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# What's Love Got to Do With It? Social Functioning, Perceived Health, and Daily Happiness in Married Octogenarians

Robert J. Waldinger
Brigham and Women's Hospital and Harvard Medical School

Marc S. Schulz
Bryn Mawr College

This study examined day-to-day links between perceived health and happiness and between time spent with others and happiness in 47 older adult couples over an 8-day period. Marital satisfaction and time spent with others were explored as potential moderators of links between health and happiness. For both men and women, hierarchical linear modeling revealed daily links between more time spent with others and greater happiness. Daily links between time spent with one's partner and happiness were strongly moderated by marital satisfaction. For both men and women, marital satisfaction buffered day-to-day links between poorer perceived health and a decline in happiness, but time spent with others did not. This study provides support for the role of marital satisfaction in protecting older adults' happiness from daily fluctuations in perceived physical health and for the influence of social connections in promoting happiness in the lives of older adults.

*Keywords:* social functioning, aging, marital satisfaction, health, happiness

Understanding the determinants of happiness in late life takes on particular urgency as the population ages. Physical health and social functioning are widely believed to be important determinants of happiness in old age (Jopp & Rott, 2006). Research has demonstrated links between perceived physical health and happiness (e.g., Brief, Butcher, George, & Link, 1993) and between social functioning and happiness (Bishop, Martin, & Poon, 2006; Cacioppo et al., 2008). Studies also suggest that social relationships may moderate the impact of stressors, such as physical health problems, on emotional well-being (Cohen, 2004). Although perceived health, social functioning, and happiness may vary from day to day—particularly among older adults (Milligan, Bingley, & Gatrell, 2005)—prior research in this area has focused almost exclusively on relatively stable individual differences in these domains and on the longer term processes by which they are linked. Using daily reports of the experiences of 47 older adult married couples across an 8-day period, we explored ways that daily fluctuations in social functioning and perceived physical health may be linked with the ebb and flow of happiness in older adults. In addition to examining direct daily connections among these factors, we investigated two more sustained aspects of social functioning—time spent with others and marital satisfaction—as potential moderators of the daily link between perceived health and levels of happiness. Identifying factors that may buffer older adults from the demoralizing effects of ill health has the potential to inform efforts to improve the quality of life for this rapidly growing segment of the population.

Robert J. Waldinger, Department of Psychiatry, Brigham and Women's Hospital, and Department of Psychiatry, Harvard Medical School; Marc S. Schulz, Department of Psychology, Bryn Mawr College.

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Correspondence concerning this article should be addressed to Robert J. Waldinger, Department of Psychiatry, Brigham and Women's Hospital, 1249 Boylston Street, 3rd Floor, Boston, MA 02215. E-mail: rwaldinger@partners.org

## Happiness in Late Life

For some older adults, the physical decline and personal losses associated with old age are linked with diminished happiness (Bishop, Martin, & Poon, 2006). However, as a group, older adults report higher levels of subjective well-being and lower levels of depressive symptomatology than younger adults (Carstensen, Isaacowitz, & Charles, 1999). Studies by Mroczek and Kolarz (1998) and by Carstensen, Pasupathi, Mayr, and Nesselroade (2000) found modest but consistent increases in happiness from mid- to late adulthood. More recently, Yang (2008) replicated these findings in a carefully executed longitudinal study spanning 33 years, providing evidence that age-related increases in self-reported levels of happiness are not an artifact of cohort effects. Happiness has often been conceptualized as a trait; happy individuals have been defined, for example, as "those who experience frequent positive emotions" (Lyubomirsky, King, & Diener, 2005, p. 816). Yet, studies have documented both long- and short-term shifts in levels of happiness (Lucas, 2007; Luo & Inoue, 2000).

## Health and Happiness

The association of health and positive mood has long been a subject of research interest (e.g., Benyamini, Idler, Leventhal, & Leventhal, 2000; Casten, Lawton, Winter, Kleban, & Sando, 1997). Although happiness and positive affect are not identical constructs, they are closely related (Diener, 2000; Diener, Suh, Lucas, & Smith, 1999). Numerous studies have documented that

when disease severity increases, positive affect, including happiness, declines (for a review, see Pressman & Cohen, 2005). Particularly among older adults, many chronic medical conditions have been associated with lower levels of positive affect (Benyamini et al., 2000; Jelicic & Kempen, 1999). Most of these studies have focused on enduring levels of positive affect (Pressman & Cohen, 2005). Late life is a time when health challenges are more prevalent and daily fluctuations in perceived health are quite common (Yorgason, Almeida, Neupert, Spiro, & Hoffman, 2006). Research on younger adults suggests that health and the experience of positive affect are linked on a daily basis (e.g., Watson, 1988), yet studies of day-to-day associations between health and positive affect among older adults are lacking.

Empirical associations across individuals between health and emotional well-being are generally stronger in studies using self-report measures of health than in studies using objective health ratings by physicians (Diener, Suh, Lucas, & Smith, 1999). This is likely to be due, in part, to the finding that individual personality traits, such as neuroticism, influence the subjective evaluation of one's health and in this way contribute to discrepancies between objectively rated health and subjective reports (Brief, Butcher, George, & Link, 1993). Examining within-person associations between day-to-day fluctuations in subjective ratings of health and happiness, as we do in this study, has the advantage of restricting the role that enduring personality traits can play in these associations.

## Social Functioning and Happiness

Research has consistently found links between the quantity and quality of interpersonal connections and late-life well-being. For example, greater participation in social activities and broader social networks have been linked with higher perceived well-being among older adults (Heidrich & Ryff, 1993), and the absence of social involvement has been associated with higher suicide rates (Heisel & Duberstein, 2005). Research has also pointed to positive short-term influences of interactions with others, including the promotion of more positive psychological states (Cohen, 1988, 2004; Thoits, 1983).

Studies of links between social functioning and happiness per se are rare. In a study comparing very happy and very unhappy undergraduate students, Diener and Seligman (2002) found that very happy people spent significantly less time alone each day and more time socializing than their unhappy counterparts. Very happy people also had more satisfying social relationships by their own reports and the reports of informants. Among older adults ages 50–68, Cacioppo et al. (2008) found that those who were more socially integrated (e.g., married, attended church, belonged to organizations) were happier, as were those with broader social networks as measured by the number of people to whom an individual speaks at least once every 2 weeks. In the Aging in Manitoba Study of adults ages 67–95 (Menec, 2003), social activity was found to be the strongest correlate of happiness.

Although the breadth of one's social network (the number of people with whom one has regular contact) is often used to quantify interpersonal connections, this index can be especially misleading in studying older adults. Research suggests that adults' peripheral social networks shrink as they age but that the quality of their close relationships improves (Cornwell, Laumann, & Schumm, 2008; Lang & Carstensen, 1994). This is consistent with Carstensen's socioemotional selectivity theory, which posits that a sense of limited time prompts older adults to shed their less important and less satisfying interpersonal ties as they prioritize emotional satisfaction in interactions with others (Carstensen, 1993; Frederickson & Carstensen, 1998). For this reason, happiness in old age might be less related to the number of individuals in one's social network than to indices tapping the amount of social contact, such as the amount of time spent with others each day. We therefore chose to examine time spent with others each day as an index of the quantity of social participation.

Declines in physical and cognitive functioning create greater need to depend on others, making the presence and quality of close relationships particularly important in late life. Numerous studies have documented the health benefits of being married, but typically the variability in subjective well-being explained by marital status alone is modest—as low as 2% in the meta-analysis conducted by Haring-Hidore, Stock, Okun, and Witter (1985). Among those who are married, *relationship satisfaction* has been found to be an important predictor of health and well-being (Gallo et al., 2003; Kiecolt-Glaser & Newton, 2001). There is evidence that relationship satisfaction may also moderate links between health and well-being. For example, in a study of marital satisfaction and depressed mood in late life, Bookwala and Franks (2005) found that older adults who reported being in more conflictual marriages showed a stronger association between levels of physical disability and depressed affect. More research is needed to determine whether the moderating effect of marital satisfaction on links between health and mood is present when happiness rather than negative affect is the focus.

## The Daily Fabric of Life: The Advantages of Repeated Assessments

Investigations of links among health, emotional well-being, and social functioning have depended largely on traditional correlational approaches that focus on connections among relatively stable individual differences in these domains. For example, studies indicate that people who report more social connectedness in general tend to be better off physically and emotionally than those who are more socially isolated (e.g., House, Landis, & Umberson, 1988; Lee & Ishii-Kuntz, 1987). However, traditional approaches do not address the question of whether and how these factors are linked on a short-term basis, which is the time window in which mechanisms linking social functioning, physical functioning, and affective state are often thought to operate. For example, is spending more time with others on a given day related to experiencing higher levels of happiness on that day? Does an individual experience greater happiness on days when he or she feels better physically? Within-person analyses of repeated daily measures are particularly suited to investigating these short-term processes and linkages (Bolger, Davis, & Rafaeli, 2003).

Moreover, links found in traditional approaches that collect self-report data at one point in time are particularly vulnerable to potentially confounding third variables that may explain the connection between the two variables of interest. The use of repeated daily assessments substantially reduces the number of potential confounds that might account for such links. If two variables covary on a daily basis, then a confound would have to vary

according to the same daily time course (i.e., the same daily rhythm). So, for example, it is possible that a vulnerability to social desirability biases prompts some individuals to report generally low levels of physical stressors and generally high levels of well-being. However, if physical stressors and well-being are found to covary within individuals on a day-to-day basis—that is, if individuals experience less happiness on days when they report poorer physical health and more happiness on days when they report better health—then a confound would have to vary from daily assessment to daily assessment in the same way that physical stressors and well-being fluctuate from one day to the next. It is unlikely that a social desirability bias and other commonly identified potential confounds (e.g., socioeconomic status) would vary according to such a daily rhythm. Thus, the number of possible alternative explanations is substantially reduced by the use of repeated daily assessment and appropriate analytic techniques.

In addition, repeated daily measures can facilitate more accurate assessments of social experiences and emotional and physical well-being than can be obtained retrospectively with questionnaires that ask about longer time spans or experience in general (Almeida, Wethington, & Chandler, 1999; Larson & Almeida, 1999). Many people have difficulty accurately recalling experiences (Smith, Leffingwell, & Ptacek, 1999), and this is particularly the case among the very old.

Studies of daily life among the very old are rare. Even rarer are studies that have used repeated measurements to investigate daily connections among fluctuations in health, social functioning, and happiness. Existing studies suggest that older adults may be particularly vulnerable to daily challenges. Mroczek and Almeida (2004) found that daily links between stressors and negative affect were stronger for older individuals (up to age 74) than younger individuals. Recently, in a study of 96 older couples, Yorgason et al. (2006) found that day-to-day variability in one partner's health was related to fluctuations in the other's emotional well-being. However, they did not examine how day-to-day fluctuations in health affected one's own emotional well-being.

In the current study of octogenarian couples, we examined two particularly salient aspects of perceived health—reported daily levels of pain and perceived degree of physical limitations on daily activities due to ill health. Two distinct indices of social functioning were examined as potential moderators of daily links between health and happiness: (a) overall relationship satisfaction and (b) the proportion of time typically spent with others each day (and, more specifically, time spent with the spouse). We investigated the following hypotheses about the role of marital satisfaction, time spent with others, and perceived health in shaping the happiness of married older adults:

*Hypothesis 1:* On a daily basis, poorer perceived health (as indexed by self-reported levels of pain and physical limitation) is associated with reports of less happiness.

*Hypothesis 2:* On a daily basis, a greater proportion of time spent with others is associated with reports of greater happiness.

*Hypothesis 3:* Marital satisfaction moderates links between daily perceived health and happiness, such that daily links between poorer health and unhappiness are weaker among individuals who report greater marital satisfaction.

*Hypothesis 4:* Time spent with others moderates the daily association between perceived health and happiness. Generally, spending more time with others buffers older adults from the daily effect of poorer perceived health on happiness.

## Method

### Participants

The sample for this study consisted of 47 heterosexual couples. The male participants are part of a 68-year longitudinal study of adult development that began when they were age 18 or 19. Between 1939 and 1942, the Harvard University Health Service chose 268 college sophomores for intensive multidisciplinary study (Heath, 1945; Vaillant, 1977). These sophomores were selected because examination at college entrance revealed no mental or physical health problems, and their deans perceived them as having the potential to become promising adults. Of these students, 64% went on to obtain graduate degrees, and many worked throughout their adult lives in high-prestige occupations. Participants were assessed with interview and questionnaire techniques at regular intervals. Beginning in 2003, the men and their intimate partners were invited to participate in a study of late life marriage. Among the surviving members of the original sample, 105 had partners. To be eligible, couples had to have been living together for a minimum of 1 year.[1] In addition, both members of the couple had to score above 25 (indicating minimal or no cognitive impairment) on the Telephone Interview for Cognitive Status (Brandt, Spencer, & Folstein, 1988) and be in sufficient physical health to be able to complete the in-home and follow-up telephone interview procedures described later. Twenty-six couples were unable to participate because physical or cognitive impairment made one or both partners unable to complete assessments. Seven couples completed part but not all of the assessments. One couple was separated and therefore did not meet the criterion of living together. An additional 24 couples declined to participate. The most common reason given for refusal was a wish to preserve the privacy of their relationship. Our $t$ tests revealed that the 24 eligible men who declined to participate in the study did not differ significantly from the 47 men who participated with respect to age, number of years of education, income at ages 55 and 80, health at age 70 based on an internist's rating of medical records (for details, see Vaillant, 1979, 1998), number of previous divorces, or marital satisfaction at ages 75 and 80.

All participants were Caucasian. Mean age was 82.9 years for men ($SD$ = 1.7, range = 80–88) and 78.8 years for women ($SD$ = 6.16, range = 62–87). Forty-three couples (92%) were married, and four couples (8%) were not married but living together. The mean length of these relationships was 41.5 years ($SD$ = 19, range = 1–62). Virtually all of the men had a history of white-collar employment, and most women worked in the home. The Human Research Committee affiliated with Brigham and Women's Hospital approved the study, and written informed consent was obtained from all participants.

### Procedure

A questionnaire assessing marital satisfaction was completed during a home visit that also included interviews and interaction

[1] An exception was made to include the members of one couple who had been dating steadily for 5 years and were about to begin living together.

tasks not examined in this study. Following the home visits, men and women were interviewed separately by telephone on 8 consecutive evenings. Telephone interviewers varied across the 8 days and were different from those who collected data during home visits. Telephone interviewers were unaware of all prior data on participants, including responses on previous days of telephone interviewing and of their partner's responses in interviews. Participants were assured that their responses would remain confidential (including from their spouses), and participants were asked to be in a location during telephone interviews where their responses could not be overheard by others. Interviews lasted 15 to 20 min and focused on the participants' activities during the previous 24 hr. Most interviews were conducted around the dinner hour each day. The telephone interviews ensured a high rate of questionnaire completion. The mean number of interviews completed by participants was 7.6 ($SD = 0.73$).

## Measures

**Marital satisfaction.** At the start of the study, marital satisfaction was measured with the Short Marital Adjustment Test (Locke & Wallace, 1959), a widely used 16-item self-report questionnaire. Respondents are asked to rate the extent to which they and their partners agree or disagree on common subjects (e.g., sexual relations, handling of family finances), with additional questions on topics such as how they handle disagreements and how happy they are overall with their relationship (range = *very unhappy* to *perfectly happy*). The measure has good internal reliability, test–retest stability, and discriminant validity (Freeston & Plechaty, 1997). Higher scores reflect greater satisfaction with the marriage. Scores below 100 are considered to be indicative of clinically significant marital distress (Christensen & Heavey, 1999; Gottman, 1994).

**Time with others.** On each of the 8 evenings of daily telephone interviews, participants were asked, "In the past 24 hours, how much awake time did you spend alone? How much awake time did you spend with children, grandchildren, partner, friends or neighbors, church or other community members, volunteer or work colleagues, nonfamilial caregivers or helpers?" There was a strong correlation between spouses' daily reports of time spent with each other, $r(285) = .52$, providing support for the validity of these assessments. The proportion of awake time spent with others each day was computed by dividing the number of hours spent with others by the sum of the number of hours spent with others and the number of hours spent alone. The proportion of awake time participants spent specifically with their partner each day was computed with a similar formula. To examine the possible role of the amount of time typically spent with others as a moderator of daily links between perceived health stressors and emotional well-being, we aggregated the proportion of each person's waking hours spent with others across the 8 days into a mean score. The same procedure was used to create an index of time participants typically spent with their partner (see Table 1).

**Happiness.** Participants were asked to rate how happy or unhappy they felt during the previous 24 hr on a 7-point Likert-type scale with the following anchors: 1 = *very unhappy*, 2 = *moderately unhappy*, 3 = *a little unhappy*, 4 = *neither happy nor unhappy*, 5 = *a little happy*, 6 = *moderately happy*, and 7 = *very happy*. Happiness and related constructs (e.g., quality of life) are often measured with single items on Likert-type scales (Diener, 2000; Sandvik, Diener, & Seidlitz, 1993), and there is evidence for the validity and reliability of such single-item measures (Kalmijn & Veenhoven, 2005; Yang, 2008; Zimmerman & Arunkumar, 1994).

Perceived health was indexed by two variables—pain and physical limitation. Pain was measured each day by asking the participant to rate on an 11-point scale their level of bodily pain during the previous 24 hr (0 = *no pain*, 10 = *pain as bad as it can be*). This measure is adapted from the widely used Brief Pain Inventory (Cleeland, 1989). Single-item measures of pain have been found to have adequate validity and reliability (for a review, see Stinson, Kavanagh, Yamada, Gill, & Stevens, 2006). The degree of physical limitation was measured each day by asking participants to rate on a 5-point Likert-type scale how much their physical health hindered their usual daily activities during the previous 24 hr (1 = *not at all*, 5 = *extremely*). Past research suggests that single item measures of physical limitation have acceptable validity and reliability (e.g., van Oyen, Van der Heyden, Perenboom, & Jagger, 2006).

## Data Analytic Approach

The central questions of this study were whether perceived health and time spent with others were linked with happiness on a

Table 1
*Hours Spent in Daily Activities*

| | Men | | Women | | | |
|---|---|---|---|---|---|---|
| Daily activity | *M* | *SD* | *M* | *SD* | $t$[a] | *p* |
| Hours spent with partner | 8.28 | 3.04 | 8.17 | 3.25 | 0.28 | .78 |
| Hours spent with friends | 1.10 | 0.97 | 1.56 | 1.23 | −3.12 | .003 |
| Hours spent with children or grandchildren | 0.68 | 1.00 | 0.88 | 1.37 | −2.29 | .03 |
| Hours spent with caregivers | 0.12 | 0.23 | 0.20 | 0.49 | −1.20 | .24 |
| Hours spent with neighbors | 0.28 | 0.53 | 0.45 | 0.60 | −1.85 | .07 |
| Hours spent in volunteer work | 0.28 | 0.57 | 0.60 | 1.30 | −1.57 | .12 |
| Hours spent alone | 4.01 | 2.04 | 3.29 | 1.90 | 2.06 | .04 |
| Proportion of waking hours spent with others | 0.71 | 0.14 | 0.76 | 0.14 | −2.27 | .03 |
| Proportion of waking hours spent with partner | 0.54 | 0.18 | 0.52 | 0.17 | 1.05 | .30 |

[a] Paired $t$ tests that use variables aggregated across 8 days ($n = 47$) to examine gender differences.

day-to-day basis and whether marital satisfaction and time spent with others buffered individuals from the daily impact of poorer perceived health on happiness. The 8 days of data contributed by participants can be conceptualized at two levels of analysis: a within-person level (Level 1) that captures daily covariation among time spent with others, perceived health, and happiness for each person across 8 days and a between-person level (Level 2) that captures variability between individuals in these patterns of covariation. Analyses were conducted with a hierarchical modeling approach that simultaneously models effects at the within- and between-person levels (Raudenbush & Bryk, 2002). Because husbands' and wives' experiences each day are likely to be related, we implemented a multivariate extension of hierarchical linear modeling (HLM) so that data for husbands and wives could be analyzed simultaneously (O'Brien & Peyton, 2002; Raudenbush, Brennan, & Barnett, 1995).

Analyses were conducted in two stages. We first examined whether time spent with others and perceived health were linked with happiness on a daily basis. Separate models were estimated for each combination of the pain and physical limitation variables and happiness and for the two variables indexing time spent with all others and time spent specifically with partner and happiness. We then investigated whether variations across individuals in within-person linkages of perceived health and happiness were related to levels of marital satisfaction and the overall proportion of time spent with others. In this stage of analysis, separate models were estimated for each combination of the two perceived health variables and happiness, and each of these models was tested for moderation by marital satisfaction, time spent with others, and time spent with partner. To facilitate ease of interpretation, marital satisfaction, time spent with others, and time spent with partner were centered around their respective grand means (for each gender) in the models.

Following the recommendations of Larson and Almeida (Bolger, Zuckerman, & Kessler, 2000; Larson & Almeida, 1999), we accounted for previous day's level of happiness when examining the daily association between time spent with others and happiness. In effect, this strategy allowed us to examine the potential impact of time spent with others on changes in happiness from day to day. The Level 1 model for time spent with others and daily happiness can be written as follows:

$$\begin{aligned} \textit{daily happiness}_{it} = {} & (\textit{female})_{it}[\pi_{f0i} + \pi_{f1i}(\textit{daily happiness})_{it-1} \\ & + \pi_{f2i}(\textit{time with others})_{it}] + (\textit{male})_{it}[\pi_{m0i} \\ & + \pi_{m1i}(\textit{daily happiness})_{it-1} \\ & + \pi_{m2i}(\textit{time with others})_{it}] + e_{it}, \end{aligned} \quad (1)$$

where $\textit{daily happiness}_{it}$ is daily happiness on day $t$ ($t$ = Days 2–8) for the man or woman in couple $i$, and $\textit{daily happiness}_{it-1}$ is that participant's daily happiness from the previous day. Of particular interest are $\pi_{f2i}$ and $\pi_{m2i}$, which capture the predicted change in daily happiness associated with a one unit increase in time spent with others after controlling for the previous day's happiness. The Level 1 parameter estimates were allowed to vary randomly in the Level 2 model. In this first stage of analysis, no predictors were added to the between-subjects level of the model. In HLM, the Level 1 parameters estimated for each couple are pooled at Level 2 to obtain estimates for the group as a whole. The Level 2 equation for this model investigating the daily influence of time spent with others can be written as follows:

$$\pi_{f2i} = \gamma_{f20} \qquad \pi_{m2i} = \gamma_{m20}, \quad (2)$$

where $\gamma_{f20}$ and $\gamma_{m20}$ capture the pooled estimate of the daily association of happiness and time spent with others. All model estimates were made with the HLM 6 computer program (Version 6.06; Raudenbush, Bryk, & Congdon, 2000).

In the first stage of analysis, we began by estimating models in which all of the parameters in Equation 1 (or the equivalent Level 1 model) were free to vary across gender. If a multivariate test indicated no gender difference in the estimated parameters, we re-estimated the model while constraining all of the parameters to be equivalent across gender. This approach led to a more parsimonious and statistically precise model. In the second stage of analysis, we used a similar approach, constraining the Level 2 moderators across gender when no differences were found between men and women.

## Results

### Daily Life for Octogenarian Couples

These older men and women spent a large majority (more than 70%) of their waking hours with others and over 50% of their waking hours with their spouses. On average, both men and women reported spending over 8 hr of their waking time with their partners, but there was significant variation across individuals. Participants spent less time each day in volunteer activities with those who were not family members or with neighbors and spent relatively little time with nonfamily caregivers.[2] Although women spent more time on average with other people than did men, the difference amounted to only 5% of waking hours. Men and women did not differ significantly in the proportion of time they reported spending with their partners.

On average, participants reported relatively low levels of pain and physical limitation across the 8 days of study (Table 2). They indicated in their daily reports that they were generally moderately happy. Paired $t$ tests revealed no significant differences in men's and women's typical reports of happiness, pain, or physical limitation.

In addition to variation among individuals, we found meaningful within-person variation across the 8 days in levels of time spent with others, perceived physical health, and happiness. The average man in our sample varied in the number of daily hours spent with others across the 8 days by 6.6 hr, and the average woman's time with others varied by more than 5 hr per day across the 8 days. Similarly, the average man in our sample varied in his level of pain across the 8 days by 2.6 points on the 11-point pain scale, and the average woman varied in her level of pain across the 8 days by 1 point (in each case, slightly less than one standard deviation). The

[2] A very small percentage of participants' time was spent with caregivers. Fewer than 1.3% of their days involved spending 3 hr or more with caregivers. These data suggest that the overall lack of correlation between percentage of time with others and happiness was not likely due to the influence of some participants who appeared socially integrated but spent most of their time with others with a caregiver.

Table 2
*Descriptive Statistics for Daily Perceived Health and Happiness Reports*

| | Men | | | Women | | |
|---|---|---|---|---|---|---|
| Aggregated daily report | *M* | *SD* | Actual range of daily reports | *M* | *SD* | Actual range of daily reports |
| Pain (0–10) | 1.59 | 1.53 | 0–7 | 1.69 | 1.54 | 0–8 |
| Physical limitation (1–5) | 1.67 | 0.70 | 1–5 | 1.66 | 0.71 | 1–5 |
| Happiness (1–7) | 5.62 | 0.96 | 2–7 | 5.70 | 0.96 | 1–7 |

*Note*. Means reported are the aggregated mean scores of 8 days of data collection ($n = 47$).

average man in our sample varied in the extent to which his daily activities were hindered by his health by 2.4 points on the 5-point physical hindrance scale over 8 days, and the average women varied by 1.3 points (in each case, more than two standard deviations). Finally, the average man and woman reported that their level of happiness varied by almost 2 points (or slightly more than two standard deviations) on the 7-point happiness scale across the 8 days.

Participants generally reported being satisfied in their marriages ($M = 124$ for men and 123 for women). There was, however, meaningful variability in satisfaction across participants in our sample (*SD* for women = 27, *SD* for men = 22). About one sixth of participants reported levels of marital satisfaction characteristic of couples in distress (scores below 100; cf. Gottman, 1994).

## Is Time Spent With Others Linked With Happiness on a Daily Basis?

We first examined whether time spent with other people was linked with happiness on a daily basis. A multivariate test of the preliminary HLM model indicated no gender differences in the estimated parameters, $\chi^2(1, N = 47) = 0.38$, $p > .5$. We therefore re-estimated the model by constraining all pooled estimates to be equivalent across gender (see Raudenbush & Chan, 1993; Schulz, Cowan, & Cowan, 2006). The results of the re-estimated model indicate covariation of daily happiness and social interaction for both men and women that approaches statistical significance ($\gamma = .227$, $t = 3.96$, $p = .07$). Converting the *t* ratio for this association into an effect size correlation ($r_{effect} = .27$) indicates that this daily connection between time spent with others and happiness represents a medium effect (Cohen, 1988).[3]

We also examined whether time spent specifically with a partner (as opposed to time spent with all categories of other people) was linked with happiness on a daily basis. Preliminary modeling indicated no gender differences, and the final model showed that daily variation in time spent with a partner was, on average, linked with daily fluctuation in happiness for both men and women at a level approaching statistical significance ($\gamma = -.366$, $p = .07$). However, because it seemed likely that the association of time spent with a partner and happiness might depend on one's marital satisfaction, we reran the model with marital satisfaction introduced into the Level 2 equation as a moderator of daily links between time spent with a partner and happiness. Significant and strong moderation was found for both men and women ($\gamma = .019$, $p < .001$, $r_{effect} = .65$), with no gender differences, $\chi^2(1, N = 47) = 1.28$, $p = .26$. Individuals who were more satisfied with their marriages, as compared with those less satisfied, displayed a more positive association across days between time spent with partner and their reported happiness.

## Do Time Spent With Others and Marital Satisfaction Moderate the Daily Association of Perceived Health and Happiness?

We first examined daily links between perceived health and happiness without any moderators present in the model (see Table 3). For women, reports of both perceived pain and physical limitation covaried significantly with happiness on a daily basis. As expected, increases in pain and physical limitation on a given day were associated with less happiness on that same day. The magnitude of these links was between medium and large. For men, the link between reports of daily physical limitation and happiness approached statistical significance ($p = .07$).[4]

Next, we investigated whether marital satisfaction or the amount of time typically spent with others was associated with individual variation in daily links between perceived health and happiness. We first examined marital satisfaction as a Level 2 moderator of links between perceived health and happiness. As shown in Table 4, marital satisfaction was a consistent moderator of daily connections between perceived health and happiness. There were no gender differences in these moderating effects—pain: $\chi^2(1, N = 47) = 2.38$, $p = .12$; physical limitation: $\chi^2(1, N = 47) = 0.08$, $p > .5$—which were large in magnitude.

We explored these interactions further by using simple slopes analysis (Curran, Bauer, & Willoughby, 2006; Preacher, Curran, & Bauer, 2006). For both men and women, lower marital satisfaction was associated with a stronger daily negative covariation between pain and happiness and between physical limitation and happiness. The daily happiness of men—coefficient = −0.142, $t(45) = 2.36$, $p = .02$—and of women—coefficient = −0.283, $t(45) = 5.78$, $p < .001$—who reported marital satisfaction one standard deviation below the average significantly decreased on days when they

[3] The formula used for converting the *t*s into $r_{effect}$s was $r_{effect} = \sqrt{[t^2/(t^2 + df)]}$ (see Karney & Bradbury, 1997; Schulz et al., 2006).

[4] Additional analyses were run to investigate whether between-subject differences in daily reports of perceived health might influence the association between daily fluctuations in perceived health and happiness. The average daily reports of pain and physical limitation were added to the model as Level 2 moderators of daily perceived health and happiness links. No significant connections were found between average levels of perceived health and daily covariation of perceived health and happiness, indicating that individual differences in perceived health (including self-reporting biases) could not account for this daily association.

Table 3
*Final Hierarchical Linear Modeling Estimates of Daily Links Between Perceived Health and Happiness*

| | Happiness | | | |
|---|---|---|---|---|
| Perceived health | Unstandardized coefficient | *SE* | *t* | Effect size *r* |
| Men | | | | |
| Pain, $\gamma_{20}$ | −.072 | .066 | −1.08 | .16 |
| Physical limitation, $\gamma_{20}$ | −.160 | .081 | −1.96$^{+}$ | .28 |
| Women | | | | |
| Pain, $\gamma_{20}$ | −.176 | .056 | −3.11$^{**}$ | .42 |
| Physical limitation, $\gamma_{20}$ | −.263 | .082 | −3.19$^{**}$ | .43 |

*Note*. Separate models were estimated for pain and physical limitation. All analyses control for previous day's level of happiness.
$^{+}$ $p < .10$. $^{**}$ $p < .01$.

also reported pain. For men—coefficient = 0.074, $t(45) = 1.13$, $p = .27$—and for women—coefficient = −0.021, $t(45) = .36$, $p = .72$—who reported marital satisfaction one standard deviation above average, there was no daily connection between pain and happiness. Similarly, simple slopes analysis of daily hindrance–happiness covariation revealed a negative connection—for men, coefficient = −0.246, $t(45) = 2.92$, $p < .01$; for women, coefficient = −0.462, $t(45) = 5.27$, $p < .001$—for more maritally dissatisfied men and women but not for individuals in more satisfying relationships—for men, coefficient = 0.061, $t(45) = 0.693$, $p = .49$; for women, coefficient = −0.089, $t(45) = 1.02$, $p = .31$.

In contrast to the consistent moderating influence of marital satisfaction, analyses examining typical levels of time spent with others as a moderator revealed no effects (Table 4). That is, generally spending more or less time with others was not associated with differences across individuals in the degree to which perceived health covaried on a daily basis with reports of happiness. We did a parallel set of analyses examining whether time spent with a partner was a Level 2 moderator of links between perceived health and happiness. As with time spent with others in general, there was no indication that time spent with a partner moderated links between perceived health and happiness.

## Discussion

This study was designed to investigate the daily experiences of octogenarians and to examine closely the links among perceived health, social functioning, and happiness in this group of older adults. By collecting daily reports over 8 days, we were able to assess typical levels of social interaction, perceived physical health, and happiness and the day-to-day variability in these variables across this period. We found that these married octogenarians were quite social, spending on average more than 70% of their waking hours with others and more than half of their waking hours with their spouses, but that there was significant daily variation in the extent of their social connections. The daily reports indicated that health concerns and difficulties were indeed a common part of their lives and varied from day to day. Despite the presence of these health concerns, the participants reported that, on average, they were moderately happy.

We hypothesized (Hypothesis 1) that poorer perceived health on particular days would be associated with reports of less happiness on those days. This hypothesis was supported, particularly for women. We found that, on days when women reported less pain and physical limitation, they reported being happier. For men, the link between less physical limitation and greater daily happiness approached statistical significance. There was no significant association for men between daily reports of pain and levels of happiness.

On the basis of previous research, we hypothesized that more time spent with others would be linked with greater happiness on a daily basis (Hypothesis 2). For men and women, multilevel analyses revealed a link that approached statistical significance between reports of spending more time with others on a given day and being happier on that day, even after accounting for level of happiness on the previous day. We also found links between spending time specifically with partners and happiness that were moderated by how satisfied participants were with their marriages. For both men and women, being more satisfied in their marriages was strongly associated with a more positive daily connection between time with partner and levels of happiness.

We next addressed the question of whether relationships convey some benefit by attenuating links between reports of poorer health and decreased happiness. As hypothesized (Hypothesis 3), we found a negative daily connection between poorer health and happiness for more maritally dissatisfied men and women but not for individuals in more satisfying relationships. Our results suggest that a less satisfying marriage leaves one more vulnerable to the negative daily impact of health problems on happiness. In contrast to the strong buffering role of marital satisfaction, neither the typical amount of time spent with others nor the amount of time spent with partners in particular moderated day-to-day links between perceived health and happiness, thus failing to confirm the prediction made in Hypothesis 4.

Table 4
*Final Hierarchical Linear Modeling Estimates of Marital Satisfaction or Time Spent With Others as a Moderator of Daily Links Between Perceived Health and Happiness for Men and Women*

| | Happiness | | | |
|---|---|---|---|---|
| Fixed effects | Unstandardized coefficient | *SE* | *t* | Effect size *r* |
| Marital Satisfaction × Pain, $\gamma_{21}$ | .005 | .001 | 4.86$^{***}$ | .59 |
| Marital Satisfaction × Physical Limitation, $\gamma_{21}$ | .007 | .001 | 4.67$^{***}$ | .57 |
| Time Spent With Others × Pain, $\gamma_{21}$ | −.246 | .234 | −1.05 | .15 |
| Time Spent × Physical Limitation, $\gamma_{21}$ | −.034 | .254 | −0.13 | .02 |

*Note*. Separate models were estimated for pain and physical limitation. All analyses control for previous day's level of happiness. Estimates for the moderating impact of marital satisfaction and time spent with others on pain–happiness and physical limitation–happiness links were constrained to be equivalent across gender.
$^{***}$ $p < .001$.

A number of studies have documented the health benefits of being married (Waite & Gallagher, 2000), but it is becoming increasingly clear that relationship satisfaction is a key determinant of the health benefits of marriage (Bookwala & Franks, 2005; Gallo et al., 2003; Kiecolt-Glaser & Newton, 2001). Results of this study extend existing findings by documenting the role of marital satisfaction in protecting happiness from the daily ups and downs of physical health and by contrasting this protective role with the absence of any moderating influence by time spent with others. These findings are consistent with results in related domains that distinguish between the number of social connections and the quality of social connections or available support. For example, Cohen and Wills (1985) found that the degree to which an individual is integrated into a broad social network is directly linked with well-being, whereas the perception that support is available in time of need buffers individuals from the potential adverse effects of stressors. In our study, a direct link was found between time spent with others each day and daily happiness, but time spent with others did not exert a buffering influence on links between daily health fluctuations and happiness. By contrast, marital satisfaction (an index of relationship quality and arguably of available support) strongly buffered both men and women from the negative effects of poorer health on happiness. Tugade, Fredrickson, and Barrett (2004) demonstrated that positive emotions can undo the lingering aftereffects of negative emotional reactivity and restore cardiovascular equilibrium after negative emotional arousal. To the extent that satisfying marriages are associated with more positive and less negative emotion even in the face of health difficulties, day-to-day interactions in such marriages may help to reduce overall emotional and physiological strain. Finally, in a large representative and somewhat younger sample of older adults (mean age 68.9 years), Mancini and Bonanno (2006) found that marital closeness moderated the negative effects of functional disability on increased depression and anxiety and decreased self-esteem.

Important strengths of this study are its collection of repeated daily measures and its use of multilevel analyses to examine within-person associations across time. Our focus on short-term, within-person links helps narrow the field of likely mechanisms that underlie the connections between physical health and happiness and between time spent with others and happiness. For example, associations at the between-subjects level for time spent with others and happiness tell us that individuals who generally spend more time with others also report being generally happier. These associations could be due to a number of influences that operate over time frames that are longer than a week. So, for example, individuals who have generally sunny dispositions might also be better at making and maintaining friendships and might therefore spend more time with others. In contrast, our finding of within-person associations between time spent with others and happiness can be explained only by shorter term mechanisms that operate on a day-to-day basis, such as the happiness-enhancing benefit of interacting with others. Other variables that might vary on a day-to-day basis (e.g., weather) cannot be ruled out as alternative explanations for this link. However, although more temporally stable variables, such as personality, might moderate (i.e., strengthen or weaken) this daily covariation, they cannot by themselves account for the processes underlying such short-term associations.

Even with the use of daily reports of happiness, social functioning, and health, teasing out the direction of influence among these variables is difficult. We used recommended procedures to control for previous day's level of happiness (Larson & Almeida, 1999) in our analyses investigating the daily associations among these variables. Such statistical controls, however, do not allow us to conclude with certainty that happiness is shaped by daily interactions with others or by fluctuations in perceived levels of pain and physical disability. It is possible that happiness also shapes the likelihood that one will seek contact with others and the likelihood that one will report health concerns. There are also personality dimensions (e.g., neuroticism) that we did not examine that might influence the strength of the daily associations we found in this study.

Additional study limitations should be noted. The modest sample size of 47 couples restricts statistical power and may be responsible for some of the null and marginally significant findings. These 47 couples are the surviving married members of a larger cohort that originally numbered 268. Although analyses included in this report indicate that these individuals are, in a number of ways, representative of the survivors of the original cohort, it is possible that the survivors have other features that distinguish them in important ways from those who have already died or who have had relationships that have not endured. For example, the levels of physical limitations reported in this sample are relatively low and may not be representative of all octogenarians. Future research with larger samples should examine how physical mobility and functioning might influence some of the connections examined in this study. The study sample consisted of socioeconomically advantaged men and women, most of whom came of age in the World War II era. Further research is needed to determine the extent to which these findings are generalizable to other ethnic groups, to different social classes, and to different birth cohorts. It is also important to study how daily social experiences and health difficulties might be linked with daily happiness in single older adults.

Daily telephone interviews have methodological limitations that must also be kept in mind. It is possible that responses to interviewers' questions were influenced by concerns about social desirability (Diener, 2000). It is also possible that daily subjective ratings of pain and physical limitation were systematically biased by mood and therefore confounded with ratings of happiness. Although past research has linked perceived health in particular to happiness and marital satisfaction, it would be useful to have objective daily ratings of health as well. In the future, methodological innovations may allow researchers to obtain objective and subjective health ratings simultaneously on a daily basis.

The results of this study suggest that social relationships play an important role in shaping the happiness of older adults. It is imperative that social policy efforts designed to improve the quality of life for our society's oldest citizens take into account the effect of such efforts on both the quality of older adults' social relationships and the amount of time they spend each day with others.

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