Published in final edited form as:

Soc Sci Med. 2008 October ; 67(8): 1291–1299. doi:10.1016/j.socscimed.2008.06.029.

Life Sustaining Irritations? Relationship Quality and Mortality in the Context of Chronic Illness

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Abstract

The social integration and mortality link is well documented but not well understood. To address this issue, the present study examined the context within which relationship quality affects mortality over a 19 year period. Participants were 40 years and older from Waves 1 (1986) and 2 (1989) of the nationally representative Americans' Changing Lives Study ($N = 2098$). Interviews included questions about health and positive and negative relationship quality with spouse, children, and friends/relatives. A total of 39% ($N=827$) of participants were deceased by 2005. In support of the main effect model, Cox proportional hazard regressions revealed that consistently low levels of positive support and an increase in negativity from spouse or child from 1986 to 1989 were associated with increased mortality. In support of the buffering effect, among people with chronic illnesses, negative relations at baseline were associated with *decreased* mortality. We conclude that the social relations-mortality link is more complex than previously understood and is influenced by the context.

Keywords

USA; mortality; social relationships; chronic illness; survival analysis

A great deal of literature has confirmed that social integration (e.g., marriage, community ties, friends, frequent contact with others) is associated with increased survival (Berkman & Syme, 1979; Ceria, Masaki, Rodriquez, Chen, Yano & Curb, 2001; House, Landis, & Umberson, 1988; Orth-Gomer, & Johnson, 1987; Seeman, 2000). Social integration may lead to lower mortality because of positive social relations (e.g., emotional support, Berkman, 2000; Cohen, 1988; House, 2002). Social relations, however, include both positive (e.g., feeling loved) and negative qualities (e.g., feeling criticized) which are often experienced within the same relationship (Antonucci, 2001; Newsom, Nishishiba, Morgan, & Rook, 1993). To date, research is inconclusive regarding whether positive and negative social relations affect mortality. Inconsistencies in the literature may be due to the examination of different relationship types, cross sectional data, and either main or buffering effects but not both. Relationship quality may have a greater effect on survival when examined over time or under stressful life circumstances such as illness (i.e., buffering effects; Cohen & Wills, 1985; Uchino, 2004). In this paper, we contribute to the literature by examining the main effects of

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positive and negative relations on mortality as well as the buffering effects of relationship quality in the context of severe illness.

The quality of social relations has a stronger effect on health and well-being than the quantity (e.g., number of relationships) but there is debate in the literature regarding whether relationship quality has a main or buffering effect (Antonucci, Fuhrer & Dartigues, 1997; George, Blazer, Hughes & Fowler, 1989). The main effect model proposes that relationship quality independently affects mortality whereas the buffering effect model argues that relationship quality moderates the effect of stress on mortality. Attention to the main and buffering effects of relationship quality will allow for a more comprehensive understanding of the social relations- mortality link.

Social Relationship Quality and Mortality: Evidence of Main Effects

According to the main effect theory, there is a direct association between relationship quality and mortality irrespective of stress (Berkman & Syme, 1979; House, Landis & Umberson, 1988; Loucks, Berkman, Gruenewald, & Seeman, 2006; Thoits, 1983). Research has focused on the direct effect of positive relations rather than considering the effect of negative relations. Studies of positive relationships have often aggregated across relationships or examined the effect of one relationship (e.g., spouse). Aggregate measures of positive relations (e.g., emotional support) usually confirm the main effect hypothesis but, interestingly, the direction of effect varies. For example, some studies have found that individuals who receive more emotional support across relationships (e.g., spouse, child, network members) survive longer (Blazer, 1982; Ceria et al., 2001; Lyyra & Heikkinen, 2006). On the other hand, others have found that receiving greater emotional support is associated with increased mortality (Walter-Ginzburg, Blumstein, Chetrit, & Modan, 2002). The influence of positive relations may depend on who gives the support, the quality of support, and the context within which the support is provided. Indeed, support can lead to feelings of increased dependency, lower functional health and distress perhaps because too much support undermines autonomy and self-efficacy (Antonucci & Jackson, 1987; Baltes & Wahl, 1992; Smith & Goodnow, 1999).

Research on the impact of positive relations in specific social ties on mortality has also produced mixed results. For instance, married people who provided support had lower mortality rates than those who received support (Brown, Nesse, Vinokur, & Smith, 2003). In addition, feelings of companionship in marriage and supportive relations at work were associated with lower mortality rates among women (Hibbard & Pope, 1993). At the same time, other studies reveal no association between relationship quality in specific relations (e.g., parent-child, neighbors, and friends) and mortality (Dalgard & Haheim 1998; Silverstein & Bengtson, 1991; Sugisawa, Liang, & Liu, 1994).

Although there have been limited studies assessing the main effect of negative relations on mortality, there is research that suggests a possible link. Negative relations are associated with increased physiological stress, depression, and lower self-rated health (Antonucci, 2001; Bolger, DeLongis, Kessler, & Shilling, 1989; Kiecolt-Glaser, Glaser, Cacioppo, MacCallum, Snydersmith, Cheongtag et al., 1997; Newsom et al., 2003). People who report experiencing a great deal of negative emotion have increased mortality (Wilson, Bienias, Mendes de Leon, Evans, & Bennett 2003). Most recently, Eaker and her colleagues found that women who 'self-silence' in response to marital conflict are more likely to die than women who use other strategies to cope with the conflict (Eaker, Sullivan, Kelly-Hayes, D'Agostino, & Benjamin, 2007).

While negative relations are often harmful, other findings suggest that they may have the dual effect of increasing distress while simultaneously improving health behaviors (Hughes & Gove, 1981). Krause, Goldenhar, Liang, Jay and Maeda (1993) found that although negative

interactions were associated with greater depression, they were also associated with more frequent physical exercise among Japanese elderly. Similarly, Lewis and Rook (1999) reported that social control efforts were associated with greater distress as well as improved health behaviors. These findings suggest that although negative aspects of relationships may be distressing, they may lead to health improvements. However, it is also possible that behavior changes without affecting health.

The discrepant findings may be due to the examination of aggregate social network variables versus specific relationships or only positive aspects of relationships. Examinations of specific relationships indicate that the quality of the spousal relation (especially negative qualities) is more highly associated with well-being than the quality of other family and friend relations (Antonucci, Lansford, & Akiyama, 2001; Okun & Keith, 1998). In addition, Adams and Blieszner (1995), among others, have noted that family members are more likely to provide instrumental support whereas friends and family provide emotional support. Indeed, research suggests that although spouses and family are important for overall well-being, friends often voluntarily provide companionship increasing daily well-being (Sherman, de Vries, & Lansford, 2000).

Another limitation of the majority of the previous literature is that most examined social relationships at a single point in time. The life course perspective and the biopsychosocial model (Antonucci, 2001; Seeman & Crimmins, 2001) suggest that relationship experiences accumulate over time influencing health either positively or negatively. Indeed, Seeman and her colleagues examined retrospective accounts of the parental relationship in childhood as well as current spousal relationship quality and found that people who reported positive relationship pathways (positive parental and spousal relations) had better health across several physiological measures (Seeman, Singer, Ryff, Love, & Levy-Storms, 2002). It may be important to consider cross sectional as well as longitudinal patterns of relationships when examining determinants of health.

Social Relationships and Chronic Illness: Evidence of Buffering Effects

In contrast to the main effect theories, stress buffering theories state that social relations are particularly influential under stressful life circumstances by either preventing stress or reducing negative reactions to it (Cohen & Wills, 1985; Uchino, 2004). Researchers have found support for this model in the context of life stressors including lower levels of education, life events, and chronic illness (Antonucci, Ajrouch, & Janevic, 2003; Uchino, 2004). The present study focuses on the buffering effect of relationships in the context of chronic illness (e.g., cancer, coronary heart disease) for three reasons: 1) Chronic illness is a common stressful life event, especially among older adults, 2) There is a strong association between chronic illness and mortality, and 3) Individuals with chronic illnesses often experience depression and negative relations or isolation from close network members (Bloom & Spiegel, 1984; Bolger, Foster, Vinokur, & Ng, 1996; Palinkis, Wingard, & Barret-Connor, 1990; Wortman & Dunkel-Schetter, 1987).

Research examining the buffering effects of positive relationships in the context of illness has found mixed results. People hospitalized for myocardial infarction who lacked emotional support (positive relationship quality) before the infarction had lower survival rates six months later (Berkman, Leo-Summers & Horowitz, 1992). Similarly, individuals with congestive heart failure who had higher quality spousal relationships (high positive, low negative) were more likely to survive four years later (Coyne, Rohrbaugh, Shoham, Sonnega, Nicklas & Cranford, 2001). Surprisingly, Murberg and Bru (2001) found that greater spousal positivity was associated with *increased* risk of mortality two years later among people with congestive heart failure whereas support from close family/friends or relatives/neighbors was not associated

with mortality. Examining the same data with six year mortality information, Murberg (2004) found no association between positive relationships with spouse, close family/friends, neighbors/relatives and mortality among people with congestive heart failure. These studies may have found inconsistent results because they examined different relationship types, different aspects of support, and different survival times. In addition, negative aspects of relationships may have distinct influences on mortality especially when individuals are experiencing stress.

The Present Study

As this brief review indicates, most research examining the influence of social relationships on mortality has focused on positive relationship qualities. The present study seeks to address this limitation by simultaneously examining positive and negative relationship quality. Another significant limitation in the literature to date is the tendency to examine relationships in the aggregate (e.g., how much support do you receive from others?) or from one specific relationship (e.g., spouse, parent or child). Because relationship quality is likely to vary depending on the specific relationship, we examined the effect of multiple close relationships, i.e. spouse, child, other family/friends, on mortality. And finally, most assessments of relationship quality are drawn from a single point in time which is vulnerable to singular events that might affect the quality of relationships. In the present study we benefited from longitudinal relationship data which permitted the assessment of relationship quality over time.

The purpose of this study was two-fold. First, this study examined the main effects of positive and negative qualities of relationships with spouse, child and other family/friends on survival. We predicted that people with greater positive and less negative relationships at Wave 1 would have better survival rates than people with lower positive and greater negative relations at Wave 1. In addition we predicted that people with consistently low levels of relationship quality over time (low positive, high negative) would have lower survival rates than participants who reported increases or consistently high levels of relationship quality. We also predicted that the spousal and child relationships would be more highly associated with mortality than relationships with more distant relationships with friends/relatives.

Second, this study assessed the buffering effect of positive and negative relations with spouse, children and other family/friends on survival among those with a chronic illness. We predicted that relationship quality (high positive, low negative) would buffer the association between chronic illness and mortality (Berkman et al., 1992; Coyne et al., 2001). Because spouse and children are expected to provide support during illness we predicted that the effect of the spouse and child would be stronger than friend/relatives (Antonucci, 2001).

Method

Participants

The data were from the Americans' Changing Lives Study (ACL; House, 2002) which is a nationally representative stratified probability sample of people over age 25 in the U.S. who were interviewed in 1986 and 1989. We included participants over age 40 in 1986 ($N = 2544$) in order to ensure adequate mortality rates. All data were weighted to reduce biases due to sample selection, response rates, and attrition. The weighted sample included 2098 participants. The Wave 1 sample was 55% women and ranged in age from 40 to 96 ($M = 58.19$, $SD = 12.70$) with a mean education of 11.62 years ($SD = 3.33$). Around 70% of the participants were married or living with a partner and 85% had at least one child over age 16. A total of 1630 participants completed Wave 2. See Table 1 for sample details.

Procedure

In 1986 and 1989, participants were interviewed in their homes regarding their demographics, health status, and social relations. In 2005, the participants' names were submitted to the National Death Index and data were collected regarding their mortality status and the date of their death. A total of 827 (39%) participants aged 40 and older in 1986 were deceased by 2005.

Measures

Mortality—Participants were coded '1' if they had died between the first wave of the study and 2005 or a '0' if they were alive in 2005. The number of months from the first wave until the time of their death was also recorded ($M = 182.63$, $SD = 69.17$; range = 1 to 229). Participants who survived received a score of 229 months.

Chronic illness—To measure the context of illness, in 1986, participants indicated whether they had experienced any of the following chronic conditions in the past year: lung disease, heart attack or other heart trouble, diabetes or high blood sugar, stroke, or cancer/malignant tumor. Participants received a score of '1' if they reported having experienced one or more of these conditions and a '0' if they did not.

Relationship quality—In 1986 and 1989, respondents rated the extent to which their children (aged 16 and over), spouse/partner, and friends/relatives loved and cared for them and were willing to listen (positive) and the degree to which they were criticized and felt that too many demands were made of them within each relationship on a scale that ranged from 1 (*not at all*) to 5 (*a great deal*). These measures have been used successfully in past research (Okun & Keith, 1998; Umberson, 1992). The items were examined separately (e.g., spouse listen, spouse critical) to gain a detailed account of links between specific aspects of relationships and survival. We considered combining the items into negative and positive quality scales but the internal consistency reliability was low (.49 to .73), suggesting the items measure different dimensions.

For each of the relationship quality constructs, we examined baseline data in 1986 as well as change/stability from 1986 and 1989. To create pattern variables, relationship quality scores were standardized with T scores based on the sample mean of 1986 followed by the calculation of difference scores between Wave 1 and Wave 2. Longitudinal pattern variables were created with the difference scores by categorizing them as: 1 (*consistently low scores*), 2 (*increase from Wave 1 to Wave 2*), 3 (*decrease from Wave 1 to Wave 2*), or 4 (*consistently high scores*). Low was defined as below the median while high was above the median.

Covariates—This study accounted for gender, race, age, and education because they are highly associated with mortality (House, 2002). We also included multiple dimensions of well-being: physical, psychological, and cognitive.

Demographics—Participants reported their age, number of years of education, gender, and race. Gender was coded 0 (*Men*) and 1 (*Women*). Race was categorized as 0 (*Not black*) or 1 (*Black*). Years of education were considered a proxy for socioeconomic status and it was highly associated with income ($r = .53$).

Physical health—To assess physical health we included self-rated health, functional health, and smoking. Participants rated their health from 1 (*poor*) to 5 (*excellent*; $M = 3.47$; $SD = 1.12$). As a measure of functional health, participants indicated whether they were in a bed or chair most of the day, and the extent to which they had difficulty with bathing, climbing stairs, walking several blocks, and heavy housework. A Gutman type scale was created with these

scores, which ranged from 1 (*most severe*) to 4 (*no functional impairment*; $M = 3.58$, $SD = .84$). Participants also reported whether they smoked and the number of cigarettes smoked a day to create a score that ranged from 0 to 50 ($M = 5.65$, $SD = 11.05$).

Psychological health—Participants reported depressive symptoms with an 11-item Center for Epidemiologic Studies Depression Scale (CESD; Radloff, 1977) in which they indicated the extent to which they had experienced a series of symptoms (e.g., difficulty sleeping, feeling sad) in the past week from 1 (*hardly ever*) to 3 (*most of the time*). Kohout and colleagues (1993) created this 11-item scale for use with older adults ($\alpha = .81$) and it is highly associated with the 20-item scale ($r = .95$; Kohout, Kohout, Berkman, Evans & Cornoni-Huntley, 1993).

Cognitive functioning—Participants completed a modified version of the Short Portable Mental Status Questionnaire (Pfeiffer, 1975). They were asked to recall the current date, the day of the week, the current and previous president, their mother's maiden name, their self-reported age and birth date. They were also asked to subtract 3 from 20 until asked to stop. Incorrect answers were added to create an index of cognitive impairment that ranged from 0 (no cognitive impairment) to 7 (high cognitive impairment; $M = 1.02$, $SD = 1.13$).

Analysis strategy—Cox proportional hazards models were used to examine whether mortality varied as a function of positive and negative aspects of relationships in 1986 and the pattern of relationship quality over time (1986 to 1989). Analyses were conducted in SUDAAN to account for the complex clustered design of the study. The analyses produce hazard ratios which are interpreted as the hazard function that corresponds to each unit change in the predictor. A hazard ratio greater than one represents an increase in the rate of the event and less than one refers to a decrease. The outcome was mortality status and the number of months until death. All analyses controlled for demographics and health (physical, psychological, and cognitive). Types of relationships (spouse, child, friend/relative) were examined in separate models because including all three relationship types together would have reduced the sample by 40% ($n = 1273$). The four quality items were included as predictors in each model (love, listen, demands, critical). Four types of models were estimated: 1) main effect of relationship quality in Wave 1 on mortality, 2) main effect of the pattern of relationship quality from over time on mortality, 3) buffering effect of relationship quality in Wave 1 among people with chronic conditions, and 4) buffering effect of the pattern of relationship quality over time for people with chronic conditions. Relationship quality and chronic conditions were centered in interaction analyses.

Results

Analyses first addressed the main effect model by examining mortality as a function of relationship quality. The next set of analyses assessed whether associations between chronic illness and mortality varied by relationship quality.

Main Effect Models

Cox proportional hazards models were estimated to examine mortality as a function of relationship quality in Wave 1. We estimated 3 models: one for each relationship type with love, listen, demands and criticism as the predictors. After controlling for demographics, health, and chronic illness we found that spousal love predicted mortality but in the opposite direction that was expected. Greater spousal love predicted greater mortality rates (Table 2). There was also an association between friend/relative love and mortality that approached significance. Participants who reported more love and care from friends and relatives had higher mortality rates. None of the other baseline quality items were associated with mortality.

Next, models were estimated to assess the main effects of patterns of positivity and negativity from 1986 to 1989 on mortality (Table 2). These models tested the hypothesis that people with consistently low quality relationships (low positive or high negative across waves) would have higher mortality rates. For the positive relationship patterns, we included three dummy variables that represented consistently high positivity, increase in positivity, and decrease in positivity over time with consistently low positivity over time as the comparison group. For the negative relationship patterns we included dummy variables representing the consistently low negativity, increase in negativity, and decrease in negativity over time with the consistently high negativity pattern as the comparison group.

Three models were estimated; one for each relationship type. Predictors included the four pattern variables: love, listen, demands and criticism. After controlling for demographics, health and chronic illness, there were significant associations between the patterns of spouse quality (love, listen and critical), child quality (listen, critical) and friend/relative quality (love; Table 2). There were also an association between friend/relative demands and mortality that approached significance. There were predicted as well as somewhat surprising associations between patterns and mortality. Participants who reported consistently low levels listening from spouse/partner or children had higher mortality rates than participants with other patterns of listening over time. Participants who reported an increase in criticism from spouse/partner or children over time had higher mortality rates than participants who reported consistently high criticism over time. Finally those who reported consistently high demands from friends/relatives had higher mortality rates those who reported a decrease in demands. Somewhat surprisingly those who reported an increase in love from spouse, a decrease, or consistently high love from friends/relatives had higher mortality rates than those who reported consistently low levels of love over time.

Buffering Models

Next, models were estimated to examine whether the association between mortality and social relationship quality varied by chronic conditions (Table 3). First, Cox proportional hazard models were estimated to assess whether mortality varied as a function of social relationship quality and chronic illness at baseline. Chronic illness, social relationship quality variables (e.g. child love), and the interaction between the relationship quality variables and chronic illness were the predictors. Each interaction was examined separately. Every model included the main effects of listen, love, demands and criticism. After controlling for demographics, functioning, and the main effects of relationship quality, significant interactions remained between spousal relationship quality (love & care, critical) and chronic conditions and between child relationship quality (demands) and chronic conditions (Table 3). There was also an interaction approaching significance between spousal demands and chronic conditions.

To understand the interactions, survival curves were created for the combinations of relationship quality and chronic conditions. The combinations included: 1) No chronic conditions and low levels of negative or positive quality, 2) No chronic conditions and high levels of quality, 3) At least one chronic condition and low levels of quality, 4) At least one chronic condition and high levels of quality. Relationship quality did not appear to influence survival among people without chronic condition, thus providing some evidence for a buffering effect. The relationships that appeared to buffer the association between chronic illness and mortality were contrary to some of the main effect support literature but consistent with other clinical research. The spousal love and chronic conditions interaction indicated that participants with high levels of spousal love who had chronic illnesses did not survive as long as those who had low levels of love and chronic illnesses. Similarly, the interactions between spouse critical, demands, and chronic conditions indicates that people who reported higher spouse criticism or demands survived longer than those with low levels. Finally, people with chronic conditions

who reported higher levels of child demands appeared to have greater survival rates than people who reported low demands.

Post hoc analyses examined whether people with less severe chronic illnesses may have had more negative and less positive relationships thus explaining their enhanced survival rates. Correlations were calculated between Wave 1 relationship qualities, self rated health, and functional health among people with chronic illnesses. Participants who reported more positive (spouse love, listen from spouse, child and friend/relative) and less negative relationships (spouse demands) reported better self rated health (r s .13, .26, .13, .12, respectively). On the other hand, greater positive (spouse listen) and *greater* negative relationships (child demands, friend/relatives criticism) were associated with better functional health (r s .14, .13, .11, respectively). Thus, functional health may partially explain the association between child demands and mortality. Children may make more demands of parents who have better functional health which may explain the increased survival rates among people with chronic illness and higher child demands. Self rated health did not help explain the findings because people who reported more positive and less negative relationships reported better health but did not live as long.

In the second set of analyses, Cox proportional hazard regressions were estimated to examine whether mortality varied by chronic illness, the pattern of social relationship quality from 1986 to 1989, and the interaction between chronic conditions and the pattern of social relations. We included interaction terms between the dummy codes and chronic conditions along with the main effects. Variables were centered before inclusion in the models. We were not able to include the main effects of all pattern variables due to the large number required predictors. There was an interaction between child love and chronic conditions; all other interactions were not significant. The interaction indicates that among people with illnesses, those who reported an increase in love from children appeared to survive longer than the other groups.

Discussion

Examination of positive and negative aspects of close relationships and mortality over time provides an opportunity to achieve a better understanding of the complex and sometimes paradoxical nature of social relationships. This study provides support for the main and buffering hypotheses but also indicates that contextual factors must be considered. Although baseline relationship quality was not associated with mortality, the pattern of relationship quality over time was associated with survival. In addition, the quality of relationships at baseline buffered the effects of chronic conditions on mortality. Relationship quality appears to affect survival because of its cumulative effects as well as by buffering current stressful circumstances. In addition, positive and negative relationships may have beneficial as well as detrimental effects on survival depending on the types of support, type of relationship, and life circumstances. These findings provide further evidence of the complexity of relationships and suggest a more differentiated conceptualization of the buffering model.

Examination of the main effect of relationship quality on mortality yielded mixed results. Overall, the patterns of relationship quality over time were more highly associated with survival than baseline relationship quality. Spouses and children had a greater effect on survival than did friends/relatives. Participants who felt their spouse or child did not listen consistently over time had lower survival rates. In addition, those who reported an increase in criticism from spouse or child had lower survival than those who had consistently critical relationships. Thus, it appears that the consistent lack of emotional support or an increase in criticism may have cumulative negative effects on health/survival. On the other hand, findings regarding baseline spousal love and the pattern of love in the spouse and friend/relative relationships and mortality might be considered counterintuitive. Participants who reported greater love from spouses or

friend/relatives at baseline had higher mortality rates. Similarly those who reported consistently low levels of love over time from spouses or friends/relatives had better survival than participants who reported other patterns of love over time. This finding appears to be consistent with Carstensen and her colleagues (Carstensen, Isaacowitz & Charles, 1999) view that increases in positive aspects of relationships may occur before death and Cutrona's (1996) review indicating that over protectiveness can be harmful to health.

The findings regarding patterns of relationship quality and mortality have implications for the literature. Although overall network support is associated with reduced mortality rates (Blazer, 1982; Ceria et al., 2001; Lyyra & Heikkinen, 2006), studies testing the main effect of specific relationships on mortality have been less consistent (Dalgard & Haheim 1998; Sugisawa et al., 1994). Chronic relationship history or convoys of social relationships over time may be more important for well-being than relationships assessed at one time point (Antonucci, 2001; Seeman et al., 2002). These findings are in line with Life Course Theory and the Biopsychosocial Model which suggest that cumulative experiences over time influence health (Seeman et al., 2002). Thus, early work may have provided an interesting but incomplete picture of these associations over time and life circumstances. It may be that more specific and more frequent indicators of relationship quality are needed to gain a comprehensive and accurate understanding of relationships and mortality.

Consistent with the stress buffering model and our hypothesis, negative and positive relationship quality with spouse and child significantly predicted mortality among people with physical illnesses. However, the findings, again, might be considered somewhat paradoxical. In particular, among people with chronic illnesses, those who reported higher spousal demands or criticism and child demands at baseline survived longer than people with chronic illnesses who reported lower levels of negative relations at baseline. In addition, people with a chronic illness who reported higher levels of spousal love had lower survival rates than those with lower spousal love at baseline. Although an increase in love from children appeared to be beneficial for survival among this same group. These findings indicate that relationships are particularly important for well-being when under stress (Cohen & Wills, 1985; Uchino, 2004). It appears, however, that negative relations and a lack of support may sometimes actually be *beneficial* for survival among people with chronic illnesses. Although this finding is inconsistent with some literature indicating that aversive relationships are associated with health problems and depression (Koopman, Hermanson, Diamond, Angell, & Spiegel 1998), it is similar to other literature indicating that negativity has dual effects of increasing distress while leading to better health outcomes (Fukukawa, Nakashima, Tsuboi, Niino, Ando & Kosugi, 2004).

Interestingly positive aspects of relationships appear to be more important for main effects on health whereas the negative aspects of relationships had buffering effects. This may be explained by the concept of the health continuum in which certain types of support are beneficial but only under certain circumstances. The type of support provided must match the circumstances. Thus, while it is generally good for individuals' health to have others who are willing to listen, these types of support may not be as important or have different effects in the context of chronic illness. For example, when a person is ill, social partners who avoid being over protective and are a little demanding may promote health and self-efficacy.

There are several possible explanations for the reduced mortality rates among people with greater negative relations, less love, and chronic illnesses. Theorists have suggested that supportive and sympathetic behaviors can often 'backfire' in the context of physical illnesses (Cutrona, 1996; Fordyce, 1976; 1978). Overly solicitous relationships may reinforce sickness behaviors and increase dependencies. Thus, the lack of support and/or negativity may involve efforts to increase independence and reduce illness behaviors in people with chronic illness.

In the context of illness, negative relations (especially demands) may also include efforts to control health behaviors (Krause et al., 1993). For example, a spouse or child may remind (demand) a sick partner/parent to take medicine (Rook & Ituarte, 1999). In addition to social control, negativity may signify the lack of detrimental types of support such as overprotection and protective buffering (Hagedoorn, Kuijer, Buunk, DeJong, Wobbles & Sanderman, 2000), it may keep people actively engaged, or it may involve disguised or invisible support. Bolger, Zuckerman and Kessler (2000) found that invisible support (support that is disguised so that the receiver is unaware or does not interpret the interaction as support) was more beneficial for well-being when couples were under severe stress. Negative aspects of relationships may also decrease before death. The literature suggests that as people perceive their time to be more limited (e.g., closer to death), they report fewer interpersonal problems and seek to resolve unfinished business and receive forgiveness (Carstensen et al., 1999; Koenig, 2002; Steinhauer, Christakis, Clipp, McNeilly, McIntyre & Tulsky, 2000).

The majority of the previous explanations assume that relationships cause variations in health. However, people with illnesses often experience a decrease in support, become less socially active, and cause discomfort among their social partners (Bloom & Spiegel, 1984; Wortman & Dunkel-Schetter, 1987). For example, spousal support declines over time among women with breast cancer (Bolger et al., 1996). This study considered whether health status may have led to differences in relationship quality and survival. Individuals who reported more positive and less negative relations generally reported better self rated health. Although lower quality relations may enhance survival, they may be associated with lower self reported health. Similarly, the dual effect hypothesis suggests that relationships may cause distress while simultaneously improving health behaviors (Hughes & Gove, 1981).

Limitations and conclusions

There are several limitations to this study that should be noted and addressed in future research. First, it is unclear whether relationships changed in response to the diagnosis and severity of chronic illnesses. It is possible that negativity occurs in the beginning of an illness and decreases before people die. Although spouse and child were examined separately, other family and friends were included together in the same questions. This may be problematic because individuals often expect family members to provide instrumental support whereas they may seek certain types of emotional support from friends (Antonucci, 2001). Future research should also consider a more detailed examination of the links between illness, relationships and mortality. For example, multiple waves of interactions among dyadic partners would permit a more complex assessment of the causal processes and dynamics that occur between individuals as they cope with illness.

Despite these limitations, this study offers a preliminary examination of negative and positive aspects of relationships over time and mortality. Our findings support the life course perspective and indicate that relationship patterns have a greater impact on mortality than do relationships at a single time point. The findings also support the notion of a health continuum in which the effectiveness of types of support varies by health status. Indeed, relationships that are less loving and more demanding may actually help individuals with chronic illnesses. Interventions should consider ways of teaching individuals to seek out and manage support in a way that matches their needs. For example, people with chronic illnesses may benefit from supportive relationships that are challenging and not too over protective. Future studies will benefit from a more detailed examination of relationships and need to examine these associations to assess whether these findings can be replicated. This study highlights the complex and psychological nature of close social relations. It suggests that the association between social relations and health varies by both type and quality of relationship as well as health status. Prior research at the aggregate level may have masked more detailed,

relationship-specific dynamics. We believe that these findings provide important insight into the dynamic association between social relationships and mortality and suggest critical directions for future research.

Acknowledgements

We would like to thank Kristine Ajrouch and the Life Course Development Program for their helpful feedback on this manuscript.

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Table 1

Description of Weighted Variables in Wave 1 (1986) and Wave 2 (1989)

	Wave 1 1986 N =2098	Wave 2 1989 N= 1630
<i>Demographics</i>		
Men (n, %)	938 (44.7)	707 (43.4)
White (n, %)	1806 (86.1)	1416 (86.9)
Black (n, %)	225 (10.7)	169 (10.4)
Education (<i>M, SD</i>)	11.62 (3.33)	11.76 (3.22)
Age (<i>M, SD</i>)	58.19 (12.70)	60.23 (12.36)
<i>Relationships available</i>		
Married (n, %)	1466 (69.9)	1093 (67.1)
Live with partner (n, %)	47 (7.5)	40 (2.5)
Have children all under age 16(n, %)	104 (4.9)	45 (2.8)
Have 1 child over age 16 (n, %)	310 (14.8)	217 (13.3)
More than one child over 16 (n, %)	1478 (70.4)	1185 (72.7)
Number of children (n, %)	2.91 (1.93)	2.80 (1.90)
Friends/relatives (n, %)	2094 (99.9)	1629 (99.9)
<i>Functioning</i>		
Self-rated health (<i>M, SD</i>)	3.47 (1.12)	3.62 (.97)
Functional health (<i>M, SD</i>)	3.58 (.84)	3.57 (.84)
Smoking (<i>M, SD</i>)	5.65 (11.05)	4.16 (10.33)
Cognitive impairment (<i>M, SD</i>)	1.02 (1.13)	.49 (.92)
Depressive symptoms (<i>M, SD</i>)	-.06 (.97)	-.09 (.96)
At least one illness	443 (21.1)	412 (25.3)

Table 2

Main Effect Models: Mortality as a Function of Relationship Quality in 1986 and Patterns of Relationship Quality from 1986 to 1989

	Spouse/partner HR (95% CI)	Child/ren HR (95% CI)	Friend/relative HR (95% CI)
<i>Baseline in 1986 Models</i>			
Love and Care	1.25(1.03–1.51)*	1.05(.92–1.19)	1.08(.99–1.17) ⁺
Listen	.95(.85–1.06)	.97(.92–1.03)	.99(.90–1.09)
Demands	.98(.88–1.10)	.97(.87–1.09)	.94(.85–1.03)
Critical	1.05(.93–1.18)	.99(.92–1.07)	1.01(.92–1.11)
<i>Pattern from 1986 to 1989 Models</i>			
Love and Care			
Low	-	-	-
Increase	1.74(1.05–2.87)*	.89(.58–1.26)	1.46(.89–2.40)
Decrease	1.39(.87–2.23)	.89(.68–1.16)	1.55(.99–2.44)*
High	1.51(.90–2.52)	.99(.75–1.31)	1.71(1.15–2.54)**
Listen			
Low	-	-	-
Increase	.53(.34–.85)**	.73(.52–1.02) ⁺	1.01(.71–1.45)
Decrease	.56(.34–.92)*	.68(.48–.98)*	1.02(.72–1.45)
High	.50(.29–.87)**	.67(.48–.92)*	.83(.57–1.21)
Demands			
Low	1.09(.82–1.44)	1.15(.80–1.65)	.97(.66–1.43)
Increase	1.04(.76–1.42)	1.07(.68–1.67)	.98(.64–1.50)
Decrease	.96(.68–1.35)	1.12(.71–1.78)	.72(.49–1.05) ⁺
High	-	-	-
Criticism			
Low	.91(.57–1.45)	1.15(.81–1.62)	.99(.70–1.41)
Increase	1.44(.99–2.09)*	1.29(.95–1.74) ⁺	.95(.64–1.40)
Decrease	1.21(.86–1.72)	1.10(.74–1.62)	.92(.64–1.34)
High	-	-	-

Note. All models include demographic and health covariates.

⁺
 $p < .10$

*
 $p < .05$

**
 $p < .01$

Table 3

Buffering models: Mortality as a function of the Interaction between Relationship Quality in 1986 and Chronic Conditions

	Buffering Effects			
	Model 1	Model 2	Model 3	Model 4
<i>Spouse/partner</i>				
Love × CC	1.39(1.05–1.83) [*]			
Listen × CC		1.10(.89–1.34)		
Demands × CC			.85(.70–1.03) ⁺	
Criticisms × CC				.79(.65–.95) [*]
<i>Child/ren</i>				
Love × CC	1.17(.94–1.47)			
Listen × CC		1.04(.91–1.18)		
Demands × CC			.85(.74–.98) [*]	
Criticisms × CC				.90(.75–1.08)
<i>Friends/relatives</i>				
Love × CC	1.02(.86–1.20)			
Listen × CC		1.01(.89–1.15)		
Demands × CC			.93(.79–1.08)	
Criticisms × CC				1.01(.84–1.20)

Note. All models include demographic and health covariates and the main effects of love, listen, demands, and criticism.

⁺ $p < .10$

^{*} $p < .05$

^{**} $p < .01$.