areas as well in other geographic areas.

These analyses represent an effort to apply a structural theory to the examination of social support network characteristics among older people. Though the

structural argument only received partial support, it does suggest directions for future research on networks. There may be other structural factors that are not captured in this analysis that explain race differences in network dimensions in later life. For example, past or present occupational prestige and mobility may have greater bearing on network formation in the older population than a simple measure of employment history. Also, a history of residential mobility could factor into network structure. Finally, a critical variable to examine with respect to opportunities for contact is proximity of family and friends that are considered part of the social network.

Though these results provide a baseline study through which to compare subsequent studies on network structure among the elderly, our results are based on cross-sectional data. Without a causal model, it is unclear how structural factors are affecting the process of network formation and reformation. Also, analysis of panel data would facilitate the examination of networks as a process. This is a critical point because social networks have often been assumed to be unidimensional and stable entities. Given how many life changes can occur to individuals (particularly in late life), this assumption deserves further attention. Finally, it is important to consider other characteristics of social support networks, such as reciprocity and satisfaction, in the older population. These two characteristics in particular may have a substantial effect on health and well-being among the elderly. The next important step for network research is to examine the impact of changes in support networks on health over time and to understand how older persons' networks are mobilized in times of illness and hardship. Such research will advance our knowledge of network structure, formation, and process in later life.

APPENDIX A.
Individual Variables Comprising Amount of Support Given to Others

Questionnaire Items:

"As you know, family and friends often help each other in different ways. In the past year did you ever help your family and/or friends in the following ways . . .

1. . . . listen to their problems?
2. . . . give them advice about life's problems?
3. . . . prepare or provide meals for them?
4. . . . help them out with money?
5. . . . babysit or help take care of their children?
6. . . . fix things around their houses?
7. . . . provide transportation for them?
8. . . . help with housework or household chores?

9. . . . shop or run errands for them?
10. . . . give them advice on business or financial matters?
11. . . . give them gifts or presents?
12. . . . provide companionship to them?
13. . . . help them out when they are sick?

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REFERENCES

Angel, R. J., Angel, J. L., & Himes, C. L. (1992). Minority group status, health transitions, and community living arrangements among the elderly. *Research on Aging, 14,* 496-521.

Berkman, L. (1984). Assessing the physical health effects of social networks and social support. *Annual Review of Public Health, 5,* 413-432.

Berkman, L., & Syme, C. (1979). Social network, host resistance, and mortality: A nine-year follow-up study of Alameda county residents. *American Journal of Epidemiology, 109,* 186-204.

Blau, P. (1977). *Inequality and heterogeneity: A primitive theory of social structure.* New York: Free Press.

Blazer, D., Burchett, B., Service, C., & George, L. K. (1991). The association of age and depression among the elderly: An epidemiologic exploration. *Journal of Gerontology: Medical Sciences, 46,* M210-M215.

Blazer, D., Hays, J. C., Fillenbaum, G. G., & Gold, D. T. (1997). Memory complaint as a predictor of cognitive decline: A comparison of African American and White elders. *Journal of Aging and Health, 9,* 171-184.

Burton, L., Kasper, J., Shore, A., Cagney, K., LaVeist, T., Cubbin, C., & German, P. (1995). The structure of informal care: Are there differences by race? *The Gerontologist, 35,* 744-752.

Chatters, L. M., Taylor, R. J., & Jackson, J. S. (1985). Size and composition of the informal helper networks of elderly blacks. *Journal of Gerontology, 40,* 605-614.

Choi, N. G. (1995). Racial differences in the determinants of the coresidence of and contacts between elderly parents and their adult children. *Journal of Gerontological Social Work, 24,* 77-95.

Cook, K., & Emerson, R. (1978). Power, equity, and commitment in exchange networks. *American Sociological Review, 43,* 721-739.

Cornoni-Huntley, J., Brock, D. B., Ostfeld, A., Taylor, J. O., & Wallace, B. P. (Eds.). (1990). *Established populations for epidemiologic studies of the elderly. Vol. II. Resource*

data book (NIH Publication No. 90-495). Washington, DC: U.S. Department of Health and Human Services.

Fischer, C., & Oliker, S. (1983). A research note on friendship, gender, and the life cycle. *Social Forces, 62,* 124-132.

George, L., Blazer, D., Hughes, D., & Fowler, N. (1989). Social support and the outcome of major depression. *British Journal of Psychiatry, 154,* 478-485.

Gibson, R. C., & Jackson, J. S. (1987). Health, physical functioning, and informal supports of the African-American elderly. *Milbank Quarterly, 65,* 421-454.

Granovetter, M. (1973). The strength of weak ties. *American Journal of Sociology, 78,* 1360-1380.

Granovetter, M. (1982). The strength of weak ties: A network theory revisited. In N. Lin and P. Marsden (Eds.), *Social structure and network analysis.* Beverly Hills: Sage Publications.

Haines, V., & Hurlbert, J. (1992). Network range and health. *Journal of Health and Social Behavior, 33,* 254-266.

Hatch, L. R. (1991). Informal support patterns of older African-American and White women. *Research on Aging, 13,* 144-170.

Hays, J. C., & Landerman, L. R. (1993). *How to adjust tests of significance when using data from the duke EPESE sample.* Unpublished manuscript.

Hofferth, S. L. (1984). Kin networks, race, and family structure. *Journal of Marriage and the Family, 46,* 791-806.

Horwitz, A. (1977). Social networks and pathways to psychiatric treatment. *Social Forces, 56,* 86-103.

House, J., Umberson, D., & Landis, K. (1988). Structures and processes of social support. *Annual Review of Sociology, 14,* 293-318.

Johnson, R. J., & Wolinsky, F. D. (1994). Gender, race, and health: The structure of health status among older adults. *The Gerontologist, 34,* 24-35.

Kadushin, C. (1982). Social density and mental health. In N. Lin and P. Marsden (Eds.), *Social structure and network analysis.* Beverly Hills: Sage Publications.

Landerman, R., & Wagner, R. (1993). *EPESE composite measures and other commonly used measures: Description and documentation of original variables and variables with missing values imputed.* Unpublished manuscript.

Lin, N. (1982). Social resources and instrumental action. In N. Lin and P. Marsden (Eds.), *Social structure and network analysis.* Beverly Hills: Sage Publications.

Lin, N., & Ensel, W. (1989). Life stress and health: Stressors and resources. *American Sociological Review, 54,* 382-399.

Lin, N., Ensel, W., & Vaughn, J. (1981). Social resources and strength of ties: Structural factors in occupational status attainment. *American Sociological Review, 46,* 393-405.

Lin, N., & Peek, M. K. (1999). Social networks and mental health. In A. V. Horwitz and T. L. Scheid (Eds.), *The sociology of mental health and illness.* New York: Cambridge University Press.

Liu, X., Liang, J., Muramatsu, N., & Sugisawa, H. (1995). Transitions in functional status and active life expectancy among older people in Japan. *Journal of Gerontology: Social Sciences, 50B,* S383-S394.

Marsden, P. (1987). Core discussion networks of Americans. *American Sociological Review, 52,* 122-231.

Miller, B., McFall, S., & Campbell, R. T. (1994). Changes in sources of community long-term care among African American and white frail older persons. *Journal of Gerontology: Social Sciences, 49,* S14-S24.

Mitchell, J. S., & Register, J. C. (1984). An exploration of family interaction with the elderly by race, socioeconomic status and residence. *The Gerontologist, 24,* 48-54.

Moore, G. (1990). Structural determinants of men's and women's personal networks. *American Sociological Review, 55,* 726-735.

Mutran, E. (1985). Intergenerational family support among African-Americans and Whites: Response to culture or to socioeconomic differences. *Journal of Gerontology, 40,* 382-389.

Peek, M. K., Coward, R. T., & Peek C. W. (2000). Race, aging, and care: Can differences in household structure account for race variations in informal care? *Research on Aging, 22,* 117-142.

Peek, C. W., Henretta, J. C., Coward, R. T., Duncan, R. P., & Dougherty, M. C. (1997). Race and residence variation in living arrangements among unmarried older adults. *Research on Aging, 19,* 46-68.

Peek, M. K., & Lin, N. (1999). Age differences in the effects of network composition on psychological distress. *Social Science and Medicine, 49,* 621-636.

Peek, C. W., Zsembik, B. A., & Coward, R. T. (1997). The changing caregiving networks of older adults. *Research on Aging, 19,* 333-361.

Pescosolido, B. A. (1991). Illness careers and network ties: A conceptual model of utilization and compliance. *Advances in Medical Sociology, 2,* 161-184.

Pescosolido, B. A. (1992). Beyond rational choice: The social dynamics of how people seek help. *American Journal of Sociology, 97,* 1096-1138.

Pescosolido, B. A. (1996). Bringing the community into utilization models: How social networks link individuals to changing systems of care. *Research in the Sociology of Health Care, 13,* 171-197.

Seeman, T. E., & Berkman, L. F. (1988). Structural characteristics of social networks and their relationship with social support in the elderly: Who provides support. *Social Science and Medicine, 27,* 737-749.

Silverstein, M., & Waite, L. J. (1993). Are African-Americans more likely than Whites to receive and provide social support in middle and old age? Yes, no, and maybe so. *Journal of Gerontology: Social Sciences, 48,* S212-S222.

Stoller, E., & Pugliesi, K. (1991). Size and effectiveness of informal helping networks: A panel study of older people in the community. *Journal of Health and Social Behavior, 32,* 180-191.

Sugisawa, H., Liang, J., & Liu, X. (1994). Social networks, social support, and mortality among older people in Japan. *Journal of Gerontology: Social Sciences, 49,* S3-S13.

Taylor, R. J. (1985). The extended family as a source of support to elderly African-Americans. *The Gerontologist, 25,* 488-495.

Taylor, R. J. (1986). Receipt of support from family among Black Americans: Demographic and familial differences. *Journal of Marriage and the Family, 48,* 67-77.

Taylor, R. J., & Chatters, L. M. (1991). Extended family networks of older African-American adults. *Journal of Gerontology: Social Sciences, 46,* S21-S217.

Taylor, R. J., Chatters, L. M., Tucker, M. B., & Lewis, E. (1990). Developments in research on Black families: A decade review. *Journal of Marriage and the Family, 52,* 993-1014.

Thornton, N. C., White-Means, S. I., & Choi, H. K. (1993). Sociodemographic correlates of the size and composition of informal caregiver networks among frail ethnic elderly. *Journal of Comparative Family Studies, 24,* 235-250.

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