2014

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Custom Citation

Waldinger, R. J., Cohen, S., Schulz, M. S., & Crowell, J. A. (2014). Security of attachment to spouses in late life: Concurrent and prospective links with cognitive and emotional wellbeing. *Clinical Psychological Science* August 18, 2014 2167702614541261.

To be published in *Clinical Psychological Science*

Security of attachment to spouses in late life:

Concurrent and prospective links with cognitive and emotional wellbeing

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Abstract

Social ties are powerful predictors of late-life health and wellbeing. Although many adults maintain intimate partnerships into late life, little is known about mental models of attachment to spouses and how they influence aging. Eighty-one elderly heterosexual couples (162 individuals) were interviewed to examine the structure of attachment security to their partners and completed measures of cognition and wellbeing concurrently and 2.5 years later. Factor analysis revealed a single factor for security of attachment. Higher security was linked concurrently with greater marital satisfaction, fewer depressive symptoms, better mood, and less frequent marital conflicts. Greater security predicted lower levels of negative affect, less depression, and greater life satisfaction 2.5 years later. For women, greater security predicted better memory 2.5 years later and attenuated the link between frequency of marital conflict and memory deficits. Late in life, mental models of attachment to partners are linked to wellbeing concurrently and over time.

Security of attachment to spouses in late life:

Concurrent and prospective links with cognitive and emotional wellbeing

The search for the underpinnings of wellbeing in late life takes on new urgency as the Baby-Boomer generation begins to swell the ranks of those living into old age. Accumulating evidence demonstrates that living longer and aging well are not solely dependent on advances in medicine but are strongly linked to the presence and quality of human relationships. A recent meta-analysis of 148 prospective studies of links between social connection and longevity indicated a 50% increased likelihood of survival for participants with stronger social ties (Holt-Lunstad, Smith, & Layton, 2010). This meta-analysis confirms the earlier influential conclusions of House, Landis, and Umberson (1988, p. 541) that "social relationships, or the relative lack thereof, constitute a major risk factor for health – rivaling the effect of well established health risk factors such as cigarette smoking, blood pressure, blood lipids, obesity and physical activity."

But what exactly is it about human relationships that impacts aging? Social relationships have been measured primarily in two ways – by gauging the breadth of one's social networks or frequency of social contacts (e,g., Vogt, Mullooly, Ernst, Pope, & Hollis, 1992; Waldinger & Schulz, 2010), and by asking about subjective perceptions of connectedness, loneliness, or support (e.g., Hawkley & Cacioppo, 2010). Analysis of social networks gives priority to social behaviors over subjective experience of relationship quality, and reports of feeling lonely or connected do not typically account for the social context in which the social exchange takes

place. A third window on human relationships that bridges the domains of subjectivity and behavior is that of mental models (Craik, 1943; Johnson-Laird, 1983) – internal representations of external reality that shape a broad range of experiences and behaviors, from how we assess probable outcomes (Tversky and Kahneman, 1983), to how we make political judgments (Westen, Blagov, Harenski, Kilts, & Hamann, 2006), to how we solve math problems (Fischbein, Deri, Nello, & Marino, 1985). Mental models typically have both explicit features that are conscious and implicit features that operate outside of awareness (Johnson-Laird, 1983).

Attachment theory (Bowlby, 1969) provides a life-span framework for understanding mental models of close relationships that links subjective experience with behavior and incorporates both consciously-held beliefs and beliefs that are largely out of awareness. Attachment models have been the topic of much research, beginning with how infants develop cognitive representations of close relationships. These representations guide the infant's patterns of careseeking and maintaining attachment to caregivers who are essential to the child's physical survival and psychological development (Ainsworth, 1979). In adult life, secure attachment to intimate partners has been linked with health, stress management, and emotional wellbeing (Mikulincer & Shaver, 2007; Pietromonaco, DeBuse, & Powers, 2013; Treboux, Crowell & Waters, 2004).

Mental models of attachment relationships are hypothesized to be essential guides for safety and survival across the life span (Ainsworth, 1985; Bowlby, 1969). Based on repeated interactions with caregivers, children develop scripts that shape expectations about and behavior in close relationships (Main, Kaplan & Cassidy, 1985). These scripts guide children to

behave in ways that help them maintain proximity to caregivers. Reliable, responsive caregiving is thought to enable children to develop *secure attachment* scripts characterized by comfort with closeness and the willingness to depend on others (Waters & Waters, 2006). By contrast, unresponsive or inconsistent caregiving is thought to foster *insecure attachment*, manifested in anxiety about abandonment and/or avoidance of closeness (Bowlby, 1969). The resulting schemas are relatively enduring (Scharfe & Bartholomew, 1994), persist into adulthood (Waters, Merrick, Treboux, Crowell & Albersheim, 2000), and shape expectations, experience and behavior in romantic partnerships (Meyers & Landsberger, 2002). Secure attachment in intimate adult relationships is associated with greater relationship satisfaction (Cobb, Davila & Bradbury, 2001), a stronger sense of intimacy (Collins & Feeney, 2004), and more frequent seeking and giving of support to partners (Simpson, Rholes & Nelligan, 1992).

Attachment theory predicts that, as with children and younger adults, older adults with secure mental models of attachment are comfortable depending on others and confident of their willingness to be supportive in times of need. Reliance on family attachments to meet basic needs for emotional and instrumental support increases with age as older adults withdraw from casual social networks (Carstensen, 1992; Wrzus, Hanel, Wagner, & Neyer, 2013) and retirement results in the loss of workplace friends and acquaintances (Damman, Henkens, & Kalmijn, 2013). Antonucci and colleagues (2004) have shown that central attachment figures remain relatively constant across much of adulthood, and that in the 8th and 9th decades of life these figures are most commonly spouses and children.

Because aging raises the specter of physical and cognitive decline and interpersonal loss, growing older may heighten concerns about the availability of important others in times of need, making attachment cognitions potentially even more central to wellbeing. Yet older adults' attachment representations and how they relate to psychological and social functioning have received little empirical attention. In one of the rare studies examining age and attachment in close relationships, Zhang and Labouvie-Vief (2004) found that older adults self-reported more secure, more avoidant, and less anxious attachment styles than younger adults.

What little is known about older adults' attachment models is derived from self-report measures designed for younger adults (e.g., Magai, Consedine, Gillespie, O'Neal & Vilker, 2004). This limits the study of late-life attachment in two important ways. First, the self-report measures designed for younger adults ask about what one is "generally" like in romantic relationships. Many adults currently in their 70s and 80s did not have other significant romantic relationships prior to marriage, and those that did may have trouble recollecting experiences from many decades in the past. Second, although consciously-held beliefs about relationships are important determinants of functioning, people are often motivated by attitudes that are outside of awareness but that nonetheless shape their experience of and behavior in intimate partnerships (Crowell & Treboux, 1995).

In younger adults, research demonstrates that these mental models of romantic attachment matter (Mikulincer & Shaver, 2007). Less secure attachment to intimate partners is associated with more negative affect (Caldwell & Shaver, 2012), greater loneliness (Bernardon , Babb, Hakim-Larson & Gragg, 2011),and less satisfaction with life (Hinnen, Sanderman &

Sprangers, 2009). In the interpersonal realm, less secure romantic attachment is associated with lower marital satisfaction (Givertz, Woszidlo, Segrin & Knudson, 2013) and less adaptive responses to marital conflict (Barry & Lawrence, 2013).

Associations between security of attachment and emotional wellbeing may be particularly consequential in late life, when cognition appears more vulnerable to interpersonal stressors. Loneliness and social isolation have been linked with earlier and more severe cognitive decline (Tilvis et al., 2004; Wilson et al., 2007). Cacioppo and Hawkley (2009) have pointed to several mechanisms that may underlie these associations, including increased activation of the hypothalamic-pituitary-adrenal axis, increased inflammation in the brain, and reduced cognitive stimulation when one is not socially engaged. Of particular relevance to attachment security is their hypothesis that social isolation and loneliness may result in chronic surveillance for threat, placing increased cognitive demands on the brain and thereby reducing available resources for creative adaptation

In the current study, we assessed models of attachment to spouses in a group of couples in their 70s and 80s, using a semi-structured interview designed specifically to tap implicit as well as explicit aspects of attachment. We developed a rapid coding system to assess security of attachment in intimate relationships and applied this to 162 interviews to examine how attachment concerns manifest in late life. We examined associations between late-life attachment and psychosocial functioning concurrently and after 2.5 years. Because security of attachment incorporates both the subjective experience of connectedness to one's intimate partner (loneliness) and behavior toward that partner (social connection), we hypothesized that

security of attachment would be positively linked with psychosocial and cognitive functioning in our older couples.

Method

Participants

The sample for this study consisted of 81 elderly Caucasian heterosexual couples. The male participants were part of a 75-year longitudinal study of adult development that began when they were adolescents. Fifty-one men were part of the original Harvard College cohort, which consisted of 268 college sophomores recruited between 1939 and 1942, for intensive multidisciplinary study of psychological health (Heath, 1945; Vaillant, 1977). Thirty men were members of the Inner City cohort, which consisted of 456 boys born between 1925 and 1932 (age 14 +/- 2 years at study intake) selected from disadvantaged families in low-income Boston neighborhoods to serve as the non-delinquent control group in a study of juvenile delinquency (Glueck & Glueck, 1950). Participants from both cohorts have been assessed using interview and questionnaire techniques at regular intervals over 75 years.

Beginning in 2003, both cohorts of men and their intimate partners were invited to participate in a study of late-life marriage. A total of 201 surviving members of the original sample had partners. To be eligible, couples had to have been living together for a minimum of one year. 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 (TICS, 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 below. Forty-four couples were unable to participate because one or both partners could not complete assessments due to

physical or cognitive impairment. Five couples completed part but not all of the assessments. Two couples could not be contacted, and two did not meet the criterion of living together for a minimum of 12 months. An additional 67 couples declined to participate. The most common reason given for refusal was a wish to preserve the privacy of their relationship.

Analyses indicate that those who participated did not differ from those who did not on a range of demographic and health variables. T-tests revealed that the 67 eligible men who declined to participate in the study did not differ significantly from the 81 men who participated with respect to age, number of years of education, income at ages 45-55, health at age 70 based on internist's rating of medical records (for details, see Vaillant, 1979), number of previous divorces, length of current relationship, or marital satisfaction at age 65-75. All participants were Caucasian. Mean age was 80.8 years for men (SD =3.4) and 75.7 years for women (SD = 6.8). The mean length of these relationships was 40.8 years (SD = 19.4). As in any longitudinal study, there was participant attrition across the 2.5 years between Time 1 and Time 2 assessments. Attrition varied slightly depending on the variable (sample sizes for each variable noted in Table 1). Attrition was lower for male participants (the original members of the Study) than for female spouses: 80% of men and 69% of women provided data at both time points.

The Partners Health Care Human Research Committee approved the study, and written informed consent was obtained from all participants for each wave of the study.

Procedure

The first wave of assessments for this study took place in 2003-2006. During a home visit, an audiotaped semi-structured interview assessing security of attachment to partner was

administered separately to each member of the couple by different interviewers, along with self-report questionnaires assessing marital satisfaction and depressive symptoms. Following the home visits, men and women were individually interviewed by telephone on 8 consecutive evenings to obtain a reliable "snapshot" of day-to-day psychosocial functioning. Telephone interviewers varied across the 8 days and were different from those who collected data during home visits. The interviewers were unaware of all prior data on participants, including responses on previous days of telephone interviewing. Participants were assured that their responses would remain confidential (including from their spouses) and were asked to be in a location during telephone interviews where their responses could not be overheard by others. Interviews lasted 15-20 minutes and focused on the participants' activities during the previous 24 hours. Most interviews were conducted around the dinner hour each day. The mean number of interviews completed by participants over 8 days was 7.6 (SD = 0.73).

The second wave of assessments took place on average 2.5 years after the first (2007-2009; mean interval = 29.5 months, SD =8.1). Couples were again visited in their homes by Study interviewers, and participants completed questionnaires assessing depression, positive and negative affect, and satisfaction with life. In addition, participants completed a battery of neuropsychological tests to assess cognitive functioning.

Measures

Time 1 Assessments

Security of attachment. Security of attachment was measured using the Current Relationship Interview (CRI; Crowell & Owens, 1996). This 45-60 minute semi-structured

interview assesses adults' specific representations of the attachment bond formed within the respondent's current couple relationship. The interview asks participants for adjectives describing their relationship with their partner and illustrative incidents supporting those adjectives. For example, if the participant describes the marriage as "loving," he/she is asked for two incidents that illustrate loving aspects of the relationship. The participant is also asked about factors that have influenced the relationship and the effects of the relationship on his or her personal development. The scoring system parallels the scoring system used in the Adult Attachment Interview (AAI; Main & Goldwyn, 1988) in that experience with the partner, discourse style, and believability or coherence of the description of the relationship are rated by coders using a number of scales (Crowell & Owens, 1996; Crowell, Treboux, & Waters, 2002; Owens et al., 1995). Based on the coding procedure used by Crowell and colleagues (Crowell & Owens, 1996), raters read each transcribed interview twice and used the following eleven rating scales to characterize the individual's behavior, the partner's behavior, and the individual's discourse style: relationship satisfaction, loving behavior, comfort with care-seeking, comfort with care-giving, valuing intimacy, derogation of attachment, derogation of partner, rejection of attachment, fear of loss, anxiety about dependence, and coherence of narrative. Coherence reflects the participant's ability to present an integrated, believable, and consistent account of his or her own and the partner's attachment-related behaviors and their meaning. Ratings were made using Likert-type scales ranging from 0 to 9 and reflect the reported behavior and thoughts of the participant with respect to attachment.

Four coders who were unaware of other participant data were trained to reliability with an expert coder (S. Cohen) in consultation with the author of the instrument (J. Crowell).

Coding required on average one hour per transcript. All four coders coded a randomly-selected subsample of 25 CRI transcripts (15% of total) to determine inter-rater reliability. Agreement among the four coders on all 11 scales was *r*=.7 or higher. All remaining transcripts were coded by at least two coders, and to increase reliability, coder ratings within two points were averaged to arrive at a final score on each scale. Discrepancies of 3 points or greater were resolved by averaging a 3rd coder's rating with the other two. Because the midpoint of the coherence scale was the cutoff for secure attachment, two-point discrepancies that spanned the midpoint on the coherence scale were also resolved using a 3rd coder.)

The CRI has good psychometric properties (Ravitz, Maunder, Hunter, Sthankiya & Lancee, 2010), including stability over 18 months (Crowell, Treboux & Waters, 2002) and discriminant validity (Owens et al., 1995; Crowell et al., 2002; Treboux, Crowell & Waters, 2004). In addition, the CRI is associated in predicted ways with attachment ratings using the AAI and with self-reports of relationship quality, satisfaction, violence, and divorce (Treboux et al., 2004). Predictive validity of the CRI is supported by the finding that security of attachment predicted a decrease in relationship conflict over the first six years of marriage (Treboux et al., 2004).

Marital satisfaction. Marital satisfaction was measured using 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 can range from 0 to 163 and those below 100 are considered to be indicative of clinically significant marital distress (Christensen & Heavey, 1999; Gottman, 1994).

Depressive symptoms. Depressive symptoms at Time 1 were assessed using the Center for Epidemiological Studies Depression Scale (CES-D). The CES-D is a widely-used 20-item scale used as a self-report of the presence of depressive symptoms. Each item asks about the frequency of depressive symptoms during the past week. The CES-D score ranges from 0 to 60, with higher scores indicating more depression. A score of 16 or above is considered to be evidence of clinically significant depression (Lewinsohn, Seeley, Roberts, & Allen, 1997). The CES-D has been shown to have good reliability and validity as a screening measure for depression in the general population (Radloff, 1977).

Mood over 8 days. On 8 consecutive days, participants were asked, "How are you feeling today?" and responses were 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. Mood and related constructs (e.g., quality of life) are often measured with single items using Likert-type scales (Diener, 2000; Sandvik, Diener, & Seidlitz, 1993), and there is evidence for the validity and reliability of single item measures (Veenhoven & Kalmijn, 2005; Yang, 2008; Zimmerman & Arunkumar, 1994). The 8 daily ratings were averaged to derive a typical daily mood for the 8-day period.

Frequency of marital disagreements over 8 days. On each of the 8 evenings of daily telephone interviews, participants were asked, "In the last 24 hours, did you have a

disagreement with your partner, even about something small?" Participants answered "yes" or "no," and positive responses were summed and averaged over 8 days to create a score between 0 and 1 reflecting the percent of days on which they reported disagreements.

Time 2 Assessments

Positive and negative affect. Positive and negative affect over the previous week was measured using the Positive and Negative Affect Schedule (PANAS, Watson, Clark & Tellegen, 1988), a 20-item self-administered questionnaire. Participants are asked to rate on 5-point Likert-type scales the degree to which they have felt each emotion on the list during the past week. Responses are summed separately for the positive affect (PA) and negative affect (NA) scales (10 items each) and range from 10 to 50 for each scale. In this sample, alpha reliability is .88 for the PA scale and .85 for the NA scale with an intercorrelation of -.22. The PANAS demonstrates test-retest reliability, and the NA scale correlates with similar measures of negative affect (Watson et al., 1988).

Depressive symptoms. Depressive symptoms at Time 2 were measured using the Geriatric Depression Scale (GDS, Yesavage et al., 1983), a 30-item "yes/no" questionnaire administered by a trained examiner. An overall depressive symptom score was calculated by summing the number of items endorsed. Validity of the GDS has been demonstrated by good agreement with depression ratings using the Research Diagnostic Criteria, the Zung Self-Rating Depression Scale, and the Hamilton Rating Scale for Depression (Yesavage et al., 1983). The measure has good internal consistency and test-retest reliability.

Satisfaction with life. Life satisfaction was measured using the Satisfaction with Life Scale (SWLS, Diener, Emmons, Larson & Griffin, 1985). The SWLS is a self-administered questionnaire that asks participants to rate how much they agree or disagree with five life satisfaction statements on 7-point Likert-type scales. Scores are summed to generate a total score that ranges from 5 to 35. In this sample, the coefficient alpha was .85. This measure correlates with peer- and family-reported life satisfaction (Pavot, Diener, Colvin & Sandvik, 1991).

Memory. Verbal episodic memory was assessed using the 16-item Free and Cued Selective Reminding Test (FCSRT, Morris et al., 1989). The FCSRT is designed specifically to discriminate true memory deficits from attentional and processing difficulties. Participants search a card containing four pictures of items (e.g., grapes, toaster) that go with unique category cues (e.g., fruit, kitchen appliances). After all four items are identified, immediate cued recall of just those four items is tested. After controlled learning has been completed for all 16 items, there are three test trials consisting of free recall, followed by cued recall for those items not retrieved using free recall. The sum of free and cued recall on each trial is called total recall. Controlled learning remediates the mild retrieval deficits that occur in many healthy elderly individuals but has only modest benefits in patients with dementia (Grober, Sanders, Hall & Lipton, 2010). The total number of items recalled during free and cued recall is used in analyses.

Executive Functioning. Executive functioning was assessed using the Trail Making Test Part B, Controlled Oral Word Association (F-A-S) Test and the Category Generation (CAT) Test (Monsch, Bondi, Butters, & Salmon, 1992). The Trail Making Test Part B is a test of visual attention and task switching that consists of numbers and letters that are to be connected in

numerical and alphabetical order. Participants are timed and scored for time taken and number of errors made. Semantic and phonemic/lexical knowledge were measured using the Controlled Oral Word Association Test Letter (FAS) and Category (CAT) (COWAT). In these tests, participants generate words that begin with the letters F, A, and S and report items within the categories of Animals, Vegetables, and Fruits for one minute each. The words generated by the participant are summed for the FAS and the CAT; these along with the Trail Making Part B score were z-scored, and the mean used as the index of executive function. In this sample, the correlations among the 3 scores were as follows: $r_{\text{fas-cat}} = .56$, $r_{\text{fas-trails b}} = .34$, $r_{\text{cat–trails b}} = .35$; $p<.001$ for all correlations. These three measures are commonly used as indices of executive functioning (Newman, Trivedi, Bendlin, Ries & Johnson, 2007; Grober et al., 2008), and previous studies indicate that the combined scores showed greater sensitivity, specificity, and predictive value than each score alone (Monsch, 1992; Hedden et al., 2012).

Results

Means and standard deviations for variables indexing psychosocial functioning are presented in Table 1. To examine the possibility that missing data on particular variables might result in sampling bias, we examined links between the presence of missing data and key demographic variables: age, membership in the College or Inner City cohort, years of formal education, and length of the marital relationship. Of 34 analyses conducted for each gender using these background variables, only one significant finding emerged – a small positive relation between women's years of education and likelihood of missing data on mood and frequency of marital disagreements derived from daily diary assessments over 8 days. These analyses indicate minimal non-random missingness. Full information maximum likelihood

estimation (FIML) as implemented in AMOS (v. 17.0) was used in all principal analyses because FIML results in unbiased parameter estimates and appropriate standard errors when data are missing at random. FIML estimates are generally superior to those obtained with listwise deletion or other ad hoc methods, even when the missing-at-random assumption is not fully met (Acock, 2005). Many of the psychosocial functioning variables under study were moderately inter-correlated both within and across assessment waves (see Table 2).

The structure of attachment in late life. Two of the 11 coded attachment variables – dependency and fear of loss – had truncated ranges, such that few participants were rated as unduly concerned about these issues (only 5% were rated as manifesting maladaptive dependency, and less than 10% were judged to be fearful of loss out of proportion with actual life factors). Coders were trained to rate these scales accounting for actual circumstances in participants' lives that might warrant fear of loss and related anxiety about dependence. Scores on these variables therefore reflect coders' judgments about the presence of inappropriate or irrational fears not tied to actual life factors. Because of the truncated range on these variables, they were excluded from analyses. Using data from all 162 individuals, we conducted principal axis factoring to identify the underlying structure of the remaining 9 variables coded from the attachment interviews. These variables were subjected to principal axis factoring with orthogonal rotation (using varimax criterion). Both an examination of the scree plot and the use of the criterion of Eigenvalues > 1 revealed one factor that accounted for 69% of the total variance. Factor loadings for eight of the nine attachment variables were at or above the .71 "excellent" level identified by Comry and Lee (1992): loving behavior (.95), valuing of intimacy (.89), satisfaction in relationship (.85), rejecting of attachment (.84), comfort with careseeking

(.83), comfort with caregiving (.82), derogation of partner (.78), and coherence of narrative (.71). The lowest factor loading was .57 for derogation of attachment, still in the "good" range. We labeled this factor "Attachment Security." Individual scale scores for each participant were derived by taking the mean of all 9 items (Tabachnick & Fidell, 1996). We considered other factor structures, including a two-factor solution (with orthogonal rotation) that might distinguish between the dimensions of anxiety and avoidance that emerge in attachment questionnaire data from younger adults. We also explored non-orthogonal rotation methods (e.g., direct oblimin). However, no support was found in any of these analyses for a multi-factorial solution. The Attachment Security scale represents a spectrum from greater security (valuing of intimacy, comfort with care-seeking and caregiving, high coherence of narrative) and less derogation (of the partner and the importance of the relationship) at one end, to less security and greater derogation at the other. The Attachment Security scale score was used in all subsequent analyses.

Links between security of attachment and psychosocial functioning. Correlational links between security of attachment to partner and psychosocial functioning were examined and are presented in Table 3. For both men and women, greater security of attachment was linked concurrently with greater self-reported marital satisfaction, better mood averaged over 8 days, and fewer marital conflicts over 8 days. For men, greater security of attachment was also associated with less concurrent depressive symptomatology. Two and one-half years later, more secure attachment predicted less negative affect, less depressive symptomatology, and greater satisfaction with life for both men and women. These correlations generally ranged from medium to large in magnitude, with marital satisfaction the largest at r=.61 and .73 for

men and women respectively. For women, greater security of attachment also predicted better memory functioning 2.5 years later. No such association was present for men, and security of attachment did not predict executive functioning for men or for women.

Security of attachment as a buffer of the effects of stress on late-life memory. In light of recent research suggesting differential susceptibility of older adults to the effects of stress on cognitive functioning (e.g., Pardon & Rattray, 2008), we considered the possibility that secure attachment might be a buffer against the effects of everyday stressors on late-life cognitive functioning. One such stressor – frequency of daily marital disagreements – was significantly correlated with memory functioning for women but not for men (r_{women} = -.27, p = .05; r_{men} = -.17, p = .19). A product term (security of attachment X frequency of disagreements with partner) was calculated and entered into a regression model predicting memory (FCSRT score), with security of attachment, frequency of disagreements with partner, and age entered into the model as covariates. The results of this analysis are presented in Table 4. Of note is that for women the interaction term was a significant predictor of memory independent of the direct effects of security of attachment and frequency of marital disagreements, and the overall model predicted 33% of the variance in memory scores across the women in this sample. No significant interaction was found for men. Further analysis indicated that for those women rated as more securely attached to their partners, frequency of marital conflicts was not related to memory 2.5 years later. By contrast, for those women rated as less securely attached, more frequent marital conflicts predicted poorer memory functioning 2.5 years later.

Discussion

Understanding the aging process depends in part on clarifying the nature of the links between healthy aging and personal relationships. This study suggests that it is not only *what* we think but also *how* we think about our connections to intimate partners that relates to wellbeing as we age. The structure and coherence of mental models of close relationships, along with judgments about the degree to which one can rely on an intimate partner for support, may be especially important as we age, yet this aspect of older adults' experience has received relatively little empirical attention. This study assesses security of attachment to intimate partners in older adults using an interview that is appropriate to both the age and the life experience of individuals who are now in their 70s and 80s. Unlike the self-report measures that access consciously-held beliefs, this interview elicits rich reports about perceptions of and behaviors in relationships from which coders can reliably assess implicit as well as explicit elements of older adults' models of attachment to their partners. In this respect, the study offers a new window on older adults' mental models of intimate relationships and their links with healthy aging.

An important goal of this study was to identify what attachment to an intimate partner looks like in old age. Do the same domains of security, avoidance, and anxiety that characterize models of attachment in children and younger adults emerge in the interviews of older adults? The emergence of a single cohesive Attachment Security factor in our sample raises the possibility that there may be differences in the structure of attachment in older adults. The nine attachment variables grouped together on a single dimension that at one extreme entailed coherence in the account of the relationship, valuing of intimacy and the partner, and comfort

with caregiving and careseeking. The other extreme of the scale was characterized by narratives about the marriage that were less convincing and coherent, by derogation of the partner, and by dismissing the importance of the partner and the relationship. Individuals who expressed unmet needs for support, intimacy, and closeness scored low on this scale, as did individuals who said that such needs were not present or important.

Our findings suggest a more unitary structure of insecure attachment in older adults than is the case in younger adults. Two perspectives afforded by old age may converge to shape this more unidimensional manifestation of insecure attachment to partners in late life – (1) older adults look back on a lifetime of accumulated experiences of intimacy, and (2) they have a heightened awareness of mortality. With regard to looking back on the course of intimacy, some of the least happy individuals in this study longed for intimate connection, but in reviewing their marriages, they appeared resigned to the futility of expecting it from their partners. When asked whether he turns to his wife when emotionally upset, one octogenarian in his 2nd unhappy marriage responded, "No. Definitely not. I would get no sympathy. I would be told that it's a sign of weakness." While not minimizing the importance of attachment needs (as is the case among avoidantly-attached individuals), some older adults appear to have resigned themselves to the prospect of never having those needs met by their partners. Hope of intimacy may no longer spring eternal for such individuals, and resignation or acceptance could be a factor in the apparent reduction in attachment anxiety seen both in the Zhang and Labouvie-Vief (2004) study and in this sample.

The second factor that may shape attachment in late life is mortality salience. Compared with their younger counterparts, older individuals face the more imminent prospect of their

own and their partners' physical decline and death, thus creating a different context in which relationships are evaluated. Empirical studies in experimental social psychology (e.g., Greenberg at al, 2003; Mikulincer, Florian, & Hirschberger, 2003) find that people manage anxiety about their own mortality using specific strategies, including adhering to a cultural worldview that provides a sense of life's meaning and purpose, and fostering a sense of connectedness and attachment security in close relationships. Mikulincer and Shaver (2012) have proposed that when proximity-seeking is inhibited by insecure attachment, individuals are left defenseless in the face of mortality concerns, and these feelings must be managed in other ways. Those who cannot find comfort in close relationships might manage anxiety about death with other forms of self-protection, such as greater investment in a cultural worldview (e.g., religion) that enhances life's meaning and purpose. For example, the study participant quoted above went on to note that he had no hope of receiving comfort from his wife but that he turned to God for solace: "I pray every night. My personal God doesn't get mad at me. He accepts that I have strengths and weaknesses." Older insecurely-attached individuals who are anxiously longing for intimacy and those who are keeping a partner at arm's length might be similarly resigned to not having needs met by their intimate partners, and their images of intimate partnerships might be more similar than different. Because death is near, such people would need to seek comfort in other ways.

Consistent with findings in studies of younger adults (for a review, see Mikulincer & Shaver, 2007), security of attachment in this older sample was strongly linked with concurrent wellbeing, including greater marital satisfaction, happier mood, and less frequent marital conflicts. For men, greater security was also associated with less depressive symptomatology.

These associations are not surprising. The feeling that one can rely on an intimate partner in times of need is likely to foster a greater sense of wellbeing in the face of life's daily stresses and uncertainties, and this feeling is likely to inform the evaluation of how satisfied partners are in their relationships. Conversely, lack of comfort with caregiving or careseeking, and the sense that a partner cannot be relied on for support, might well contribute to more frequent conflicts in the marriage, particularly as needs for support increase with age. It is also possible that causal influences operate in the other direction – that is, being in a good marriage may contribute to feelings of security.

Looking across time, security of attachment predicted wellbeing 2.5 years later. For both men and women, more secure attachment predicted greater satisfaction with life, less depressive symptomatology, and less negative affect as reported on the PANAS. The moderate-to-large magnitude of these correlations (i.e., *r*'s from .29 to .52) is particularly impressive considering the substantial separation in time of these two measurements. There was no significant association between security of attachment and PANAS Positive Affect scale scores. This may reflect something unique about positive affectivity or may be related to the nature of positive affect in late life. Many of the more "activated" emotion terms included in the PANAS scale used to tap positive affectivity, such as *inspired*, *energetic*, and *joyful*, are less frequently endorsed by older adults than by younger people (Pressman & Cohen, 2012).

Of particular note, less secure attachment predicted poorer memory function for women 2.5 years later. The association of attachment security and memory is noteworthy given links found in other studies between loneliness and cognitive decline. One possible explanation is that relationship insecurity, like loneliness, is a chronic stressor, and research has

demonstrated links between stress and cognitive decline in older adults (Lupien, McEwen, Gunnar & Heim, 2009). The association between attachment security and memory was not found for men. Moreover, security of attachment was not associated with executive functioning for men or for women, raising the possibility that the effects of insecure attachment on cognition may be domain-specific. Replication is required to determine the robustness of these findings. In addition, it is important to note that, because these cognitive, affective and wellbeing measures were only assessed at one time point, temporal precedence and the direction of effects cannot be established.

We hypothesized that insecure attachment to the partner might make it difficult for older adults to weather the normal stresses of living. We further hypothesized that the wear-and-tear of marital disagreements might be magnified in the context of insecure attachment and thereby impact memory. The significant interaction that we found for the women in this sample between attachment security and frequency of marital disagreements in predicting memory function is consistent with these hypotheses. There was no significant link between frequency of marital disagreements and memory for more securely-attached women but a significant link for women who are less securely attached to their partners. This finding is consistent with studies of younger adults in which attachment security buffers individuals from the detrimental effects of relationship stressors such as infertility (Amir, Horesh & Lin-Stein, 1999) and the transition to parenthood (Simpson & Rholes, 2002).

A number of study limitations are important to bear in mind. Methodological issues may be responsible for the absence of discrete factors for anxiety and avoidance and for the finding that two insecurities related to anxious attachment – unrealistic fears about depending on and

losing the other – were not prominent in these interviews. It is possible that (1) the interview did not facilitate the expression of two discrete types of insecure attachment, (2) our coders may not have been able to distinguish between these dimensions or between realistic and unrealistic fears around dependency and loss, or (3) our scoring system may not have accurately assessed these dimensions. Arguing against these methodological problems, the CRI has been shown to elicit data on avoidant as well as anxious attachment in samples of younger adults (Crowell, Treboux & Waters, 2002) and our coding system was adapted from the original scoring system (Crowell & Owens, 1996).

Data on psychosocial functioning were missing to varying extents, but most particularly in the Time 2 measures. Analyses revealed missingness to be largely at random, and use of FIML for primary analyses allowed us to include all 162 participants. Measures at Time 1 and Time 2 (e.g., the CES-D and the GDS) tapped similar constructs but were not identical, so we were unable to examine links between attachment security and changes in wellbeing, which will be important to study in future research. All participants in this study were Caucasian and were from two particular historical and demographic cohorts, pointing to the need for studies of attachment security and wellbeing in other populations. Finally, a larger sample may increase the power to detect a more complicated factor structure in late-life attachment.

An important strength of this study is the incorporation of diverse methods of assessment. Both mood and frequency of marital disagreements were measured using daily telephone interviews over 8 consecutive days. The interview approach has particular utility with an elderly population that may not be accustomed to using electronic or computer devices to report on daily events, and the 8-day sampling increases the reliability and accuracy of these

assessments (Larson & Almeida, 1999). Security of attachment was rated from interview transcripts, and marital satisfaction was assessed using self-report questionnaires, two distinct sources of information that make the strong correlations between these variables particularly impressive. We used a measure of memory functioning that is sensitive in distinguishing normal retrieval deficits from true cognitive decline in the elderly. Longitudinal follow-up of participants allowed for examination of wellbeing not just concurrent with measurement of attachment security but 2.5 years later. Finally, the implicit measure of attachment security has several advantages noted above. Although it is more labor-intensive than a paper-and-pencil questionnaire and may thereby limit sample sizes, our raters' ability to assess multiple aspects of security of attachment reliably in about one hour per transcript suggests that use of semi-structured interviews may be more feasible in the study of attachment than has been previously considered.

In this study, we found that more secure mental models of marital relationships in late life are linked directly with greater wellbeing, and that more secure models of attachment appear to buffer older women from the potentially deleterious effects of marital conflict on cognition. These findings challenge us to look more deeply into the mechanisms by which models of attachment may "get under the skin" and into the brains of older adults. Moving forward, it will be critical to identify exactly what it is about secure attachment that promotes wellbeing as we age. Health-promoting mechanisms of attachment security may include those that operate principally within individuals, such as the solace of believing that someone will be available in times of need; and behaviors, motivations or attitudes toward a partner that benefit both members of the dyad. Studies in which older couples are carefully observed

discussing stage-salient attachment concerns such as end-of-life vulnerability and care are a critical next step. The goal in these studies should be to identify experiences, behaviors, motivations and attitudes that distinguish securely-attached from insecurely-attached individuals in this important late-life context and to determine whether these distinctions mediate the attachment-wellbeing linkage.

Researchers also need to be attentive to the possibility that these mechanisms may operate in complex ways. Our findings regarding the moderating role of attachment on links between marital conflict and memory are consistent with a stress-buffering hypothesis (Holt-Lunstad et al., 2010) in which secure models of attachment promote adaptive behavioral or neuroendocrine responses to acute or chronic stressors (e.g., marital conflict), thereby buffering the deleterious influence of stressors on health. Such buffering mechanisms would only be evident under stress. Whether they function directly or as protective factors, the effects of attachment-related mechanisms may transcend the securely-attached individual to convey additional benefit to the partner and/or the dyad. Because of the potential partner benefits of secure mental models, it will be critical to utilize dyadic approaches, such as Actor-Partner Interdependence Modeling (Kenny, Kashy, & Cook, 2006), that can capture complex relational processes. Deeper understanding of these mechanisms has the potential to inform interventions that promote healthy aging. As social networks narrow in late life and intimate partnerships are more central, security of romantic attachment may emerge as an increasingly important factor in aging well.

Author contributions

R. Waldinger designed the overall study in consultation with the other authors and oversaw data collection. S. Cohen and R. Waldinger developed the coding system in consultation with J. Crowell. S. Cohen supervised the coding of interviews under the supervision of J. Crowell. R. Waldinger and M. Schulz performed the data analysis and interpretation. R. Waldinger drafted the paper with the assistance of M. Schulz, and all co-authors provided critical revisions. All authors approved the final version of the paper for submission.

Acknowledgments

The authors wish to thank George Vaillant, Dorene Rentz, Laura Brumariu, Nina Rovinelli Heller and four coders – Daniel Bateson, Muhannad Halassa, Sabrina Liu, and Christina Lau – for their contributions to this project. This work was supported by grants R01 MH42248 and R01 AG034554.

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Table 1
Means (SD) of Psychosocial Functioning Variables

	Men	Women
Time 1 assessments		
Marital satisfaction	124.8 (23.0) N=81	123.2 (26.3) N=81
CES-D	8.52 (7.17) N=81	9.29 (6.95) N=77
Daily disagreements with partner x 8 days	0.13 (0.17) N=78	0.17 (0.20) N=77
Daily mood x 8 days	5.78 (0.91) N=78	5.91 (0.85) N=77
Time 2 assessments		
PANAS Positive Affect	34.62 (6.72) N=61	34.82 (6.74) N=49
PANAS Negative Affect	16.51 (6.17) N=61	15.90 (6.47) N=49
Geriatric Depression Scale	5.78 (4.60) N=65	4.50 (4.19) N=56
Satisfaction with life	27.37 (5.57) N=60	27.08 (5.82) N=51
Memory (FCSRT)	46.91 (2.08) N=64	45.83 (3.82) N=53
Executive functioning	-1.03 (1.00) N=64	-0.82 (1.42) N=56

Table 2
Pearson Correlations among Psychosocial Functioning Variables*

WOMEN *r*(p) / **MEN *r*(p)**	Marital Satisfaction	CES-D	Daily disagreements	Daily Mood	PANAS Positive Affect	PANAS Negative Affect	Geriatric Depression Scale	Satisfaction with life	Memory (FCSRT)	Executive functioning
Marital satisfaction	--	-.25 (.03)	-.45 (<.001)	.53 (<.001)	-.05 (.74)	-.54 (<.001)	-.35 (.008)	.71 (<.001)	.33 (.02)	.06 (.63)
CES-D	-.49 (<.001)	--	.10 (.40)	-.30 (.01)	-.30 (.04)	.25 (.07)	.61 (<.001)	-.31 (.02)	-.09 (.49)	-.09 (.53)
Daily disagreements with partner x 8 days	-.50 (<.001)	.26 (.03)	--	-.24 (.04)	.06 (.67)	.39 (.005)	.19 (.14)	-.37 (.005)	-.27 (.05)	.12 (.38)
Daily mood x 8 days	.38 (.002)	-.31 (.01)	-.16 (.17)	--	.12 (.38)	-.46 (<.001)	-.32 (.01)	.49 (<.001)	.10 (.44)	-.03 (.81)
PANAS Positive Affect	.25 (.05)	-.45 (<.001)	.04 (.75)	.39 (.003)	--	-.21 (.14)	-.47 (.002)	.21 (.14)	.05 (.76)	.13 (.38)
PANAS Negative Affect	-.36 (.006)	.23 (.07)	.21 (.11)	-.13 (.32)	-.17 (.19)	--	.39 (.007)	-.35 (.01)	-.18 (.19)	.19 (.17)
Geriatric Depression Scale	-.49 (<.001)	.63 (<.001)	.21 (.09)	-.37 (.004)	-.50 (<.001)	.57 (<.001)	--	-.42 (.003)	-.40 (.006)	-.17 (.21)
Satisfaction with life	.46 (<.001)	-.39 (.003)	-.05 (.71)	.05 (.68)	.28 (.04)	-.26 (.05)	-.39 (.003)	--	.34 (.02)	.08 (.57)
Memory (FCSRT)	.001 (.99)	-.13 (.31)	.17 (.19)	.05 (.71)	.02 (.85)	-.18 (.17)	-.12 (.34)	.18 (.17)	--	.17 (.23)
Executive functioning	.14 (.27)	-.15 (.24)	.05 (.69)	.11 (.39)	.26 (.05)	-.07 (.59)	-.18 (.16)	.19 (.15)	.16 (.21)	--

*Correlations for men are on the bottom-left, and correlations for women are on the top-right

Table 3
Pearson Correlations between Security of Attachment and Psychosocial Functioning

	Security of Attachment	
	Men	Women
	r (p)	*r (p)*
Time 1 Assessments		
Marital satisfaction	.61 (<.001)	.73 (<.001)
CES-D	-.43 (<.001)	-.14 (.22)
Daily disagreements with partner x 8 days	-.30 (.01)	-.44 (<.001)
Daily mood x 8 days	.26 (.03)	.30 (.01)
Time 2 Assessments		
PANAS Positive Affect	.20 (.11)	-.01 (.94)
PANAS Negative Affect	-.29 (.02)	-.42 (.002)
Geriatric Depression Scale	-.34 (.006)	-.38 (.004)
Satisfaction with life	.49 (<.001)	.52 (<.001)
Memory (FCSRT)	-.12 (.34)	.41 (.003)
Executive functioning	.11 (.37)	-.08 (.55)

Table 4

Regression Analysis Predicting Memory Scores

	Women				Men			
	B	*SE B*	β	R^2	*B*	*SE B*	β	R^2
Age	-0.11	0.06	-0.21†		-.02	.08	-.04	
Security of attachment	-3.92	2.21	-1.12†		.40	1.61	.20	
Frequency of marital disagreements	-28.37	10.80	-1.51**		4.43	8.76	.35	
Security of attachment X frequency of marital disagreements	4.06	1.71	1.52*	.33	-.39	1.28	-.27	.03

† $p < .10$ * $p < .05$ ** $p < .01$ *** $p < .001$