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Social Support, Stressors, and Frailty Among Older Mexican American Adults

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Background. There is little research on the effects of stressors and social support on frailty. Older Mexican Americans, in particular, are at higher risk of medical conditions, such as diabetes, that could contribute to frailty. Given that the Mexican American population is rapidly growing in the United States, it is important to determine whether there are modifiable social factors related to frailty in this older group.

Method. To address the influence of social support and stressors on frailty among older Mexican Americans, we utilized five waves of the Hispanic Established Populations for the Epidemiologic Study of the Elderly (Hispanic EPESE) to examine the impact of stressors and social support on frailty over a 12-year period. Using a modified version of the Fried and Walston Frailty Index, we estimated the effects of social support and stressors on frailty over time using trajectory modeling (SAS 9.2, PROC TRAJ).

Results. We first grouped respondents according to one of three trajectories: low, progressive moderate, and progressive high frailty. Second, we found that the effects of stressors and social support on frailty varied by trajectory and by type of stressor. Health-related stressors and financial strain were related to increases in frailty over time, whereas social support was related to less-steep increases in frailty.

Conclusion. Frailty has been hypothesized to reflect age-related physiological vulnerability to stressors, and the analyses presented indicate partial support for this hypothesis in an older sample of Mexican Americans. Future research needs to incorporate measures of stressors and social support in examining those who become frail, especially in minority populations.

Key Words: Functional health status—Minority aging (race/ethnicity)—Social support—Stress.

MEXICAN American adults face many challenges to remaining independent and healthy at older ages. Though research suggests that there is a mortality advantage for Mexican Americans despite their unfavorable socioeconomic profile, referred to generally as the *Hispanic paradox* (Eschbach, Kuo, & Goodwin, 2006; Hummer, Powers, Pullum, Gossman, & Frisbie, 2007; Markides & Coreil, 1986; Markides & Eschbach, 2005; Palloni & Arias, 2004), research also indicates that older Mexican Americans have disability rates almost as high as non-Hispanic Blacks (Markides, Eschbach, Ray, & Peek, 2007) and high rates of obesity and diabetes (Hunt et al., 2003), which have a negative impact on remaining independent. In addition, recent research using the Hispanic Established Populations for the Epidemiologic Study of the Elderly (Hispanic EPESE) shows that a very high percentage of older Mexican Americans are frail or in a pre-frail state (55% at baseline–75% of surviving sample 10 years later; Ottenbacher et al., 2009). Frailty has been identified as a challenge to living independently and as a precursor to disability, institutionalization, and death (Fried & Walston, 1999; Gu et al., 2009; Mitnitski et al., 2005; Morley, Haren, Rolland & Kim, 2006; Rockwood, Mitnitski, Song, Steen, & Skoog, 2006).

Defining Frailty

Though frailty is not a new concept in gerontological research and literature, many aspects of frailty remain hard to define and are widely contested (Bergman et al., 2007). There is growing recognition and consensus that frailty is an entity that can be distinguished from disability or comorbidity—although there are areas of overlap (Bergman et al., 2007; Fried, Ferrucci, Darer, Williamson, & Anderson, 2004). The conceptualization of frailty exists along a continuum. At one end is the person-centered concept of biological or physical frailty. The work by Fried and colleagues reflects this approach and includes their conceptual framework of the "cycle of frailty" and "frailty phenotype" (Fried & Walston, 1999; Fried et al., 2001). At the other end of the continuum is the conceptualization of frailty as a biopsychosocial construct, also referred to as the "life course" approach to frailty. This approach includes measures of the social and physical environment along with a wide range of personal characteristics and

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functional deficits (Kuh et al., 2007; Rockwood, Mogilner, & Mitnitski, 2004; Rockwood, Andrew, & Mitnitski, 2007).

In the approach proposed by Fried and colleagues, frailty is considered a medical/clinical syndrome in which the underlying physiological and biological processes result in multiple clinical manifestations (Ferrucci & Fried, 2011). These are reflected as deficits in the person, for example, reduced strength. Fried and colleagues (2001) identified five characteristics of the "frailty phenotype": shrinking (sarcopenia), weakness, poor endurance, slowness, and low activity. These have been operationalized by Fried and colleagues (2001) and are described in the Method section. Generally, individuals with three or more of these characteristics are classified as "frail," whereas those with one or two are labeled "pre-frail." The definitions and criteria for classifying persons as frail, pre-frail, and not frail are based on the original work by Fried and colleagues (1999, 2001) and are widely used in the literature (Fried et al., 2001, 2004; Ottenbacher et al., 2005).

We selected the operational criteria developed by Fried and colleagues (2001) to characterize frailty in our sample of older Mexican Americans for the following reasons: (a) they recognize that multiple interrelated body systems contribute to frailty; (b) they provide a practical, objective definition of frailty that can be applied in clinical and community settings; and (c) they represent the most widely used method to operationally define frailty in the geriatric/gerontology literature (Bergman, Hogan, & Karunananthan, 2008). We realize, however, that disagreement and inconsistencies exist regarding how to define and measure frailty (Bergman et al., 2007; Fisher, 2005)

Frailty in Older Hispanics

Several factors related to frailty are known to differ in older Hispanics compared with their non-Hispanic White counterparts (Espinoza & Fried, 2007). For example, older Mexican Americans have a high incidence of diabetes and obesity (Ostir, Markides, Freeman, & Goodwin, 2000; Stern, Patterson, Mitchell, Haffner, & Hazuda, 1990) and low access to primary care services (Gornick et al., 1996), are more functionally impaired (Berkman & Gurland, 1998), have low rates of physical activity, and report more disabilities than non-Hispanic Whites (Markides, 2007).

Previous research has also demonstrated that Hispanic older adults have significantly higher rates of depressive symptomatology (Black, Markides, & Miller, 1998; Blazer, Hughes, & George, 1987; Gonzalez, Haan, & Hinton, 2001; White, Kohout, Evans, Cornoni-Huntley, & Ostfeld, 1986) and major depressive disorder (Jimenez et al., 2010), receive significantly more hours of informal care (Weiss, Gonzáles, Kabeto, & Langa, 2005), and report higher number of risk factors for impaired cognitive functioning (Alzheimer's Association, 2004). Taken together, these factors may impact the onset, trajectory, or outcome of frailty in this older minority population.

Social Factors, Frailty, and Older Mexican Americans

Extensive research has shown that social support and stressors influence both physical and mental health (Dressler, Oths, & Gravlee, 2005; Krueger & Chang, 2008; Schneiderman, Ironson, & Siegel, 2005; Thoits, 1995). Though the underlying theme of frailty is vulnerability, to our knowledge, there has been no systematic investigation into the influence of life stressors, which should increase vulnerability, or the effects of social support, which might ameliorate vulnerability. We hypothesize that stressors should accelerate frailty, whereas social support could potentially slow down progression to being frail. Investigating the effects of life stressors and social support on frailty is particularly important among older ethnic adults, who may have increased numbers of life stressors (Kahn & Pearlin, 2006; Turner & Avison, 2003) and show evidence of "weathering" or physiological vulnerability over the life course (Crimmins, Kim, Alley, Karlamangla, & Seeman, 2007; Geronimus, Hicken, Keene, & Bound, 2006).

There is little, if any, research examining the effects of stressors on health comparing older non-Hispanic Blacks, non-Hispanic Whites, and Mexican Americans. However, existing research suggests that older Mexican Americans and non-Hispanic Blacks are exposed to a greater number of financial stressors than non-Hispanic Whites, given that these two minority groups have been historically confined to jobs characterized by low pay, have had fewer employment opportunities, and are exposed to lower quality schools (Angel & Angel, 2006). In particular, Mexican American immigrants have been exposed to harsh working conditions over their life courses, low pay, exposure to potentially dangerous materials, and have had inadequate health care (Angel & Angel, 2006; Angel, Buckley, & Sakamoto, 2001). Given the increased levels of financial stressors at minimum for older Mexican Americans, it is important to examine the impact of financial and other stressors on the development of frailty in older life.

On the other hand, Mexican Americans tend to have strong familial support systems (Angel, Angel, Lee, & Markides, 1999; Angel, Angel, McClellan, & Markides, 1996), which could affect the likelihood of becoming frail. Extensive research has established the beneficial effects of social support on health (Dressler et al., 2005; Thoits, 1995; Uchino, 2004), and it is not known whether these benefits extend to frailty. This question becomes particularly important in light of the fact that the population of older Mexican Americans is growing at a rapid rate in the United States and that frailty is associated with increased likelihood of long-term care usage.

To address the influence of stressors and social support on frailty among older Mexican Americans, we utilize five waves of the Hispanic EPESE to address one general research question: Do stressors and social support affect the trajectory of frailty among older Mexican Americans? We hypothesize that stressors will be associated with increased frailty, whereas social support will be associated with decreased

frailty. Using a modified version of the Fried and Walston Frailty Index (Fried et al., 2001; Ottenbacher et al., 2009), we estimated the effects of social support and stressors on trajectories of frailty over a 12-year period (1995–2008).

Method

Data Source

The sample for the current study is a subsample from the Hispanic EPESE. The Hispanic EPESE is a population-based study of 3,050 noninstitutionalized Mexican American individuals aged 65 and older at baseline (1993–1994) from five Southwestern states (Texas, California, New Mexico, Colorado, and Arizona). Six waves of data have been collected thus far (1993–1994, $n = 3{,}050$; 1995–1996, $n = 2{,}438$; 1998–1999, $n = 1{,}981$; 2000–2001, $n = 1{,}682$; 2004–2005, $n = 1{,}167$; and 2007–2008, $n = 921$). Methods and procedures for collecting these data have been discussed in detail elsewhere (Markides et al., 1999; Ottenbacher et al., 2009).

For this study, we used data from Waves 2–6 to assess the risk of increasing frailty over a 12-year period (1995/1996–2007/2008). Data from the second wave were used as a starting point because it included all the measures necessary to compute the frailty index (see following description). We did not allow proxy interviews due to the physical nature of some of the assessments in the frailty measure.

Dependent Variable

Frailty was assessed using a modified version of the Fried and Walston Frailty Index (Fried et al., 2001; Ottenbacher et al., 2009). The primary difference between the Fried and Walston score and the modified scale include the lack of a physical activity measure and different cut points to determine frailty. We modified the cut points for two of the frailty criteria (grip strength and walking speed) because the original values reported by Fried and colleagues (2001) were developed to identify a percentage of the sample below a certain performance level. For example, the original data reported by Fried and colleagues (2001) for weakness (grip strength) included persons in the lowest 20% of the sample at baseline adjusted for gender and body mass index. However, the baseline sample in the study of Fried and colleagues (2001) was younger than the baseline sample in the Hispanic EPESE study. We adjusted the cutoff values to account for the age difference between the two samples. The modified scale used here is consistent with previous research on frailty in older Mexican Americans (Ottenbacher et al., 2009; Samper-Ternent, Al Snih, Raji, Markides, & Ottenbacher, 2008).

The frailty measure is assessed by weight loss, exhaustion, walking speed, and grip strength in Waves 2–6. These waves were used because the weight loss item was not available in Wave 1. Respondents received a score of "1" if they had unintentional weight loss of more than 10 lb between any two waves. They also received a "1" for the exhaustion category if they answered "a moderate amount of time" or "most of the time" to the following questions from the Center for Epidemiologic Studies–Depression (CES-D) scale (Radloff, 1977)—"I felt that everything I did was an effort" and "I could not get going." Walking speed was assessed over an 8-foot walk. Subjects unable to perform the walk or who recorded walking speeds lasting longer than 9.0 s (≥75th percentile) scored a "1" for this category. Grip strength was assessed using different criteria for men and women. Men and women unable to perform the grip strength test and those who had a grip strength of 21 kg or less (≤25th percentile) for men or 14 kg or less (≤25th percentile) for women scored "1" for the grip strength criterion. The summary frailty score is a count of items for which the respondent scored "1" (range 0–4).

Key Independent Variables

Social support is assessed as perceived emotional support, which is a two-item scale and is measured consistent with past research (i.e., Lin & Ensel, 1989) and shown to have consistent effects on health (Thoits, 1995, 2010). The first item asks the respondents whether, during times of trouble, they can "count on at least some of your family or friends?" The second item questions the respondents whether they "can talk about your deepest problems with at least some of your family or friends?" The responses range from most of the time to hardly ever. However, most of the respondents had relatively high emotional support, and the variables were collapsed into those respondents who answered "hardly ever" to both questions or "hardly ever" to one question (1), and those people who did not answer "hardly ever" to either question (0) to determine whether there was a threshold effect of support on frailty.

Three measures of stressors were included. The first was a measure of financial strain. Strain was defined as the answer for the question, during the previous 12 months "how much difficulty do you have in meeting monthly payments on your bills." The responses ranged from none to a great deal, with higher scores reflecting greater financial strain (Peek, Patel, & Ottenbacher, 2005; range 1–4). In addition, we included a count of the number of negative life events experienced in the last 12 months. These included events such as experiencing a serious illness or injury, someone close to the respondent dying, close family friend or friend having a serious illness, financial situation worsening, legal trouble, having to leave home, and being victim of crime (Holmes & Rahe, 1967). In order to conceptually distinguish between health and nonhealth events, we created a health event scale comprising two items: experiencing an illness or injury that required hospitalization and experiencing an illness or injury that restrained the respondents from their usual activities for more than a week (range 0–2). The remaining items discussed earlier comprised the nonhealth events (range 0–10).

Covariates

Sociodemographic factors included age, gender, marital status (married/not married), size of household, and education (ranges from 1–4, with 1 reflecting less than 1 year of formal schooling, 2 reflecting between 1 and 8 years of education, 3 representing more than 8 but less than 12 years, and 4 reflecting a high school degree or higher). In addition, we included nativity (0 reflects born in the United States, and 1 represents born outside the United States). Finally, we also accounted for number of doctor-diagnosed chronic conditions as a measure of overall health of the respondent (e.g., hypertension, diabetes, fractures, heart attack, cancer, stroke). All variables were assessed in each wave—that is, all variables are of time-varying nature, except for gender, education, and nativity.

Analysis Plan

Distinct trajectories of frailty were generated using trajectory modeling (Jones, 2001). Regular regression models and standard growth models calculate probabilities on an overall group mean and are useful when all individuals in the sample are expected to shift in the same direction over time. The advantage of trajectory modeling is that it affords the opportunity to estimate probabilities of membership to multiple trajectories of varying direction simultaneously (Cerda, Johnson-Lawrence, & Galea, 2011; Gill, Gahbauer, Han, & Allore, 2010; Norris, Tracy, & Galea, 2009). These models were run using SAS software and user-written procedure PROC TRAJ (Jones, 2001, 2007). This procedure is based on a semiparametric, group-based mixture modeling strategy using maximum likelihood. Frailty was modeled as a zero-inflated Poisson distribution.

Model selection was guided by Bayesian information criterion (BIC) comparisons between models where 2 times the change in BIC approximates the log of the Bayes factor. This approach allowed us to determine both the appropriate number of groups and appropriate order of each group (i.e., intercept only, linear, quadratic, or cubic; Cerda et al., 2011; Gill et al., 2010; Norris et al., 2009). We tested models with one to five trajectories and tested the significance of the form of the trajectories. The three-equation model chosen minimized the BIC (–7704) compared with a four-equation model (–7715) and models with five trajectories (–7727). Thus, the best-fitting model was a three-trajectory model comprising two linear and one intercept-only trajectories. All analyses were performed using SAS software, version 9.2 (SAS, Cary, NC).

Results

Table 1 shows the demographic, health, stressor, and support characteristics of the sample at Wave 2 (1995–1996), which is the current study's baseline ($n = 2{,}438$). The average age of the sample at Wave 2 is 75, with a range of 67–107.

Table 1. Characteristics of Older Mexican American Adults from the Hispanic Established Populations for the Epidemiologic Study of the Elderly in Wave 2 (1995/1996; $N = 2{,}438$)

Characteristic	Sample % or sample mean (*SD*), range
Covariates	
Age	75.14 (6.57), 65–107
Women	58.37%
U.S.-born respondents	55.31%
Education	4.79 (3.90), 0–20
Married	53.08%
Number in household	2.59 (1.65)
Number of chronic conditions	1.46 (1.18), 0–7
Stressors	
Financial strain	2.70 (1.03), 1–4
Health events	0.47 (0.75), 0–2
Nonhealth events	0.92 (1.13), 0–10
Social support	
Perceived emotional support	3.52 (1.04), 0–4

A majority of the respondents were women and married, and 55% were born in the United States. Respondents, on average, have about 1.5 chronic conditions. The average number of health events and nonhealth events is less than 1, with only 16% reporting that they hardly ever have someone to talk to, count on, or talk about problems.

Table 2 shows the distribution of the frailty categories over the four wave periods. There is information on 2,061 respondents for the frailty summary measure in Wave 2. The table shows that 377 were missing information on the frailty measure. Generally, these respondents were missing because they used proxies or the physical measures were not attempted due to health or safety concerns by either the respondent, proxy, or the interviewer. The percentage of respondents who are not frail in any given wave declines, as expected, over the 12-year time period. Respondents in the frail category range from roughly 19% in Wave 2 to 45% in Wave 6. Frailty estimates are probably underestimated due to the high percentage of missing data, which in turn is due to either being a proxy respondent or the physical measures not being attempted due to health or safety reasons.

Frailty trajectories.—Three distinct frailty trajectories were identified over 12 years in the Hispanic EPESE sample: stable low frailty, progressive moderate frailty, and progressive high frailty (Figure 1). First, the smallest group is the respondents who, over the 12 years, had consistently very low frailty. Second, the largest group contained respondents who started at a higher level of frailty and had a sharp increase between Waves 5 and 6. The last group is composed of respondents who started off at the highest level of frailty, and, except for the slight decline in the third wave, their frailty levels steadily increased. Based on the Wald test, we found that the intercepts for each of the trajectories was significantly different (low to moderate $p = .01$; moderate to high $p < .001$) and that the linear terms of the progressive moderate frailty and the progressive high frailty

Table 2. Frailty Measures Among Older Mexican American Adults Over Five Waves From the Hispanic Established Populations for the Epidemiologic Study of the Elderly (1995/1996–2007/2008)

	Wave 2 (1995/1996)		Wave 3 (1998/1999)		Wave 4 (2001/2002)		Wave 5 (2004/2005)		Wave 6 (2007/2008)	
Frailty variable	*N*	%	*N*	%	*N*	%	*N*	%	*N*	%
Overall *N*	2,438		1,980		1,682		1,167		921	
Not frail (0 items)	968	46.97	670	42.24	489	38.90	368	41.44	162	24.25
Pre-frail (1 item)	711	34.50	560	35.31	477	37.95	273	30.74	209	31.29
Frail (2+ items)	382	18.53	356	22.45	291	23.16	147	27.82	297	44.46
Missing	377		394		425		279		253	
Proxy	223		221		183		145		133	
Physical measures not attempted or not completed due to health or safety reasons	158		158		153		131		55	
Other reason	6		25		89		3		65	

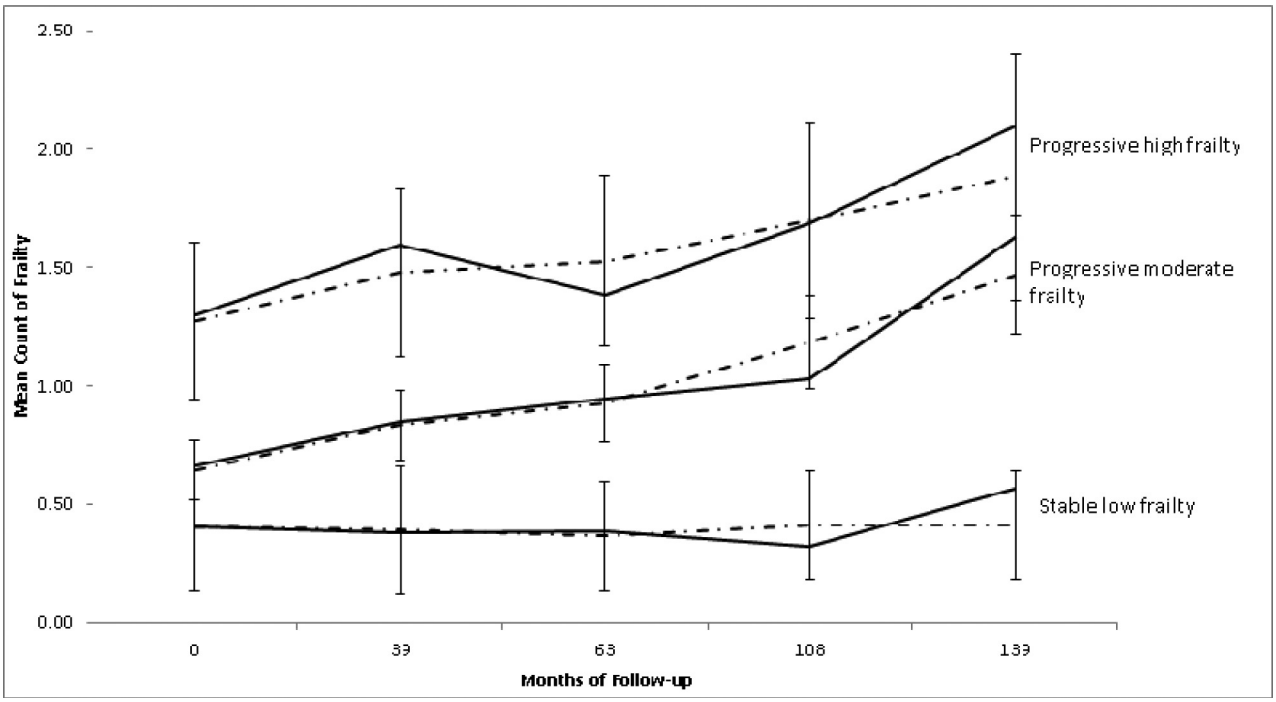

Figure 1. Trajectories of frailty over 12 years in the Hispanic Established Populations for the Epidemiologic Study of the Elderly (EPESE; 1995/1996–2007/2008). *Note:* The solid lines are the observed trajectories, whereas the dashed lines indicate predicted trajectories, and the I lines are 95% confidence intervals for the observed level of frailty.

groups were significantly different ($p = .01$), suggesting that the overall slopes of their trajectories are not parallel.

Table 3 shows group membership according to Wave 2 or baseline characteristics. Adults in the stable low frailty group are considerably younger than those in the progressive high frailty group. Also, probably as a function of age, the percentage of women increases, education declines, and percentage of adults who are married declines, comparing the stable low frailty group to the progressive moderate and progressive high frailty groups. Because of the uneven distribution among groups by nativity in the initial models (there were no U.S.-born respondents in the stable low frailty group), concerns of heteroscedasticity led to the removal of nativity from the final model. This finding is entirely consistent with the "healthy immigrant" effect, where foreign-born adults show healthier profiles than native-born adults (Antecol & Bedard, 2006; Blue & Fenelon, 2011; Markides & Coreil, 1986; Markides & Eschbach, 2005).

Table 4 indicates the predictors of frailty within the three trajectories. First, in the stable low frailty group, financial strain and more chronic conditions are significantly related to increases in frailty. Having greater financial stress over the 12-year period is associated with greater frailty over the same time frame. Second, in the progressive moderate frailty group, higher numbers of health events, greater financial strain, and more chronic conditions are significantly related to higher levels of frailty over a 12-year period. The

Table 3. Characteristics of Respondents, According to Frailty Trajectory Over 12 Years in the Hispanic Established Populations for the Epidemiologic Study of the Elderly (1994/1995–2007/2008)

Characteristic	Stable low frailty		Progressive moderate frailty		Progressive high frailty	
Covariates						
Age	69.99	(2.33)	73.21	(4.12)	84.53	(4.09)
Women	40.11%		59.36%		61.80%	
U.S.-born respondents[a]	—		—		—	
Married	68.45%		57.38%		33.40%	
Education	7.19	(4.65)	4.96	(3.82)	3.19	(3.08)
Number in household	2.56	(1.53)	2.59	(1.61)	2.27	(1.57)
Number of chronic conditions	1.09	(1.07)	1.46	(1.15)	1.34	(1.06)
Stressors						
Financial strain	2.30	(1.00)	2.71	(1.04)	2.80	(1.00)
Health events	0.21	(0.41)	0.26	(0.44)	0.31	(0.46)
Nonhealth events	0.55	(0.50)	0.52	(0.50)	0.48	(0.50)
Social support						
Perceived emotional support	3.61	(0.96)	3.52	(1.03)	3.46	(1.05)
Frailty count	0.23	(0.46)	0.65	(0.77)	1.47	(1.01)
N	177		1,489		365	

Note: Means (*SD*) or percentages presented.

[a]Because of the uneven distribution among groups by nativity in the initial models (all of the stable non-frail were non-U.S.-born respondents), concerns of heteroscedasticity led to the removal of nativity from the final model.

relationships between health events, financial strain, and increased levels of frailty are consistent with the overall hypothesis that higher levels of stress would be related to greater frailty. However, the nonhealth events were not significantly related to the slope of frailty over time. In addition, increased social support is associated with less-steep increases in frailty over time for those who are already moderately frail. However, for those in the high frailty group, there is no significant association between social support and frailty. Finally, among respondents who have progressively high frailty, more health events and higher numbers of chronic conditions are associated with increased frailty over time.

For the demographic characteristics, age and education are related to frailty over time. Advancing age, as expected is related to increased frailty over time. Age is associated with membership in both of the declining groups: progressive moderate frailty ($b = 0.15$, $p = .07$) and progressive high frailty ($b = 0.46$, $p < .001$). Thus, older ages are associated with significantly increased risk of being in the progressive high frailty and progressive moderate frailty trajectories compared with the stable low frailty trajectory. Education, however, is protective—having increased education is associated with reduced risk of being in the progressive high frailty ($b = –0.19$, $p < .01$) trajectory than in the low stable frailty trajectory.

Discussion

In this study, we addressed the question of whether or not stressors and social support affect frailty over time among older Mexican Americans. In order to determine the effects of stressors and social support on frailty, we first grouped respondents according to one of three trajectories: low, progressive moderate, and progressive high frailty. Based on previous research on the deleterious effects of stressors on health and the beneficial effects of social support on health, we expected that stressors would increase levels of frailty and that social support would be associated with less-steep increases in frailty. We found partial support for these expectations. The effects of stressors and social support on frailty varied by trajectory and by type of event. Higher numbers of health events over the 12-year period increased levels of frailty for those who had more frailty at Wave 2 and who continued to become progressively more frail. Moreover, financial strain was associated with increased frailty over time among those who had low frailty over time and among respondents who were progressively moderately frail. However, because only the health events and financial strain impacted levels of frailty over time, the hypothesis that frailty is affected by stressors is partially supported.

In addition, there is evidence that social support protects against increases in frailty for the group that is characterized by progressive moderate frailty. Thus, it appears that the stable low frailty group and the progressive high frailty groups are less influenced by potentially modifiable characteristics, such as social support. This middle group potentially represents a group in "transition"—not quite as high risk at the progressive high frailty group nor as stable as the least frail group. This group represents an important segment of the Mexican American population that could be targeted for early intervention.

The findings from these analyses support the notion that frailty is a state characterized by vulnerability. Although other research has shown that frailty is a state distinguished by physiological vulnerability (Fried & Walston, 1999; Gu et al., 2009; Morley et al., 2006; Walston et al., 2006),

Table 4. Trajectory Model Predicting Frailty Across Three Trajectories: Stable Low Frailty, Progressive Moderate Frailty, and Progressive High Frailty Across a 12-Year Period in the Hispanic Established Populations for the Epidemiologic Study of the Elderly (1994/1995–2007/2008)

	Stable low frailty		Progressive moderate frailty		Progressive high frailty	
	β	*SE*	β	*SE*	β	*SE*
Covariates: time-varying						
Married	0.262	(0.211)	0.045	(0.051)	0.043	(0.087)
Number in household	–0.035	(0.067)	–0.005	(0.017)	–0.005	(0.028)
Number of chronic conditions	0.217	(0.087)*	0.118	(0.022)**	0.100	(0.033)**
Stressors						
Financial strain	0.242	(0.115)*	0.059	(0.022)**	–0.018	(0.037)
Health events	0.184	(0.132)	0.178	(0.032)**	0.141	(0.047)**
Nonhealth events	–0.146	(0.107)	0.000	(0.022)	0.012	(0.032)
Social support						
Perceived emotional support	–0.037	(0.086)	–0.062	(0.020)**	–0.008	(0.035)
Covariates: group membership						
Age			0.155	(0.051)**	0.463	(0.092)**
Women			0.575	(0.330)	0.475	(0.506)
U.S.-born respondents[a]			—		—	
Education			–0.070	(0.039)	–0.192	(0.064)**
N	177		1,489		365	

Note: Unstandardized β (*SE*) presented.

[a]Because of the uneven distribution among groups by nativity in the initial models (all of the stable non-frail were non-U.S.-born respondents), concerns of heteroscedasticity led to the removal of nativity from the final model.

*$p < .05$. **$p < .01$.

we have presented evidence that financial stressors, in addition to health events, significantly influence frailty over time. Our findings lend evidence to the argument that frailty reflects, at least partially, excessive vulnerability to stressors (Walston et al., 2006). It is not surprising that financial stressors had consistent deleterious effects on frailty. There is long-standing evidence that socioeconomic position influences multiple health outcomes (Adler & Rehkopf, 2008; Backlund, Sorlie, & Johnson, 1996; Braveman et al., 2005; Link & Phelan, 1995; Lynch, Kaplan, & Shema, 1997). Having lower socioeconomic position is associated with increased exposure to social, psychological, and physical risk factors related to poor health outcomes, along with having fewer resources to deal with negative circumstances (Lynch et al., 1997; Turner & Avison, 2003). In addition to the impact of increased financial stressors, having a higher education was related to a lower likelihood of being in the progressive high frailty group.

We expected that both health and nonhealth events would be associated with increased frailty over 12 years for both the progressively moderate and high frailty groups. However, the effects of nonhealth events on frailty are probably underestimated in these analyses. Included are only a selection of negative life events that are possible, and although the events incorporate "major" events, such as death of spouse, there are measures of chronic stressors that were not part of the survey. Chronic stress over the life course is associated with declines in health status, and failure to account for chronic stressors may result in underestimating the life course impact of stressors on the development of frailty (McIlvane, Baker, & Mingo, 2008).

Although the effects of social support were only apparent in one group, the progressive moderate frailty group, this is not necessarily surprising. As mentioned above, the moderate frail trajectory is possibly one where there is greater likelihood for stressors and support to make an impact on frailty. This group is more frail and on a more treacherous slope than the stable low frailty group, but because they are not as frail as the high progressive group, there is greater potential for modifiable risk factors to affect health. In addition, results indicate (not shown) that 44% of the married women in this sample report the highest level of support compared with 78% of married men. It is likely, then, that gender differences in perception of support may be masking the overall effects of social support. We also tested the possibility of a stress "buffering" effect—the idea that social support is only health protective among those who are experiencing high stress. However, none of the interaction terms were significant (results not shown).

An important benefit of using longitudinal data to explore the relationships between stressors and frailty is that the examination of the impact of stressors over time allows teasing out of potential causal mechanisms. The findings suggest that financial stressors influence frailty, rather than reverse causation, where being in a frail state increases the likelihood of being in a lower socioeconomic group. However, the possibility of feedback effects, where being frail further diminishes economic resources, is still a possibility. This holds particularly true for health events—it is very likely that frailty further increases occurrence of health events, such as major illness and hospitalization.

Although it is important to examine older minority adults with respect to risk factors for frailty, we are

unable to make direct comparisons to other ethnic groups. Thus, it is not clear from these results whether older Mexican Americans are at a *greater* risk for frailty than older non-Hispanic Whites or non-Hispanic Blacks due to increased financial strain and health events. Previous research implies that non-Hispanic Blacks have greater amounts of stressors over the life course compared with non-Hispanic Whites (Geronimus et al., 2006; McIlvane et al., 2008; Turner & Avison, 2003), and this probably translates into an increased risk for poor health indicators including frailty. Direct comparisons with respect to ethnicity and frailty are important in the understanding of stressors as a precursor to frailty.

An additional limitation is that the findings assessing the impact of stressors and social support on frailty potentially vary depending on how variables are assessed. First, we include a measure of perceived social support only. Though research strongly suggests protective effects of perceived emotional support on health outcomes (e.g., Thoits, 1995, 2010), other forms of social support, such as instrumental support and support actually received, potentially affect frailty over time. Second, in this study, we used a modified version of the Fried and Walston index of frailty (Fried et al., 2001). Though the measure utilized here is consistent with previous research on this sample (Ottenbacher et al., 2009), we cannot rule out the possibility that the findings would have varied if a different measure was addressed. As noted in the introductory section, we used an approach to measuring biological frailty that is well established and based on data that can be collected in clinical and community settings. Our assessment of frailty did not include a measure of activity; therefore, our total frailty values cannot be directly compared with previous studies using the complete Fried and Walston (1999) index (Fried et al., 2001). There was a physical activity measure in Waves 2 and 6, but not in between them. Thus, we did not incorporate physical activity into the models because of the focus on measuring trajectories and trying to capture the dynamic nature of frailty.

In addition, we assessed frailty for respondents from Waves 2–6. This may have biased the sample because including those individuals at Wave 2 as a starting point included survivors only. By excluding Wave 1 and through exclusion of respondents who did not feel safe in participating in the timed walk and grip strength, we have potentially underestimated the effects of stressors on frailty over time.

In conclusion, we have provided evidence that stressors related to health events and financial strain in the lives of older Mexican American adults significantly affects frailty over time. This rapidly growing group of older minority adults, whose risk factors for frailty are increasing, will translate into higher costs for the health care system as well as lowered quality of life. Identifying at-risk populations earlier in the process of declining health has significant implications for health service providers and for potentially reducing health care costs. Research that we have reported here suggests that health events in the group characterized by both progressive high and moderate frailty strongly affect the acquisition of further frailty. These are two critical groups with whom to aggressively intervene as health events occur. In addition, classifying risk factors that place these respondents at higher risk for membership in the progressive high and moderate frailty trajectories can aid in developing prevention and intervention strategies.

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