

# *The Relation of Social Isolation, Loneliness, and Social Support to Disease Outcomes Among the Elderly*

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**Objectives:** This study examined relations between social isolation, loneliness, and social support to health outcomes in a sample of New Mexico seniors. **Method:** We used random-digit dialing to obtain a random sample of 755 southern New Mexico seniors. Participants answered questions pertaining to demographics, social isolation and loneliness, social support, and disease diagnosis including diabetes, hypertension, heart disease, liver disease, arthritis, emphysema, tuberculosis, kidney disease, cancer, asthma, and stroke. The sample allowed for comparison of Caucasian and Hispanic participants. **Results:** Correlational and logistic analyses indicated that belongingness support related most consistently to health outcomes. Ethnic subgroup analysis revealed similarities and differences in the pattern of associations among the predictor and outcome variables. **Discussion:** The results demonstrate the importance of social variables for predicting disease outcomes in the elderly and across ethnic groups.

**Keywords:** *social support; loneliness; isolation; aging; Hispanic*

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*Social isolation, loneliness, and lack of adequate support* are social conditions that exact a significant toll on psychological well-being and physical health, with the costs of these conditions particularly

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high among retired and elder population (G. D. Cohen, 2000; Sorkin, Rook, & Lu, 2002). Demographic trends in retirement, dissolution of the traditional family, and increased geographic mobility all compound this situation. Moreover, trends in these variables suggest that loneliness and social isolation will only increase as time passes, particularly as the baby boomer generation ages.

Research has shown diverse negative health effects of isolation, loneliness, and low support including now-classic investigations relating these conditions to all-cause mortality and morbidity (Cassell, 1976; Cobb, 1979; S. Cohen & Syme, 1985; House, Landis, & Umberson, 1988). The effect of these social conditions on cardiovascular health has been a particularly prosperous avenue of research (Uchino, Cacioppo, & Keicolt-Glaser, 1996).

In this article, we examine the relation of isolation, loneliness, and social support to multiple disease outcomes in a random probability sample of southwestern United States seniors. We first briefly review the primary social concepts including isolation, loneliness, and then examine research relating these conditions to physical health outcomes. We conclude the introduction with an overview of the present investigation.

*Social Conditions:  
Isolation, Loneliness, and Social Support*

Social isolation, loneliness, and social support reflect related but distinct social conditions. Social isolation typically refers to objective physical separation from other people, such as living alone or residing in a rural geographic area. Loneliness, in contrast, refers to the more subjective feeling state of being alone, separated, or apart from others. Loneliness has also been conceptualized as an unfavorable balance between actual and desired social contact (see Ernst & Cacioppo, 1999). Although isolation and loneliness may be related, there is no necessary relationship between the two. For example, objective isolation may lead to feelings of loneliness in some individuals, whereas some objectively isolated people may never experience loneliness. Conversely, other individuals may feel lonely even while in the midst of a large social network—this latter idea is captured by the concept of alienation (Brennan & Shaver, 1990).

Because it reflects the reality or perception that one is part of a social network, social support is the natural counterpart to social isolation and loneliness. Similar to isolation and loneliness, social support has been conceptualized and assessed objectively and subjectively. So-called structural conceptions of support reflect the objective degree to which one is socially connected, whereas functional conceptions reflect the subjective perception of the availability of social resources, a close significant other, or a sense of group belonging. Like social isolation and loneliness, although positively correlated, there is no necessary relationship between structural and functional aspects of social support.

Social support is a multidimensional concept in at least two distinct ways. First, researchers differentiate among broad types of support, including such categories as tangible support, instrumental support, and emotional support. Tangible or instrumental support often consists of things such as actual physical assistance, financial assistance, information, or other help useful for solving a problem or answering questions. Emotional support, on the other hand, refers more to a feeling of group belonging or the feeling that one is cared for by some significant other or others. Second, researchers distinguish among different sources of support, including significant others such as partners or spouses, family members, friends, coworkers, neighbors, and even pets.

#### *SOCIAL ISOLATION, SUPPORT, WELL-BEING, AND HEALTH*

Research has shown fairly consistently that social isolation and loneliness are related to negative health outcomes and that social support of various types and from various sources is associated with positive health outcomes (Cassell, 1976; Cobb, 1979; S. Cohen & Syme, 1985; Ernst & Cacioppo, 1999; Gupta & Korte, 1994; House et al., 1988; Uchino, Uno, & Holt-Lunstad, 1999). Rewarding social relationships are also thought to be a key factor in psychological health, including happiness and subjective well-being (Myers & Diener, 1995).

Research examining the effects of social conditions such as isolation, loneliness, and social support has related these experiences to a wide variety of health outcomes. As noted, researchers have examined

their relation to all cause mortality and morbidity (Cassell, 1976; Cobb, 1979; House et al., 1988). The sheer scope of this effect indicates that the mechanisms underlying the toxic aspects of loneliness, isolation, and low support are sufficiently general to affect a wide range of systems and outcomes. Supporting this view, Uchino et al. (1999) have reviewed research relating social support to cardiovascular, neuroendocrine, and immune systems. Others have related social isolation to elevated hypothalamic-pituitary activity and the release of cortisol (Sapolsky, Alberts, & Altmann, 1997; Stanton, Patterson, & Levine, 1985). In addition, several studies have demonstrated social support's ability to buffer cardiovascular reactivity to stress (Allen, Blascovich, Tomaka, & Kelsey, 1991; Gerin, Pieper, Levy, & Pickering, 1992; Kamarck, Manuck, & Jennings, 1990). Finally, recent studies have shown how loneliness contributes to altered regulation of blood pressure, cortisol levels, sleep patterns (Cacioppo, Ernst, et al., 2002; Hawkey, Burleson, Berntson, & Cacioppo, 2003), and silent coronary problems (Sorkin et al., 2002).

Despite its volume, one limitation of this research is that it has been largely carried out on Caucasian populations. As such, little is known about the nature of these processes in Hispanic populations. This oversight is particularly egregious regarding Hispanics, who now comprise the largest minority population in the United States according to the most recent census. There are several reasons to suspect that support processes may differ in Hispanic versus Caucasian populations. For example, it is well known that the family and extended family play a more central role in Hispanic cultures and social lives. As such, one might expect family support to play a particularly critical role in the health and well-being of Hispanics. Conversely, lack of family support may be particularly damaging for Hispanics. This latter notion is consistent with the notion that loneliness reflects as an unfavorable balance between actual and desired social contact (see Brennan & Shaver, 1990; Ernst & Cacioppo, 1999)

#### *THE PRESENT INVESTIGATION*

The present study examined relations among social isolation, loneliness, and social support to health outcomes in a randomly selected population of southwestern residents aged 60 and above. This study

also examined these relations in Caucasian and Hispanic subsamples. Though not necessarily intended to be direct comparison, we examined several operations of isolation and support, including objective and perceived social isolation, and family and belongingness support. The primary outcomes were reports of disease diagnosis for ailments common in this age group. In general, we hypothesized that greater social isolation, greater loneliness, and lower social support would be associated with poorer health outcomes. In addition, we anticipated that the family support would play a greater role in the health of Hispanic participants, whereas belongingness support would play a bigger role in the health and well-being of Caucasians.

### *Method*

#### *PARTICIPANTS*

Seven hundred fifty-five southern New Mexico residents participated in this study. All participants were randomly selected for inclusion using a random-digit dialing procedure with the sole criteria for entry into the study being age of 60 years or greater and willingness to participate.

#### *MEASURES*

The present investigation employed measures of demographics, several isolation and support concepts, and disease outcomes. All measures for the present investigation were part of a larger survey designed to assess health status, mobility, and health needs among regional elderly. To keep the overall burden on survey participants to a minimum, scales for this study were necessarily brief. We used shortened versions of instruments in several cases and several measures were created specifically for this investigation. Many of the items in the larger survey came from previous health and needs assessment studies (Parkerson, Broadhead, & Tse, 1990; Ware, 1999). All instruments were translated to Spanish, then back translated to English to ensure the accuracy of the original Spanish translation. Modifications of the original translation were made as necessary.

*Demographics.* We assessed several demographic variables for possible inclusion in the study as descriptive information and as potential control variables. Demographic information included age, gender, ethnicity, income, and marital status.

*Social isolation.* We assessed social isolation structurally (i.e., objectively) and functionally (i.e., subjectively). Structurally, we used a question asking participants if they lived alone or with others and coded structural social isolation positively if the individual lived alone and negatively if he or she did not. We assessed social isolation more functionally with a single item assessing “Do you feel socially isolated?” coded no or yes.

*Loneliness.* Four items from the UCLA Loneliness Scale (Russell, Peplau, & Cutrona, 1980) assessed perceived loneliness. We chose the specific items for inclusion based on face validity and ease of translating the item’s meaning to Spanish. Individual items asked about the frequency of feeling a lack of companionship, feeling alone, feeling no longer close to anyone, and time spent by themselves. Each item was accompanied by a 4-point scale ranging from 1 = *never* to 4 = *always*.

*Family and belongingness social support.* We assessed social support from two sources—family and friends or groups—using scales constructed for this purpose. Three items assessed extent of social interaction with family including “I talk daily with family,” “I socialize with my family,” and “I spend several hours a day with my family.” Similar items assessed degree of interaction with friends and social groups. Three items assessed the extent to which “I participate in organized groups (e.g., senior centers, clubs, etc.),” “I socialize with a group of friends,” and “I talk daily with friends or neighbors.” All social support items were assessed on the same 4-point scale used for the loneliness items.

*Disease diagnosis.* We attempted to assess disease outcomes as objectively as possible and to avoid confounding by negative affectivity or neuroticism (see Watson & Pennebaker, 1989, and Costa & McCrae, 1990, respectively). To do so, we asked participants to

report on disease diagnoses by using the standard stem, "Your doctor has told you that you have. . . ." In each case, the stem was completed by a disease common to older populations including diabetes (high blood sugar; type 1 or type 2 combined), hypertension (high blood pressure), heart or coronary disease, tuberculosis, kidney disease, liver disease, cancer, arthritis, emphysema, asthma, and a stroke. Items were coded 1 = *yes* (true) or 0 = *no* (false). This method is consistent with the procedure used by the Centers for Disease Control and Prevention (CDC) in its annual Behavioral Risk Factors Surveillance Survey.

#### *PROCEDURE*

The present investigation was part of a 3-year health and needs assessment project conducted by the Center for Aging at the University of Texas at El Paso and Funded by the Paso Del Norte Health Foundation. Overall project goals included surveys of border seniors, focus groups, surveys of provider agencies, and review of demographic trends. Data for the current project were collected as part of Phase II of the project, which surveyed seniors in southern New Mexico, specifically Doña Ana and Otero counties. People in these counties come from a mix of urban and rural surroundings. Although much of the covered territory is rural, a great many individuals reside in the City of Las Cruces, New Mexico, a small to moderately sized urban area.

All survey procedures were conducted by Border Research Solutions, Inc., a local research and evaluation company, in collaboration with the Center for Aging. The survey was administered by phone to a random sample of 755 residents age 60 and older residing in Doña Ana ( $n = 384$ ) and Otero ( $n = 371$ ) counties. The survey sample was provided by Scientific Telephone Samples, Inc., using a targeted random-digit dialing sampling frame of residents 60 years and older residing in Doña Ana and Otero counties. Within each household sampled, the interviewer asked the informant to list the number of individuals 60 years and older in the household and their birth dates. The individual having had the most recent birthday was then invited to participate in the phone survey.

The survey instrument was administered by highly trained bilingual interviewers. Participants were allowed to choose whether they preferred to be interviewed in English or Spanish. Overall, the survey took approximately 15-30 min to complete. Approximately 46% of eligible seniors who were contacted in person agreed to participate in the study.

## *Results*

### *OVERVIEW OF STATISTICAL ANALYSES*

The results section is divided into preliminary and predictive analyses. The preliminary analyses include examination of general participant demographics, assessment of the representativeness of the sample, reporting of the psychometric properties of the measures, an examination of disease rates, and an exploration of ethnic differences in social support and disease rates. The predictive analyses use bivariate and logistic regression techniques to examine associations among and between the social support variables and disease outcomes. A final set of analyses examined whether self-reported limitations on physical activity mediated relations between the social support variables and disease outcome. Logistic regression was used for prediction because the disease outcomes were dichotomous. In addition to conducting analyses of the entire sample, we also conducted logistic regression analyses separately for the Hispanic and Caucasian subsamples. In each analysis, disease diagnosis was regressed on the isolation, loneliness, and social support variables using a forward conditional entry procedure in SPSS. Because age is typically related to disease prevalence, particularly in older samples, all logistic analyses controlled for age.

### *PRELIMINARY ANALYSES*

*Participant demographics and sample representativeness.* The average age of the sample was 71.11 years with a range of 60 to 92. The sample was majority female (59%). Seventy two percent reported their ethnicity as White or Anglo (i.e., Caucasian), twenty-three percent reported their ethnicity as Hispanic, and 5% reported other

categories. Given the demographics of the region, proximity of the U.S.-Mexico border, and typical migration streams, the vast majority of Hispanics were of Mexican descent. The average education level of the sample was 13 years with a range of 0 to 24 years. Most individuals (58%) reported annual incomes of \$25,000 or greater, with 39% reporting incomes of greater than \$35,000. Twenty-one percent reported incomes of less than \$15,000. As such, the sample had a high mean education, and moderate to high income levels, but with considerable range on both variables.

Although the sampling procedure clearly resulted in more Caucasians than Hispanics, the observed proportions were not particularly far from the actual ethnic distribution of the 60+ population in this region. This is mainly due to the fact that although the Hispanic population is growing rapidly, that growth has not yet reached the 60+ population and Caucasians are still the majority in this age range. Indeed, based on 2000 census numbers for these counties—where elders comprise 43% of the Doña Ana and 19% of the Otero county populations—we expected that Hispanics would comprise about 35% of our sample (weighted to account for the larger population of Doña Ana County). As such, our observation of 23% participation rate, while suggesting that Hispanics were somewhat underrepresented in our sample, also suggests that such underrepresentation was not as severe as it might appear given overall ethnic distributions of this region uncorrected for age. Although we have no way of knowing for sure, we suspect that the mild sampling bias may reflect differential access to telephones, willingness to participate, or other unknown factors.

*Scale properties.* Composite variables for loneliness, family support, and belongingness support were examined for internal consistency. The coefficient alpha was .71 for the loneliness composite, .76 for family support, and .67 for belongingness support.

*Disease diagnoses and social support.* Table 1 shows the overall frequencies of disease diagnoses, as well as comparisons between Hispanic and Caucasian participants. Lending validity to our self-report measures of disease outcomes, the prevalence rates show considerable correspondence with estimates of actual disease prevalence

Table 1  
Overall Disease Prevalence and Prevalence by Ethnic Background

Disease Diagnosis	Overall			Hispanic			Caucasian		
	Percentage	Frequency	F	Percentage	Frequency	F	Percentage	Frequency	F
Diabetes	14.4	108		22.7	39	16.86****	10.5	56	16.86****
Hypertension	43.2	324		45.3	78	0.43	42.5	227	0.43
Heart disease	19	142		14.6	25	3.06*	20.7	110	3.06*
Tuberculosis	0.9	7		0.6	1	0.53	1.1	6	0.53
Kidney disease	4.3	32		5.3	9	0.39	3.8	20	0.39
Liver disease	2.0	15		1.2	2	0.32	2.4	13	0.32
Cancer	14.3	107		7	12	9.68****	16.5	88	9.68****
Arthritis	56.6	423		57	98	0.91	56.5	300	0.91
Emphysema	6.8	51		2.9%	5	5.19**	7.9	42	5.19**
Asthma	11.8	88		5.8	10	7.01****	13.2	70	7.01****
Stroke	6.3	47		6.4	11	0.87	6.0	32	0.87

\* $p < .08$ . \*\* $p < .05$ . \*\*\* $p < .01$ . \*\*\*\* $p < .001$ .

in these populations (see CDC, 1997; Texas Department of Health, 2001; American Cancer Society [ACS], 2001; American Heart Association, 2004).

Table 1 also shows that Hispanics and Caucasians differed in disease prevalence for diabetes, cancer, emphysema, asthma, and to a lesser extent, heart disease. Not surprisingly, Hispanic seniors had more than twice the rate of diabetes compared with Caucasians. In contrast, Hispanics report less than half the rates of cancer, emphysema, and asthma. Examination of cancer types from an open-ended follow-up indicated that three types of cancer were primarily responsible for the overall difference: Skin, prostate, and colon. All three differences are consistent with ACS evidence suggesting lower cancer rates for these types of cancer among Hispanics.

Table 2 shows the means for the isolation, loneliness, and support variables, as well as comparisons between Hispanics and Caucasians. Overall, reports of isolation and loneliness were relatively low, whereas social support ratings were quite high. Comparisons between Hispanics and Caucasians revealed that Hispanics reported greater social isolation than Caucasians. Interestingly, they reported this although they were significantly less likely to live alone. Consistent with culturally based expectations, Hispanics reported greater family support than Caucasians. Caucasians, however, reported greater belongingness support than Hispanics. Despite the differences—or perhaps because of them—Hispanics and Caucasians did not differ in overall feelings of loneliness.

#### PREDICTIVE ANALYSES

*Associations among support variables and bivariate relation to disease.* Table 3 shows the intercorrelations among the isolation, loneliness and support variables. As shown, subjective isolation, living alone, and subjective loneliness were positively correlated, and negatively correlated with the two support variables, which were also correlated. Only the correlation between living alone and belongingness support was not significant. Overall, the direction and magnitude of these correlations show a reasonable pattern of convergent and discriminant

Table 2  
 Overall Social Isolation, Loneliness, and Social Support and Differences by Ethnic Background

Variable	Overall		Hispanic		Caucasian		F
	M	SD	M	SD	M	SD	
Perceived social isolation	1.13	.33	1.18	.39	1.11	.56	6.30*
Live alone	1.34	.47	1.27	.45	1.36	.48	4.83*
Loneliness	1.83	.67	1.81	.71	1.84	.66	0.68
Family support	3.36	.63	3.47	.57	3.32	.64	6.29*
Belongingness support	2.99	.72	2.73	.81	3.08	.67	31.81***

\* $p < .05$ . \*\*\* $p < .001$ .

Table 3  
Correlations Among Isolation, Loneliness, and Social Support Variables

Variable	2	3	4	5
1. Subjective isolation	.16*	.44*	-.16*	-.28*
2. Live alone		.46*	-.34*	0.03
3. Subjective loneliness			-.37*	-.24*
4. Family support				.17*
5. Belongingness support				

Note.  $n = 742-750$ .

\* $p < .01$ .

validity. Although not shown, examination of Hispanic and Caucasian subgroup matrices revealed similar patterns of intercorrelation.

Table 4 displays the zero-order correlations between the isolation, loneliness, and support variables and reports of disease diagnosis. We excluded tuberculosis from this and further analyses because of its low frequency of occurrence (seven cases). As shown, subjective isolation was positively associated only with arthritis, whereas living alone was not significantly correlated with any disease outcome. Loneliness was positively related to arthritis and emphysema. Family support was marginally and negatively associated with hypertension and significantly negatively associated with arthritis and stroke. Finally, belongingness support was negatively associated with diabetes, hypertension, arthritis, and emphysema and positively associated with liver disease. The overall pattern of correlations suggests that isolation and loneliness were positively related to disease, whereas social support (family and belongingness), with one exception, was negatively related to disease.

*Logistic regression analyses.* As noted, we used logistic regression to examine multivariate relations among isolation, loneliness, and support variables and the disease outcomes. In addition to analyses of the entire sample, we also conducted these analyses separately for the Hispanic and Caucasian subsamples. In each analysis, disease diagnosis was regressed on the isolation, loneliness, and support variables using a forward conditional entry procedure in SPSS. All analyses controlled for age.

Table 4  
 Bivariate Correlations Between Isolation, Loneliness, and Support Variables and Disease Outcomes

Social Variable	Disease Outcome									
	Diabetes	Hypertension	Heart Disease	Kidney Disease	Liver Disease	Cancer	Arthritis	Emphysema	Asthma	Stroke
Subjective isolation	.05	.04	-.02	.00	-.03	-.04	.08**	.05	-.05	.01
Live alone	.03	.05	-.04	.02	.04	.05	.04	.03	.02	.01
Subjective loneliness	.05	.03	-.01	.02	.00	.01	.10***	.09**	.03	.04
Family support	-.03	-.06*	.04	.01	.03	-.04	-.06*	-.01	-.01	-.07**
Belongingness support	-.08**	.10***	-.06	-.04	.10***	.03	-.08**	-.14***	-.04	.01

Note.  $n = 742$  to  $750$ .

\* $p < .08$ . \*\* $p < .05$ . \*\*\* $p < .01$ .

As many of these analyses were exploratory for this population, we followed Hosmer and Lemeshow's (1989) recommendation of using a liberal entry criterion (.15) to ensure entry of variables with coefficients different than zero (see Tabachnik & Fidell, 1996). Given that the frequency of some disease outcomes was quite low (e.g., liver disease and emphysema), we monitored coefficient and standard error sizes for indications of problematic analyses. As a result, we did not conduct logistic analyses for tuberculosis, nor did we conduct subgroup analyses of emphysema and liver disease among Hispanics. Finally, we did not include living alone in the Hispanic subgroup analysis of asthma because no Hispanics with asthma lived alone.

*Full sample.* Table 5 displays the results of the logistic regression analyses for the entire sample and Hispanic and Caucasian subsamples. The results for the full sample are displayed in the first column of every major division, whereas the ethnic group subsample analyses (described below) are in the second and third columns. Subjective isolation failed to predict disease outcomes and was omitted from the table. For the entire sample, belonging support was the most consistent predictor of disease outcomes, predicting diabetes ( $b = -.29$ ), hypertension ( $b = -.27$ ), liver disease ( $b = 1.36$ ), arthritis ( $b = -.19$ ), and emphysema ( $b = -.69$ ). These associations were all in the expected protective direction (i.e., support negatively predicting disease) for all outcomes except liver disease, where belonging support positively predicted disease outcomes. The results also showed that living alone was negatively associated with heart disease ( $b = -.37$ ), indicating that those who lived alone were less likely to have heart disease. Finally, family support was negatively related to stroke ( $b = -.42$ ) with high levels of support being associated with low levels of disease.

*Ethnic group analyses.* The second two columns in each major division of Table 5 show the logistic regression results conducted separately for the Hispanic and Caucasian subsamples. Overall, the Caucasian subsample results paralleled the overall analyses to a greater extent than did the Hispanic subsample results—a result that is not surprising given that Caucasians were overrepresented in the total sample. For Hispanics, family support predicted diabetes ( $b = -.58$ ), kidney disease ( $b = -.78$ ), and arthritis ( $b = -.61$ ), all in the direction

Table 5  
Logistic Regressions for Hispanic and Caucasian Subsamples

Disease	Live Alone		Subjective Loneliness		Family Support		Belonging Support	
	All	Hispanic Caucasian	All	Hispanic Caucasian	All	Hispanic Caucasian	All	Hispanic Caucasian
Diabetes								
Beta					-0.58**		-0.29**	-0.32*
Standard error					0.31		0.14	.20
Wald					3.57		4.57	2.50
Odds ratio					0.56		0.75	0.72
Hypertension							↗	↗
Beta			0.39*				-0.27**	-0.30***
Standard error			0.22				0.10	0.13
Wald			3.07				7.23	4.96
Odds ratio			1.48				0.76	0.75
Heart disease								
Beta	-0.37*			0.58**				
Standard error	0.21			0.29			0.37*	
Wald	3.10			4.06			0.19	
Odds ratio	0.69			1.78			3.70	
Kidney disease							1.45	
Beta								
Standard error								
Wald								
Odds ratio								
Liver disease								
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Cancer				
Arthritis				
Beta	-0.61***	-0.19*	-0.53**	
Standard error	0.30	0.10	0.21	
Wald	4.03	3.55	6.12	
Odds ratio	0.54	0.82	0.59	
Emphysema <sup>a</sup>				
Beta	0.37*	-0.79	-0.69***	
Standard error	0.22	0.24	0.19	
Wald	2.75	11.40	13.85	
Odds ratio	1.45	0.45	0.50	
Asthma <sup>b</sup>				
Beta			-0.69*	
Standard error			0.41	
Wald			2.80	
Odds ratio			0.50	
Stroke				
Beta	0.60*	-0.44	-0.42**	
Standard error	0.39	0.22	0.27	
Wald	2.40	3.65	2.69	
Odds ratio	1.83	0.66	0.65	

a. We did not conduct Hispanic subgroup analysis for emphysema because of low disease incidence.

b. No Hispanics with asthma lived alone, so *live alone* was excluded from this regression analysis.

↗ = Mediation by reduction in normal social activities suggesting causal effect of disease on social condition.

\* $p < .10$ . \*\* $p < .05$ . \*\*\* $p < .01$ .

of high family support being associated with more favorable (i.e., lower) disease outcomes. Loneliness was also a consistent predictor of cardiovascular disease outcomes for Hispanics, with high levels of loneliness predicting hypertension ( $b = .39$ ), heart disease ( $b = .58$ ) and stroke ( $b = .60$ ). Finally, among Hispanics, belongingness support made an independent contribution (along with family support) to the prediction of arthritis ( $b = -.53$ ) and predicted asthma ( $b = -.69$ ). Both associations for belongingness support are in the protective direction with greater support being associated with more favorable disease outcomes.

For Caucasians, belonging support continued to predict diabetes ( $b = -.32$ ), hypertension ( $b = -.30$ ), and liver disease ( $b = 1.60$ ) in the same way as for the entire sample, with diabetes and hypertension in the expected, protective way, and liver disease in the opposite direction. Also consistent with analyses for the entire sample, living alone was negatively related to heart disease ( $b = -.52$ ), with family support making an independent and positive contribution in the subgroup analysis ( $b = .37$ ). This unusual pattern of associations suggests that heart disease is associated with a reduced likelihood of living alone and a parallel, but independent, increase in family support. In addition to heart disease, family support also predicted emphysema ( $b = -.79$ ) and stroke ( $b = -.44$ ), these latter associations both in a direction supporting a protective role for family support.

*Mediational analyses.* The final analyses involved conducting a series of mediational analyses in an effort to help explicate the presumed causal direction of the associations between the social support variables and disease outcomes. These analyses are important because given the cross-sectional nature of the data and the elder sample, multiple directions of causality are possible—social conditions such as loneliness and low social support may be the cause or consequence of disease. The latter direction is particularly relevant when considering some of the more debilitating health conditions, including arthritis, emphysema, and stroke, all of which may cause deterioration of social support.

To examine the possibility that health-related reductions in social activities accounted for the associations between the social variables

and disease outcomes, we used participant reports of whether they experienced recent reductions in their normal social activities accounted for the association between social variables and disease outcomes. The logic of these analyses was that if health conditions were causing social deficits, the association between a given social variable and health outcome should be mediated by reports of reducing normal social activities because of health. Presence of such mediation would suggest that the direction of causality runs from disease (e.g., emphysema) to social condition (e.g., low belongingness support). Of course, failure of reductions in social activities to mediate these associations does not necessarily indicate the opposite pattern of causality, although it certainly remains a possibility. Accordingly, we reexamined all significant logistic regression associations controlling for reports of reduction in normal social activities. In testing mediation, we followed guidelines set out by Baron and Kenny (1986).

Two similarly worded items assessing whether participants “had recently cut down on their normal social activities for health reasons” ( $\alpha = .76$ ) comprised the *reduction in social activities* variable. The arrows in Table 5 convey the results of these analyses. Arrows going up and right indicate mediation of the association between social condition and disease by reductions in normal social activities. These arrows suggest that disease is causing social deficits. The results of these analyses suggest that two associations—one between belongingness support and diabetes and one between belongingness support and arthritis—show evidence of mediation by reduction in social activities. Specifically, these analyses suggest that the presence of either diabetes or arthritis leads to reductions in belongingness support. Table 5 suggests that diabetes is particularly likely to lead to belongingness support deficits among Caucasians.

### *Discussion*

Research has consistently demonstrated the health-damaging effects of social isolation and loneliness—and the health-promoting effects of social support. The present study examined these issues in a randomly selected sample of southwest seniors, a sample that contained significant subsamples of Hispanics and Caucasians. Thus, this

study included two of the fastest growing segments of society: seniors and Hispanics.

The specific focus of the study was to examine how subjective and objective social isolation, subjective loneliness, family support, and support from friends and social groups (i.e., belongingness support) related to a series of diseases known to affect this population. In general, the results showed consistent support for the respective roles of these variables in health outcomes, particularly for belongingness support, but also for family support and loneliness. Overall, these data show that loneliness and social support play important roles in the health of the aging population, including aging Hispanics.

Although not designed as a test of competing conceptions of isolation, loneliness, and support, analyses of the entire sample showed belongingness support to be the strongest and most consistent predictor of disease outcomes. Specifically, belongingness support was related to diabetes, hypertension, liver disease, arthritis, and emphysema, and all but one of the associations indicated a positive association between belongingness support and health. The sole exception was liver disease, where belongingness support was positively associated with disease, a finding particularly true among the Caucasian participants. The nature of this finding tempts us to speculate that a significant segment of our Caucasian sample may have included alcohol consumption as part of their social routine. This is not just idle speculation, however, as our liver disease results are consistent with Hawkley et al. (2003), who found that highly integrated college students (i.e., high social support) were greater consumers of alcohol than their less socially integrated counterparts.

We also found different patterns of association between the social variables and disease outcomes by ethnic group. Loneliness was a better predictor among Hispanics, for example, with subjective loneliness predicting hypertension, heart disease, and stroke. Family support also fared somewhat better among Hispanics, predicting diabetes, kidney disease, and arthritis. Belongingness support fared somewhat less well; it predicted arthritis and asthma, particularly when compared to the full sample analyses. Among Caucasians, living alone negatively predicted heart disease, a finding that suggests that heart disease may reduce independence. Among Caucasians, loneliness predicted only emphysema. Family support was also

important among Caucasians, negatively predicting emphysema and stroke but positively predicting heart disease. Finally, belongingness support continued to predict diabetes, hypertension, and liver disease.

Several interesting patterns emerged from the ethnic group analyses. First, subjective loneliness predicted disease outcomes more consistently in the Hispanic sample compared with the Caucasian sample. This pattern suggests that the negative effects of loneliness may be particularly potent among this group—an association that warrants more research. Second, the results provide limited evidence for the cultural argument that family support would play a greater role in disease outcomes than belongingness support among Hispanics and that the opposite would be the case among Caucasians. Although both types of support predicted disease outcomes in both groups, family support predicted more outcomes among Hispanics, whereas belongingness support predicted more outcomes among Caucasians. Despite these trends, however, the results overall suggest the importance of both types of support. Finally, the Caucasian subgroup analyses for heart disease provide some striking evidence of the dynamic nature of social support. Specifically, in this group, living alone was negatively associated with heart disease, whereas family support was positively related to heart disease. One perspective on these associations is that the presence of heart disease is associated with reduced ability to maintain independent living. Moreover, the presence of heart disease is accompanied by a complementary increase in the level of received family support.

We also conducted analyses aimed at shedding light on the underlying causal directions between the social variables and disease outcomes. Specifically, these analyses examined if reductions in normal social activities due to health mediated any of the associations between social conditions and health. Presence of such mediation would suggest a causal role for disease on social condition. The results of these analyses indicated that reductions in normal social activities mediated only two of the significant associations, specifically the associations between belongingness support and diabetes and arthritis. These patterns suggest that diabetes and its complications, as well as arthritis, may reduce the ability of persons suffering from these disorders to maintain optimal levels of belongingness support. The diabetes association was particularly true among the Caucasian sample.

Reduction in social activities did not account for any of the remaining associations in the analyses of the full sample.

*ETHNIC DIFFERENCES IN SOCIAL CONDITIONS  
AND DISEASE OUTCOMES*

A secondary focus of the article was to examine differences between Hispanics and Caucasians in disease diagnosis and the social conditions of isolation, loneliness, and social support. Regarding disease diagnosis, ethnic differences emerged for several outcomes: diabetes, cancer, emphysema, asthma, and to a lesser extent, heart disease. Not surprisingly, and consistent with established differences in these populations, the rate of diabetes reported by Hispanics was twice that reported by Caucasians. In contrast, Caucasians reported significantly greater rates of cancer, emphysema, and asthma and marginally higher rates of heart disease than Hispanics. As noted above, rates of skin, prostate, and colon cancer were largely responsible for the difference in overall cancer rates, differences that are consistent with national estimates (ACS, 2001). Although the skin cancer differences might be expected given the protective effect of skin pigmentation, our data—like most data on this topic—fail to indicate if differences in colon and prostate cancer reflect real differences in disease incidence, or differences in screening and detection, which are also known to be lower among Hispanics (ACS, 2001). Other disease disparities may reflect behavioral, cultural and environmental factors. For example, the lower rate of emphysema seen among Hispanics most likely reflects ethnic differences in smoking patterns (CDC, 1997).

Asthma rates were greater among Caucasians than Hispanics, another trend that reflects national estimates for this disorder (American Lung Association, 2003). Unfortunately, surprisingly little is known about the etiology of this advantage held by Hispanics other than it tends to show early in life (0-12 years) and late in life (25 years or later; Ledogar, Penchaszadeh, Garden, & Acosta, 2000), and some have suggested that cultural and familial support play a role (Mendoza & Fuentes-Afflick, 1999). Finally, the small difference in heart disease may reflect differences in the ages of the samples, with the Caucasian sample being significantly older than the Hispanic sample.

Supporting this, an analysis of ethnic differences in heart disease rates with age as a covariate eliminated the small difference in heart disease rates.

Hispanics and Caucasians also differed in social isolation and social support. Regarding isolation, Hispanics reported greater perceived social isolation, even though they were less likely to live alone than Caucasians. Although means were high for both groups, Hispanics also reported greater family support than Caucasians, whereas the reverse was true for belongingness support. These trends support the idea that Hispanics rely more on the family for social support functions, whereas Caucasians rely more on sources outside the family unit. Despite the array of differences in living alone, social isolation, and sources of social support—or perhaps because of them—Hispanics and Caucasians did not differ in overall estimates of loneliness.

#### *LIMITATIONS*

This study has several noteworthy limitations, the foremost being the standard limitations on cross-sectional and self-reported data. For example, much has been made about the questionable validity of self-reported assessments of health (e.g., Watson & Pennebaker, 1989). Aware of this latter concern, we assessed health outcomes as objectively as possible, specifically by asking whether a doctor or other medical professional has diagnosed the participant with a particular condition—a methodology similar to that used by the CDC in its annual Behavioral Risk Factor Surveillance Survey. In this regard, the fairly close correspondence between our disease rates and national estimates, and correspondence of ethnic differences therein, attests to the validity of our health measures.

Concerns might also be raised with regard to the cultural appropriateness of the support and loneliness measures, measures where issues of translation and cultural meaning may alter the nature of responses elicited by the item and ultimately affect the nature of the results. Although difficult to prove decisively, two bits of evidence suggest that our translations were at least reasonably appropriate. First, all measures were translated (and back translated) by individuals who are not only trained social scientists but who are also native to culture. Second, the similar patterns of intercorrelations among the

measures and patterns of disease prediction between the Hispanic and Caucasian samples also suggest the appropriateness of the measures.

The cross-sectional nature of the data collection is also an important limitation and opens the results to multiple interpretations regarding causality. Relevant in this regard are reciprocal relations between the variables, such as the extent to which significant disease presence causes [of] changes in social conditions such as loneliness and social support—a concern that is particularly relevant as people age. Although some associations lend themselves easily to this line of argument (e.g., those associations mediated by reduction in social activities), others do not, such as the association of belongingness support to hypertension (a relatively nondebilitating and symptomless condition). Regardless, longitudinal, experimental, and intervention studies are needed before any particular causal pathways can be assumed. Moreover, the relationship between social variables and disease outcomes is likely to be complicated and mutually reciprocal, particularly over extended time frames, with loneliness and lack of support being both a cause and consequence of disease.

### *Summary and Conclusions*

The primary focus of this article was to examine relations between isolation, loneliness, and social support variables and health outcomes. Overall, the data show that favorable social conditions such as low loneliness and high support from family, friends, and social groups are important predictors of disease outcomes, both in Hispanic and in Caucasian samples. The data also show interesting similarities and differences between Hispanic and Caucasian populations. In conclusion, the data are encouraging of future study of the isolation, loneliness, and support process, particularly in fast-growing populations, such as the elderly and Hispanics.

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