The Relative Contribution of Ethnicity Versus Socioeconomic Status in Explaining Differences in Disability and Receipt of Informal Care

Sharon Tennstedt and Bei-Hung Chang

New England Research Institutes, Watertown, Massachusetts.

Data from a comparative study of 1975 African American, Puerto Rican, and non-Hispanic White persons age 60 and older in a large Northeastern city were used to investigate the relative contribution of ethnicity and socioeconomic status (SES) to explaining differences in the need for and receipt of informal care. It was hypothesized that differences in disability would be related largely to SES, whereas ethnicity would account for most of the differences in the amount of informal care. The results of a path analysis argue in favor of a cultural rather than a socioeconomic explanation for between-group differences. SES had no direct effect on disability when controlling for ethnicity. Ethnicity did explain between-group differences in the amount of care. Even when controlling for disability, elders in the two minority groups received more informal care than did older White persons. The findings illuminate the important role played by ethnicity in explaining an older person’s need for and receipt of long-term care assistance.

The increasing size, ethnic diversity, and life expectancy of the older U.S. population have contributed to heightened interest in estimated demand for long-term care services. Yet, lack of precise estimates of demand for long-term care services has seriously hindered the development of coherent long-term care policy for elders in the United States. This is especially true for Latinos (Hayes-Bautista, Hurtado, Valdez, & Hernandez, 1992), the fastest growing ethnic group in the U.S., and other minority groups.

Projections for long-term care services can be based either on demand or on need. Extent of need for services is typically based on the prevalence of functional disability, whereas demand is determined by actual use of services. Because national data consistently show that need exceeds demand or use (Doty, 1986; Stone, Cafferata, & Sangl, 1987), projections based on need alone are likely to be inflated. The development of accurate long-term care projections based on demand requires a detailed understanding of the factors influencing utilization. In the case of minority elders, the influence of socioeconomic status (SES) and ethnicity on use of long-term care services must be disentangled. For example, if use is influenced more by SES, improvement in the economic circumstances of minorities could result in increased demand. However, if cultural preferences and patterns of behavior are a more important determinant, then increased demand for long-term care services may not inevitably result from changes in economic status. We know that, for older White populations, use (i.e., demand) is related to disability (i.e., need) but also to the receipt of informal care (Tennstedt, Crawford, & McKinlay, 1993). That is, controlling for disability, receipt of greater amounts of informal care is associated with less use of formal services. This suggests that, above and beyond disability or need, personal preferences and patterns of behavior—as influenced by ethnicity—are an important determinant of use of formal services. However, it would be the height of ethnocentrism to assume that what is observed for older Whites is also the case for older persons in various minority groups.

Further testimony of the importance of disentangling SES and ethnicity can be seen in the literature on families in minority groups. It is commonly assumed that minority families have a strong commitment to family—perhaps even stronger than that of White families—and are therefore highly likely to provide care for a disabled elder family member. However, there is evidence of changing family structures and social roles for minority women that might influence their availability to provide care even if their willingness to care remains intact. For example, they are less likely to be married, more likely to head families on their own, more likely to have children at younger ages and outside of marriage, and more likely to work (Ortiz, 1995). In sum, socioeconomic challenges might override cultural preferences in influencing the provision of informal care in minority groups.

The objective of the present study is to better understand how care for disabled elders is influenced by SES and ethnicity. Data from a community-residing sample of African American, Puerto Rican, and non-Hispanic White persons age 60 and older are used to investigate the relative contribution of ethnicity and SES to explaining differences in the need for and receipt of informal care.

Differences in Functional Disability

The relationship between ethnicity and type and severity of disability, the most commonly used indicator of need for long-term care, is unclear. What little work has been done tends to compare the rate of disability for a single minority population with that of older White persons. While some studies suggest that the prevalence of disability is higher for elderly Blacks than for Whites (Markides & Mindel, 1987; Shanas, 1980), other work suggests that these differ-
ences may be minor (Rogers, Rogers, & Belanger, 1992; Cornoni-Huntley, Brock, Ostfeld, Taylor, & Wallace, 1986; O'Donnell, 1989; Mendes de Leon, Fillenbaum, Williams, Brock, Beckett, & Berkman, 1995), especially among the oldest-old. A so-called “cross-over” of White and Black mortality rates has been reported, such that Black mortality rates, consistently higher than for Whites to age 75, become lower after age 75, with the difference widening progressively into advanced old age (Jackson, 1985; Manton, 1980). Although scant, existing longitudinal research supports this idea, suggesting a stronger linear relationship between age and disability among Whites than among Blacks (Gibson, 1991; Ford, Haug, Jones, Roy, & Folar, 1990). For older Puerto Ricans, the data reveal a higher prevalence of poor health than for non-Hispanic Whites (Cantor, 1979; Sotomayor & Randolph, 1988; Bastida & Gonzalez, 1993), but relatively little is known about the prevalence of disability among older Puerto Ricans. An analysis of data from the AHEAD study by Smith and Kington (1997) reveals that Hispanics are more functionally disabled than Blacks or Whites. However, there was no differentiation of this finding by Hispanic subgroups. One study (O'Donnell, 1989) found Puerto Ricans to be more disabled than Blacks and Whites and suggested that greater disability among Puerto Rican elders begins relatively early and, unlike the picture for Blacks, extends throughout the aging years. Greene and Monahan (1984) reported a similar pattern of greater functional disability among Mexican Americans as compared with Whites. Data from the 1988 National Survey of Hispanic Elderly People also indicate that Puerto Ricans are more disabled than Mexican Americans and Cuban Americans (Burnette & Mui, 1995).

Socioeconomic factors are believed to provide the primary explanation for increased levels of disability among minority ethnic groups as compared with Whites. Empirical data consistently indicate that persons with low SES have higher rates of mortality and morbidity than those with high SES (Antonovsky, 1967; House, Kessler, Herzog, Mero, Kinney, & Breslow, 1990; Williams, 1990). Further, data from the National Survey of Income and Program Participation (SIPP) and the National Health Interview Survey reveal an inverse relationship between SES and functional disability and restricted activity days (Longino, Warheit, & Green, 1989; Taeuber, 1992). The reasons for this association of SES and health are not entirely clear. House et al. (1990) have suggested that persons with higher SES are able to postpone morbidity and disability until relatively late in life, whereas persons with low SES experience significant levels of mortality, morbidity, and disability beginning in midlife. Possible reasons for this include limited access to health care, selective mobility, selective survival, and exposure to psychosocial, behavioral, and environmental factors. House, Kessler, Herzog, Mero, Kinney, and Breslow (1992) later concluded that it is the latter that “substantially explains the social stratification of aging and health” (p. 23). However, SES is unlikely to explain all observed variation in disability across minority ethnic groups. For example, in two studies (O'Donnell, 1989; Rogers et al., 1992) ethnic differences are observed even after controlling for SES.

Differences in Receipt of Care

Families continue to be recognized as the primary source of long-term care for functionally disabled elders (Doty, 1986; Stone et al., 1987; Tennstedt & McKinlay, 1989). Non-kin are another source of assistance, either in addition to or in the absence of family care (Cantor, 1979; Stone et al., 1987; Tennstedt & McKinlay, 1989). All of this informal or unpaid care has been estimated to account for up to 80% of long-term care needs (Stone et al., 1987; Doty, 1986). While formal services are often used to supplement informal care, only a small proportion of elders rely exclusively on formal services for needed help (Doty, 1986; Short & Leon, 1990; Stone et al., 1987; Tennstedt et al., 1993). The majority of research on disabled elders and their receipt of care has been conducted with Anglo populations. More recently, attention has been directed to African Americans (Haley et al., 1995; Hinrichsen & Ramirez, 1992; Lawton, Rajagopal, Brody, & Kleban, 1992; Miller, McFall, & Campbell, 1994; Miller et al., 1996; Mui, 1992; Taylor & Chatters, 1991) and Hispanics (Burnette & Mui, 1995; Cox & Monk, 1990; Miller et al., 1996; Wallace, Campbell, & Lew-Ting, 1994; Wallace, Levy-Storms, & Ferguson, 1995).

However, there are limited data comparing African Americans, Hispanics and non-Hispanic Whites. Available data regarding African Americans and Hispanics are concerned primarily with differences in family structures or living arrangements, usually in comparison to White persons but not to other ethnic minority groups. While the recent work of Miller and colleagues (Miller et al., 1994, 1996) has investigated ethnic group differences in source and type of care using national data sets, the analyses were limited to general categories of providers and types of services.

Ethnic differences in family structure have been well documented. African Americans and Puerto Ricans generally have larger families, consisting of a wider range of kin as well as non-blood relatives, than do non-Hispanic Whites (Delgado & Humm-Delgado, 1982; Greene & Monahan, 1984; Mitchell & Register, 1984). However, this similarity between the two minority ethnic groups does not extend to their living arrangements. Older Puerto Ricans are more similar to older Whites in that they are likely to live alone (Cantor, 1975; Lacayo, 1980; Sanchez-Ayendez, 1988; Soldo, 1985) whereas African American elders are more likely to live in, and head, multigenerational households that include a wider range of kin (Ford et al., 1990; Jackson, 1985; Mutchler, 1990; Soldo, 1985). Yet all three groups are likely to live in close proximity to children and to see them frequently (Sanchez-Ayendez, 1988; Taylor, 1985; Tennstedt & McKinlay, 1989).

The modified extended families of African Americans and Puerto Ricans are thought to increase the informal care resources of older persons in these two groups (Chatters, Taylor, & Jackson, 1985, 1986; Miller, McFall, & Montgomery, 1991). Contacts with and participation in church activities, social clubs, and ethnic merchants have also been reported as additional sources of support for both groups (Delgado & Humm-Delgado, 1982; Hatch, 1991). Yet, most of the conclusions drawn about informal care networks have been derived from studies of family relationships. For
example, increased reciprocity between older and younger family members has been reported for both African Americans and Hispanics compared to Whites (Cantor 1979; Hatch, 1991; Jackson, 1980; Maldonado, 1985; Sanchez-Mayers, 1985; Sotomayor, 1973), but less is known about the specific types and amounts of help provided to older persons. Further, the data are inconsistent, reporting both ethnic differences (Cantor, 1979; Hays & Mindel, 1973; Mitchell & Register, 1984) and similarities (Mindel, Wright, & Starrett, 1986). Cantor’s (1979) study was the only one to compare African Americans, Whites, and Hispanics and reported that Hispanics received the most help, but that African Americans and Whites received similar amounts of help.

Relatively little research has investigated the association between SES and receipt of care. A recent study by Krause and Borawski-Clark (1995) tested for social class differences in social support among older adults. Although they found social class variations in social support, there were no differences in the amount of social support (including instrumental help) received across levels of income or education. Few older people use community services, but of those who do, use is higher by persons with low SES (Longino et al., 1989). This might be related more to the practice of means testing for eligibility for publicly funded community services than to the lack of informal care.

In sum, available data regarding receipt of care by various ethnic groups are limited in scope and comparability. Consequently, any findings regarding reasons for differential use remain inconclusive.

What Accounts for Ethnic Differences in Need for and Receipt of Long-term Care?

The majority of studies to date suggest important differences in rates of disability, family structures, living arrangements, and support networks of older Black, Puerto Rican, and White persons. However, the lack of comparability across studies and design limitations hamper the ability to draw definitive conclusions and, importantly, to unravel the explanation for these differences. Several studies have addressed the two prevailing arguments for ethnic differences—the socioeconomic argument and the cultural argument—but results are inconclusive. While these data suggest that both the cultural argument and the socioeconomic argument are important to explaining ethnic differences in needs for and patterns of care, the relative contribution of each of these factors remains poorly understood. In the present study, we hypothesize that socioeconomic status will largely account for variations in functional disability, or need for long-term care, across ethnic groups, and that ethnicity will account for differences in patterns of receipt of informal care. To test this hypothesis, data were gathered to investigate differences between African American, Hispanic, and non-Hispanic White elders regarding needs for long-term care assistance (i.e., disability) and sources and types of care received to address these needs. Because of the cultural diversity among Hispanics (Solís, Marks, Garcia, & Shelton, 1990), the study focused specifically on Puerto Ricans, the second largest group of Hispanics in the U.S. (U.S. Bureau of the Census, 1991) and the predominant Hispanic group in the Northeast (U.S. Bureau of the Census, 1989), in order to avoid obscuring between-group differences that could result from variability in Hispanic culture. Similarly, because of cultural diversity among Blacks, the study focused on U.S. mainland-born African Americans. The focus of analysis is also limited to informal care. Previous work (Cantor, 1979; Horowitz, 1985; Soldo, Agree, & Wolf, 1989; Tennstedt, Sullivan, McKinlay, & D’Agostino, 1990) has consistently related the receipt of informal care to the low use or non-use of formal long-term care services.

The Proposed Model

A path model (Figure 1) is proposed to explain the effects of SES and ethnicity on functional disability and the receipt of informal care. In the context of this model, it is hypothesized that (a) SES has a direct effect on disability across ethnic groups, and (b) ethnicity has direct as well as indirect effects on the amount of informal care received. To simplify presentation, Figure 1 depicts only the hypothesized paths with solid lines. There are many other potential paths implied in this model as well. In relation to the first hypothesis, this model is based on the assumption that SES will be influenced by the key sociodemographic characteristics of gender, age, and ethnicity and, in turn, will influence directly the extent of functional disability. This direct effect of SES on disability is hypothesized based on prior cited work of House et al. (1990), Longino et al. (1989), and Tauber (1992), revealing an inverse relationship between SES and functional disability. In terms of the second hypothesis, the model assumes that the hours of informal care received are influenced by cultural preferences and patterns of behavior associated with ethnicity (direct effect) as well as by other factors that may or may not be influenced by ethnicity (indirect effects). These other factors are ones that have been associated with informal care in previous studies, including gender, age, level of disability, and living arrangement (Horowitz, 1985; Soldo, 1985; Tennstedt & McKinlay, 1989; Tennstedt et al., 1990). This model assumes that there are recursive (unidirectional) effects among the intervening variables. For example, level of disability is determined by ethnicity, gender, age, and SES; living arrangement is determined by ethnicity, gender, age, SES, and level of disability.

Methods

Sample

The Springfield Elder Project is a comparative observational study investigating the needs for assistance with daily living activities and the sources (both informal and formal) and patterns of this help within and between African American, Puerto Rican, and White elders age 60+. The study was located in Springfield, Massachusetts, for several reasons: (a) the older population is socioeconomically diverse; (b) the city has sufficiently sized populations of older African Americans and Hispanics; and (c) the city is a major point of population dispersal for Puerto Ricans, who make up almost the entire Hispanic population in the city. This permitted focusing on one Hispanic subgroup in order to avoid obscuring any between-group differences that could result from variability in Hispanic culture.
The population-based sample was identified using two sampling frames—the Medicare Enrollment Data Base (EDB) and the local annual census list. Use of the two frames was necessary to compensate for data limitations in each frame. The local census list was used to identify Puerto Ricans primarily because of two problems in the Medicare Enrollment Data Base: (a) lack of identified Hispanic origin and (b) concern with potential undercoverage of Puerto Ricans. Because race and/or ethnicity are not indicated in this census list, Hispanic surnames were identified manually by the staff of a local Hispanic service and advocacy agency. These names were then cross-matched with those in the Medicare EDB to identify any additional Hispanic surnames not included in the census list. The Medicare EDB was used to randomly select the samples of African American and White persons age 65+. These files list race as "white, black, other." Names were sorted by race, with race being confirmed at time of first contact. Then, to obtain a sample of African American and White persons age 60–64, the local census list was used because Medicare coverage in this age group is limited to the disabled. Because race was not identified in the census list, the first respondent contacted included screening for race by self-report of the potential African American and non-Hispanic White respondents in this age group.

Identification of all Puerto Ricans in Springfield was attempted because of the limited number of persons in this group. The size of this sample was used to determine the sizes of the random samples of African Americans and Whites. To be able to do this, the separate samples of African Americans and Whites were randomly ordered and contacted in order until the desired number of respondents was obtained. Respondents in all three groups were contacted simultaneously at similar rates. However, by the time all Puerto Ricans had been identified and contacted, large numbers of African Americans and non-Hispanic Whites had been enrolled in the study. Therefore, the sample sizes for each group are not equal, as initially intended.

A primary concern in constructing a sampling scheme is that samples of key subgroups must be large enough to permit reliable estimation of rates, means, etc. as well as meaningful statistical comparisons among them. This requirement can be troublesome, particularly if some of the subgroups of interest constitute relatively small proportions of the target population, as they do in this study. For example, comparison of prevalence rates of disability between age groups (60–74 vs 75 and older) involve small numbers in the older age group, particularly in the African American sample. This is related to both lower life expectancy and the mortality crossover effect (Manton, Poss, & Wing, 1979) in African Americans. To ob-

---

Figure 1. Path model. Dashed lines represent paths that were not hypothesized. Coefficients are unstandardized. *p < .05; **p < .01; ***p < .001.
taint an adequate sample from the older age group, as well as
to ensure comparability in the age distribution for African
American, White, and Puerto Rican elders, the samples of
African American and White elders were stratified on age
using two strata (60–74 and 75 and older). The percentage of
randomly sampled African American and White elders from
each of these strata matched the corresponding percentages
found in the group of Puerto Rican elders.

Data Collection
A two-stage field design was used. In the first stage, data
were collected from the older persons. Respondents were
first screened for functional disability. A respondent was
considered disabled when she or he reported "substantial
difficulty" with at least one of 13 personal activities of daily
living (ADLs; e.g., bathing, dressing, toileting), instrumen-
tal activities of daily living (IADLs; e.g., meal preparation,
housecleaning, transportation), or mobility (e.g., walking
inside or outside the home). If not disabled, a brief, (i.e.,
15-minute) interview was conducted collecting sociodemog-
ographic data and information regarding their natural support
system to investigate potential sources of informal care. El-
ders identified as functionally disabled (n = 977; 49.5% of
respondents) received a more extensive interview (30 min-
utes), collecting data regarding their informal caregiving
network, the help provided by these caregivers, and their
use of formal long-term care services. If receiving informal
care, the name, address, and telephone number of the per-
son providing the most help (i.e., the primary caregiver)
was gathered.

In the second stage, telephone interviews (50 minutes)
were conducted with primary informal caregivers (response
rate 90.9%). The detailed data regarding the types and
amount of help provided were collected from the caregiver.

Dispositions and response rates are displayed in Table 1. The
sample for this analysis consists of the 977 function-
ally disabled elders.

Measures
Variables considered in the analyses included elder char-
acteristics: Ethnicity, Age (in years), Gender, Level of
Functional Disability, Living Arrangement (alone vs with
others), and Socioeconomic Status. Ethnicity of the care re-
cipient was measured as self-reported African American
(defined as non-Hispanic Black), Puerto Rican, or White
(non-Hispanic). We focused on ethnicity rather than on race
for purposes of defining the groups of comparison because
we thought that culture, through values and preferences,
might influence the receipt of informal care. Level of func-
tional disability was determined on the basis of responses
to each of 13 activities in three dimensions: basic ADLs
eating, bathing, dressing, bed transfers, and toileting),
IADLs (using the telephone, heavy housework, light house-
work, preparing meals, shopping, managing money), and
mobility (walking inside and outside). Using measures em-
ployed in the Longitudinal Study on Aging (Fulton, Katz,
Jack, & Hendershot, 1989), level of disability was mea-
sured by the number of tasks with which the older respon-
dent reported substantial difficulty, as described above.

Socioeconomic status was measured by the Nam-Power
Socioeconomic Index (Nam & Power, 1983), which ranks
primary occupation on a scale of 1–100, based on the me-
dian level of education and median income associated with
that occupation as derived from census data. This index was
selected for several reasons. First, it provides a measure of
occupational status, which refers to the objective socioeco-
nomic conditions associated with holding a particular occu-
pation that have been reported to be associated with health
status. Second, by including a greater range of scores (i.e.,
1–100), it is more likely to capture variability in SES in the
two ethnic groups that tend to be of lower SES than Cau-
casians. Other measures of SES, such as the Hollingshead
Two-Factor Index of Social Position (Hollingshead &
Redlich, 1958) which produces a five-category index, mini-
mize variability of SES in the minority ethnic groups be-
cause most persons in these groups are categorized at one
or two levels. Third, the occupational status score is based
on the median values of educational level and income,
avoiding the time-associated movement away from statisti-
cal averages. To determine the occupational score, the re-

<table>
<thead>
<tr>
<th>Dispositions</th>
<th>African Americans</th>
<th>Puerto Ricans</th>
<th>Whites</th>
<th>Total Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Sample Elders Screened</td>
<td>962</td>
<td>85.1</td>
<td>1129</td>
<td>76.6</td>
</tr>
<tr>
<td>Eligible respondents</td>
<td>682</td>
<td>76.6</td>
<td>702</td>
<td>78.6</td>
</tr>
<tr>
<td>Disabled*</td>
<td>324</td>
<td>285</td>
<td>417</td>
<td>998</td>
</tr>
<tr>
<td>Nondisabled</td>
<td>358</td>
<td>223</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No contact</td>
<td>34</td>
<td>165</td>
<td>28</td>
<td>227</td>
</tr>
<tr>
<td>Refusals</td>
<td>86</td>
<td>16</td>
<td>163</td>
<td>265</td>
</tr>
<tr>
<td>Ineligible*</td>
<td>160</td>
<td>357</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample Caregivers Identified</td>
<td>148</td>
<td>208</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respondents</td>
<td>151</td>
<td>194</td>
<td>84</td>
<td>409</td>
</tr>
<tr>
<td>Refusals</td>
<td>15</td>
<td>9</td>
<td>11</td>
<td>35</td>
</tr>
<tr>
<td>No contact</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ineligible*</td>
<td>1</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*At least one functional disability.
*Ineligibles, excluded from response rate calculation, consist of incorrect ethnicity, age <60, outside study area.
respondents were asked for the primary, preretirement occupations of both themselves and their spouses. Spousal data were collected even if the respondent was currently widowed or divorced. Because we were interested in the respondent’s access to resources in earlier years that might be related to their current disability status, the occupation for the major earner was used. In this cohort, it was typically the husband. For never-married respondents, their own primary occupation was used to determine their score.

Finally, the hours per month of informal care as reported by the caregiver were collected for each of six types of informal care (personal care, housekeeping, meals, transportation, financial management, arranging services). Hours per month for each type of informal care were summed to obtain total hours per month of informal care. Because elders in the two minority groups were found to be more likely than White elders to receive each type of informal care (Tennstedt & Chang, in review), the total hours of care used as the outcome measure in order to increase the statistical power for this analysis. In the case of missing data for hours of care (i.e., caregiver was not interviewed), hours of care was estimated using multiple model-based imputation (Crawford, Tennstedt, & McKinlay, 1995). If an elder respondent reported no informal caregiver, hours of informal care was assumed to be zero.

**Statistical Analysis**

Path analysis was used to test our proposed model and study hypotheses. To estimate the path regression coefficients of the proposed model, six ordinary least-squares (OLS) regression models were developed using the procedure PROC REG in SAS (SAS Institute, 1989). Each of the five intervening variables and the outcome variable Log Hours of Informal Care was the dependent variable of each of the six regression models (Yi-Y6 in Figure 1). The independent variables in a regression model are the variables preceding its dependent variable in the path model. More specifically, the first hypothesis was tested by the model that regresses disability on SES, ethnicity, gender, and age. The second hypothesis regarding the direct effect of ethnicity on amount of informal care received was tested by the model that regresses log hours of care on ethnicity, gender, age, social class, disability, and living arrangement. Because ethnicity is a categorical variable (3 categories), indicator variables were used for the regression analysis in order to do pairwise comparisons, i.e. comparing Puerto Ricans versus Whites, African Americans versus Whites, and Puerto Ricans versus African Americans. Therefore, the effect of ethnicity on disability was expressed as the mean difference in the number of ADL disabilities between two ethnic groups. The effect of ethnicity on amount of care received was expressed as the mean difference in log hours between two ethnic groups. The Hours of Care variable was log transformed due to the skewness of the distribution. Because some elders received zero hours of care, one hour was added to the value of hours variable for log transformation.

We also estimated the total effects, direct effect, and the components of indirect effects of ethnicity on disability by another series of OLS regression models (Alwin & Hauser, 1975). Level of disability was used as the dependent variable in this series of regression models. The total effects can be estimated when Ethnicity is the only independent variable in the model. Gender, Age, and Social Class were then added into the regression models as independent variables one at a time. The direct effect was estimated by the model that included ethnicity and the three variables as the independent variables. The indirect effects that were transmitted by each of these three variables were also estimated using the results obtained from this series of regression models.

The second hypothesis was tested by estimating the total effects, direct effect, and the components of indirect effects of ethnicity on hours of care by another series of OLS regression models, using log hours of informal care received as the dependent variable, and the five intervening variables as the independent variables.

**RESULTS**

**Sample Characteristics**

Sample characteristics by ethnic group are displayed in Table 2. Group comparisons were made using analysis of variance (ANOVA) for continuous measures and Pearson chi-square for categorical measures. While almost two-thirds of the elder respondents were female in all three groups, the non-Hispanic White elders were older, of higher SES, and less disabled than both the African American and Puerto Rican respondents. The Puerto Rican respondents,

<table>
<thead>
<tr>
<th>Table 2. Characteristics of the Study Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>African Americans (n = 323)</td>
</tr>
<tr>
<td>%</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Gender: female</td>
</tr>
<tr>
<td>Age (range: 60-105)**</td>
</tr>
<tr>
<td>Social class (range 0-100)***</td>
</tr>
<tr>
<td>Level of disability (range: 1-13) ***</td>
</tr>
<tr>
<td>Living arrangement: with others</td>
</tr>
<tr>
<td>Has informal caregiver(s) ***</td>
</tr>
<tr>
<td>Log hours of informal care****</td>
</tr>
</tbody>
</table>

*Calculated on non-zero hours of care.

*p < .05; **p < .01; ***p < .001.
in contrast, were the youngest of the three groups, of lowest SES, and the most disabled. They were the most likely to have informal caregivers and received more hours of informal care. While the between-group difference was not statistically significant, Puerto Ricans were the least likely to live with others. Across all these characteristics (with the exception of gender), the African American respondents generally fell between the Puerto Rican and White respondents. That is, in comparison to White respondents, they were younger, of lower SES, more disabled, less likely to live with others, and more likely to have informal caregivers. However, African American and White elders received similar amounts of informal care.

It was hypothesized that SES would largely explain between-group differences in level of disability. However, the path analysis results (Figure 1) indicated that SES had no significant direct effect on disability. Rather, ethnicity, as well as age, had significant direct effects on disability. In terms of the direct effect of age, the older the elders were, the more likely they would be disabled regardless of their ethnicity, gender, and SES. As for the direct effect of ethnicity on disability, Puerto Rican elders were the most disabled and White elders were the least disabled among the three ethnic groups after controlling for age, gender, and SES. The R² for this model was .10.

The total effects of ethnicity on level of disability were decomposed into direct and indirect effects to further explain how ethnicity affected disability through gender, age, and SES. As indicated in Table 3, the indirect effect of ethnicity through gender was close to zero. That is, gender did not explain any of the between-group differences in level of disability. There was a small negative indirect effect of ethnicity on disability through age, and a small positive effect on disability through SES. However, the observed ethnic difference in disability that can be explained by SES is minimal (=5%). Overall, these three factors combined explain only a small portion of the ethnic between-group difference in level of disability. In sum, therefore, these results do not support our hypothesis that ethnic differences in disability can be explained largely by SES.

The second hypothesis, that ethnicity would directly as well as indirectly influence the amount of informal care received, was supported strongly by the results of the path analysis. The R² for this model was .31. The total effects of ethnicity on hours of care (as expressed by the mean difference in log hours between two ethnic groups) were divided into direct and indirect effects (Table 4). Looking at total effects first, Puerto Rican elders received more hours of care than both White and African American elders, and African American elders received more care than White elders. Fifty-two percent (.47/.90) of the log hours difference between Puerto Rican and White elders can be explained by gender, age, SES, disability, and living arrangement. These five factors also explain the majority (74%) of the difference in amount of care between African American and White elders and 37% (.19/.52) of the difference in amount of care between Puerto Rican and African American elders. Yet, after controlling for these five factors, Puerto Rican elders still received .43 more log hours of care than White elders and .33 more log hours of care than African American elders, indicating the important influence of ethnicity on receipt of informal care.

The total indirect effects were further decomposed into components that were intervened by each of the five factors.

Table 3. Decomposition of the Effects of Ethnicity on Disability; Mean Differences in Level of Disability Between Two Groups

<table>
<thead>
<tr>
<th>Ethnic Group Comparison</th>
<th>Gender (Male)</th>
<th>Age</th>
<th>SES</th>
<th>Total Indirect Effect</th>
<th>Direct Effect</th>
<th>Total Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Puerto Rican-White</td>
<td>0.0</td>
<td>-.20</td>
<td>.10</td>
<td>-.10</td>
<td>2.05</td>
<td>1.95</td>
</tr>
<tr>
<td>African American-White</td>
<td>.01</td>
<td>-.12</td>
<td>.04</td>
<td>-.07</td>
<td>1.10</td>
<td>1.03</td>
</tr>
<tr>
<td>Puerto Rican-African American</td>
<td>-.01</td>
<td>-.08</td>
<td>.05</td>
<td>-.04</td>
<td>.96</td>
<td>.92</td>
</tr>
</tbody>
</table>

*The indirect effect via one specific variable was adjusted for all its preceding variables in the path, e.g., the indirect effect via SES was adjusted for gender and age.

*Direct effect is the effect adjusting for gender, age, and SES.

*Total effects is the unadjusted mean difference between two groups.

Table 4. Effects of Ethnicity on Hours of Informal Care; Mean Differences in Log Hours Between Two Groups

<table>
<thead>
<tr>
<th>Ethnic Group Comparison</th>
<th>Gender (Male)</th>
<th>Age</th>
<th>SES</th>
<th>Disability</th>
<th>Live With Others</th>
<th>Total Indirect Effects</th>
<th>Direct Effect</th>
<th>Total Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Puerto Rican-White</td>
<td>0</td>
<td>-.04</td>
<td>-.02</td>
<td>.57</td>
<td>-.04</td>
<td>.47</td>
<td>.43</td>
<td>.90</td>
</tr>
<tr>
<td>African American-White</td>
<td>.01</td>
<td>-.03</td>
<td>-.01</td>
<td>.31</td>
<td>0</td>
<td>.28</td>
<td>.10</td>
<td>.38</td>
</tr>
<tr>
<td>Puerto Rican-African American</td>
<td>-.01</td>
<td>-.01</td>
<td>-.01</td>
<td>.27</td>
<td>-.05</td>
<td>.19</td>
<td>.33</td>
<td>.52</td>
</tr>
</tbody>
</table>

*The indirect effect via one specific variable was adjusted for all its preceding variables in the path, e.g., the indirect effect via disability was adjusted for gender, age, and SES.

*Direct effect is effect adjusting for gender, age, SES, disability, and living arrangement.

*Total effects is the unadjusted mean difference.
(Table 4). Disability explained the majority of the indirect ethnic difference in log hours of care received. This implies that minority elders received more hours of informal care mainly due to higher disability (controlling for gender, age, and SES). The indirect effects that were intervened by the remaining four factors were small and negative. For example, minority elders received fewer hours of care (.01 and .02 fewer log hours) due to their lower SES and being younger (.03 and .04 fewer log hours) than the White elders.

The path diagram displayed in Figure 1 can be used to explain the different ways in which these five factors intervened on the effects of ethnicity on hours of care received. That is, ethnicity can affect hours of informal care in many ways. Depending on a specific path, being in one ethnic group might result in either less or more care than for those in one of the other two ethnic groups. Some of the paths in Figure 1 are described to illustrate the complexity of this ethnic influence on amount of informal care received. Only the paths in the model for which the regression coefficients were significant at the level of $p \leq .10$ are depicted in Figure 1. For example, compared to White and African American elders, Puerto Rican elders were more likely to be disabled (adjusting for gender, age, and SES), and therefore received more hours of care. African American elders received more care than White elders by the same path. Another path—through age and living arrangement—also results in more hours of care for elders in the two minority groups. Compared to White elders, both Puerto Rican and African American elders were younger and therefore were more likely to live with others. For these younger minority elders, this resulted in more hours of care. However, yet another path illustrates how minority group membership results in receipt of less informal care. Looking at the path of ethnicity through SES and living arrangement, these elders in the two minority groups received less care than White elders. That is, Puerto Rican and African American elders were of lower SES than White elders. Related to this, they were less likely to be living with others and therefore ultimately received less care.

**DISCUSSION**

These results support previous findings that ethnic minority groups are more disabled and receive more care than their Caucasian counterparts. Overall, the results argue in favor of a cultural rather than a socioeconomic explanation for these between-group differences. Socioeconomic status had no direct effect on disability, contrary to our hypothesis. Its effect on amount of informal care received was minimal and only indirect through its effect on the elder's living arrangement. While the strong effects, both direct and indirect, of ethnicity on amount of informal care received were plausible and as expected, the negligible effect of SES on disability was unexpected. However, the path results for the comparison of African Americans and Whites provide additional support for a sociocultural explanation for between-group differences in disability. Here too, as with the Puerto Rican–White comparison, SES had only an indirect and minimal effect on disability, with ethnicity explaining most of the variability in disability.

Overall, these results point out the important role played by ethnicity in explaining an older person's need for and receipt of long-term care assistance. Elders in the two ethnic minority groups, even when controlling for disability, received more informal care than did older White persons. A related analysis of data from this study (Tennstedt & Chang, 1996) indicates that they are less likely than White elders to use formal services, meaning that more of their needs are met informally. While not investigated in this study, this difference might be related to ethnic differences in the elder's preferred source of care (family vs service provider) or the caregiver's sense of familial responsibility to provide this care. Whatever the reasons, given that the needs for care of minority elders are greater than that for White elders, it is clear that African American and Puerto Rican caregivers are shouldering a great responsibility. Given their lower SES and the challenges associated with that status, the resiliency of these caregiving arrangements for disabled minority elders cannot be taken for granted. This concern is supported by the finding from this study that lower SES among the minority elders was associated with fewer caregivers and less informal care.

Before the socioeconomic argument for different patterns of care is abandoned, however, consideration must be given to the specific minority groups studied, particularly the Puerto Ricans. It is quite possible that these findings are related to the lower SES of the subgroup of Puerto Ricans living in the continental U.S. That is, the direct effect (or a stronger indirect effect) of SES on disability might have been masked by the lack of variability in SES among the Puerto Ricans in the sample. Puerto Ricans who live on the mainland are not representative of all Puerto Ricans. Those who moved from the island to the mainland came in search of employment and economic improvement. The majority of them moved first to New York City with the lure of plentiful manufacturing jobs. When this work failed to materialize or proved only temporary, many moved to Hartford, Connecticut, and then to Springfield to work as seasonal farm laborers, often on tobacco farms. Not only men, but also those women not employed in domestic or service jobs, worked on these farms. The work was hard physical labor and likely contributed to subsequent disability in their later years. The ones who remained on the mainland rather than returning to Puerto Rico were often those without the экономic means to return, i.e., those of lower SES. However, as plausible as this explanation seems, the only way it can be tested is through a study of a representative sample of all Puerto Ricans living on both the island and the mainland.

It must be noted that the path analysis in this study did not include use of formal services in the model, primarily because of low use of services by the study population. A related regression analysis to identify correlates of service use indicated that use was related only to the elder's level of disability. Ethnicity was not a correlate of formal service use (Tennstedt & Chang, 1996). It might be, as suggested by the path results reported here, that ethnicity influences formal service use through its effect on disability. If this is so, minority elders would be expected to use more community long-term care services. However, in this sample, there were no significant between-group differences in the amount of formal service use. This is consistent with na-
tional and community-based estimates of prevalence of long-term care service use comparing African American, Hispanic, and non-Hispanic White elders (Miller et al., 1996; Mui & Burnette, 1994). Therefore, the focus of this analysis on amount of informal care, particularly because it is the predominant source of care, is not only justified but also provides the most valuable information yet regarding factors influencing community care of disabled elders.

Finally, this study was conducted in a large Northeastern city with specifically defined minority groups. Therefore, the results cannot be generalized to all Blacks and Hispanics in the U.S. However, this apparent limitation in study design can also be viewed in a more positive light. This study provides a wealth of data about disabled older persons in three groups living in an urban area serviced by a single state-funded home care program. Therefore, decisions about the use of community service vis à vis receipt of informal care ostensibly were not influenced by service availability. As noted by Miller et al. (1996), the results from this type of area study can be more policy-relevant than national data sets because these services are provided and used in local cultural contexts. Contextual variability can be lost in aggregated national data, an important consideration when studying ethnic subgroups (e.g., Hispanic and Asian) or regional areas.

ACKNOWLEDGMENTS

This research was supported by National Institute on Aging Grant AG-11171. The authors acknowledge the helpful comments of Renee Lawrence and Anne Noonan.

Address correspondence to: Dr. Sharon Tennstedt, New England Research Institutes, 9 Galen Street, Watertown, MA 02172. E-mail: sharont@neri.org

REFERENCES


Received October 10, 1996
Accepted April 29, 1997