Journal of Research in Personality 98 (2022) 104233

Contents lists available at ScienceDirect

Journal of Research in Personality

journal homepage: www.elsevier.com/locate/jrp

Romantic attachment, stress, and cognitive functioning in a large sample of middle-aged and older couples

Rebekka Weidmann [a,b,*], William J. Chopik [a]

[a] Michigan State University, USA
[b] University of Basel, Switzerland

ARTICLE INFO

Keywords:
Romantic attachment
Cognitive health
Memory
Couples
Stress

ABSTRACT

This study examined the link between insecure attachment and cognitive functioning in 1,043 middle-aged and older romantic couples (M_{age} = 64.7 years), and tests whether stress acts as a mediator. Participants were asked about their romantic attachment (anxiety and avoidance), cognitive impairment, their and their partner's dementia symptoms, and were tested on their memory performance. Findings suggest that anxiously attached individuals experience more stress and report worse cognitive functioning, while partners of avoidantly attached individuals experience more stress, report worse cognitive functioning, and show worse memory performance. Post-hoc robustness analyses suggest that relationship satisfaction accounts for the link between avoidance and stress and serves as a mediator. Insecure attachment reflects a potential risk for worse cognitive health in older couples.

A large body of research demonstrates that satisfying relationships are a crucial factor for health (e.g., Berkman, 1995; Kiecolt-Glaser & Wilson, 2017; Robles et al., 2014). Individuals with insecure attachment orientations, however, are more likely to struggle to maintain satisfying and stable romantic relationships (Li & Chan, 2012) and are therefore at risk to experience poorer health outcomes (e.g., Marks et al., 2016; McWilliams & Bailey, 2010; Widom et al., 2018). One primary health concern in late adulthood is the maintenance of cognitive functioning: Alzheimer's disease and related neurodegenerative disorders become increasingly prevalent with age (Cummings & Cole, 2002) representing the greatest health challenge of our time (Livingston et al., 2017). Even though much research has identified various sociodemographic, medical, and behavioral risk factors of cognitive decline (e.g., Plassman et al., 2010), little knowledge exists on romantic attachment's psychosocial link with cognitive health. Although attachment orientations are stable across the life span and less likely to be socialized in adulthood (Fraley & Roisman, 2019), research shows that attachment orientations show changes into later life (Chopik et al., 2019) and can change lastingly in light of life events, such as experiencing a physical illness (Fraley et al., 2021). Identifying modifiable predictors of health, such as romantic attachment represents a promising research target to improve individuals' health (Livingston et al., 2017). Furthermore, broadening the understanding of adult attachment's link to cognitive health might help identifying people who are at higher risk of cognitive decline in middle and late adulthood. Therefore, the present study examined how an individual's attachment orientation is associated with their and their partner's cognitive functioning in over 1,000 middle-aged and older couples, and whether stress acts as a mediator.

Romantic attachment orientations are typically conceptualized as the ways in which people think, feel, and behave in romantic relationships. They are commonly measured with respect to two dimensions of insecure attachment: anxiety and avoidance (Fraley et al., 2015). Highly anxious people tend to use hyperactivating strategies and are more likely to be hypervigilant regarding relationship threats, have a strong desire for closeness and connection to their partner, and show behavior to increase their partner's attention. Highly avoidant people tend to employ deactivating strategies in that they strive for independence, distance, and self-reliance while ignoring or denying their emotional needs and states (Mikulincer & Shaver, 2007). Both dimensions, anxiety and avoidance, can be understood as parts of insecure attachment. Attachment theory has been a useful framework for understanding how romantic relationships contribute to a healthy life (Pietromonaco, et al., 2013b) and previous literature demonstrates that both anxiety and avoidance have been associated with various health outcomes (LaBelle et al., 2020; Stanton & Campbell, 2014).

A highly prevalent health concern among older adults is cognitive

* Corresponding author at: Department of Psychology, Michigan State University, 316 Physics Rd, East Lansing, MI 48824, USA.
E-mail address: weidma12@msu.edu (R. Weidmann).

https://doi.org/10.1016/j.jrp.2022.104233
Received 24 November 2021; Received in revised form 28 March 2022; Accepted 5 April 2022
Available online 6 April 2022

decline and the onset of neurodegenerative diseases. Starting at the age of 50, the prevalence of dementia-related illnesses doubles every five years (Cao et al., 2020). Based on previous research demonstrating that insecure attachment is related to a lower hippocampal cell density (Quirin et al., 2010) and heightened inflammation (Ehrlich, 2019), which are both linked to neurodegenerative disease (Andrade-Moraes et al., 2013; Irwin & Vitiello, 2019), it seems plausible that insecure attachment might be a potential risk factor for cognitive decline.

Yet, little research examined romantic attachment and cognitive functioning in middle and late adulthood. In a study of 81 older couples (M_{age} = 80.8 years for men [SD = 3.4], M_{age} = 75.7 years for women [SD = 6.8]), Waldinger et al. (2015) found that only among women, attachment security was associated with better memory performance 2.5 years later. Although past related findings point to a possible connection between insecure attachment and worse cognitive functioning, the limited evidence is based on a single, relatively small couple sample. The present study examines this question with a broader array of markers of cognitive functioning and a larger, more diverse couple sample. Based on both of their links to compromised health (LaBelle et al., 2020), we expected that anxiety and avoidance relate to lower cognitive functioning in couple members.

Since attachment is expressed as behavior in the couple's daily life, one partner's attachment orientation is likely also associated with the other partner's health (Pietromonaco et al., 2013b). For instance, previous studies suggest that insecure attachment is associated with a lower willingness and likelihood to provide support for the partner (McLeod et al., 2020; Simpson et al., 2002) and colors people's perception of the support that they receive (Ditzen et al., 2008) and whether support from the partner is effective (Girme et al., 2015; Simpson & Rholes, 2017). Furthermore, insecure attachment is also linked to poorer conflict management, such as becoming defensive in the case of avoidant attachment and heightened hostility in the case of anxious avoidance (Feeney & Karantzas, 2017; McLeod et al., 2020). Receiving less support and experiencing more negative conflict are both associated with worse health (O'Neal & Wickrama, 2020; Uchino, 2009). Given that poorer health is a major risk factor for cognitive decline, we thus also expected that the insecure attachment (e.g., higher anxiety or avoidance) of one partner to be negatively associated with their partner's cognitive functioning.

One psychological factor potentially relating romantic attachment to cognitive functioning is the experience of stress. Insecure attachment is linked to heightened distress (Simpson & Rholes, 2017), which is observable on a physiological level (Pietromonaco et al., 2013a). Various studies have found that insecure attachment is linked to the perception of general stress (e.g., its severity). For instance, insecure attachment was previously associated with higher perceived stress levels in medical students (Thompson et al., 2018), college freshmen (Reiner et al., 2010), HIV-positive persons (Koopman et al., 2000), women in young and middle adulthood (Moreira & Maia, 2021), and in individuals exposed to ongoing terrorism (Besser et al., 2009). In addition, insecure attachment has also been linked to a heightened psychological stress response (e.g., Ditzen et al., 2008), physiological reactivity during stressful relationship conflicts (Powers et al., 2006), and higher levels of stress hormone production (Jaremka et al., 2013). Past literature suggests several reasons why avoidance and anxiety are linked to higher stress levels. For instance, insecurely attached individuals (1) show attitudes colored by more pessimism and hopelessness, (2) experience lower levels of ego-resiliency and hardiness, and (3) appraise stressful events as more threatening (Mikulincer & Shaver, 2007).

Further, insecure attachment might also be linked to the partner's stress levels because of their insecure partner's maladaptive relationship behavior (Pietromonaco et al., 2013b). Stress has also been shown to be associated with cognitive functioning because it has previously been linked to higher risks for dementia and Alzheimer's disease (Greenberg et al., 2014; Johansson et al., 2010; Machado et al., 2014). Hence, stress potentially represents an interposed psychological experience between partners' romantic attachment on the one hand, and their cognitive functioning on the other.

In addition, it could also be the case that cognitive health is linked to attachment because the experience of cognitive decline and the accompanying changes in functionality might cause people's stress to increase and their attachment orientations to change over time. This is in line with a recent study which found that anxiety predicted the onset of physical illness while physical illness also predicted later increases in attachment anxiety over time (Fraley et al., 2021).

In the present study, we therefore expected that both partners' insecure attachment would be associated with higher stress, and that higher stress would be associated with worse cognitive functioning in partners (i.e., stress would mediate the association between individual and partner attachment orientation and an individual's cognitive functioning). We had no firm expectations whether stress would also relate to the partner's cognitive functioning (i.e., would stress in one person relate to their partner's cognitive decline?), but we nevertheless explored these associations.

In the present study, we examined the link between romantic attachment and cognitive functioning in a large sample of middle-aged and older romantic couples. We used three different measures for cognitive functioning: self-reports, partner-reports, and a memory recall task to see whether the associations generalize across different measures and informants. Further, we investigated whether stress would mediate the links between romantic attachment and cognitive functioning.

1. Method

1.1. Participants and procedure

Data were drawn from the Attachment and Neurodegenerative Disease Onset (ANDO) study, an online couples study[1]. The Institutional Review Board of Michigan State University approved the study (project number: STUDY00000334). Sample size, data collection details, and the analytic script for this manuscript were pre-registered prior to data collection. For this project, we recruited 1,043 couples (2,086 individuals) via Qualtrics panel services (Qualtrics, Provo, UT). To take part in the study, both partners were required to participate, they had to be together for at least six months, and both couple members had to be 50+ years old.

Of the 1,043 couples, 641 consisted of female-male couples, 208 were male-male couples, and 194 were female-female couples. Couples were on average 35.8 years together (SD = 13.2; range: 2.7–67.1 years) and couple members were on average 64.7 years old (SD = 7.7; range: 49–95 years). Regarding their education level, 55.9% had some college education. Almost a third (30.2%) of the participants reported having an annual household income of more than $100,000. A non-White racial background was reported from 10.2% of the participants. Almost all couple members reported living with their partner (98.6%) and being married (99.3%). Regarding their current cognitive health, 11 participants (0.5%) reported having been formally diagnosed with Alzheimer's disease, dementia, organic brain syndrome, senility, or another serious memory problem by a physician. These individuals were retained in the analysis sample.

[1] We pre-registered this study by uploading the study's goal and instruments (Instruments_Ando Study) as well as an R-script for the planned main analyses (ANDO_code) to the OSF framework prior to data collection. We did not have formal predictions regarding the different subcomponents of the cognitive measures. The instruments of the ANDO study, and the data and complete code for the present study are available on the Open Science Framework: https://osf.io/mk8fp/?view_only=194f55c45da94e8b8f4e40cbf6c0ee71. The first author was involved in the study design, analyzed the data, and wrote the manuscript. The second author was involved in the study design, collected the data, and reviewed the manuscript.

Couples were chosen from a broader pool of married individuals and were invited to participate in an online survey with their romantic partner. Couple members received a link that included a two-part survey for each couple, one part for each partner. Couples were instructed to give each other privacy while filling out each set of the questionnaire. The survey lasted for about 30 min, 15 min per romantic partner. Participants first read the participant information form and consented to the study. Afterwards, sociodemographic information was provided, and study measures were administered. Couples were compensated $18 for study completion, administered through Qualtrics. Data integrity indices were computed, and low-quality responses were screened out by Qualtrics according to several criteria, including metrics of careless responding, large amounts of missing data, and aberrant time-to-completion statistics.

1.2. Measures

Please see Table 1 for means, standard deviations, and bivariate correlations of romantic attachment, cognitive impairment, dementia symptoms, and cognitive performance.

1.2.1. Romantic attachment

We assessed attachment with the Experiences in Close Relationships-Relationship Structures questionnaire (Fraley et al., 2011). The scale consists of nine items, six measuring avoidance and three measuring anxiety. An example item for avoidance includes, "I don't feel comfortable opening up to my partner"; an example item for anxiety includes, "I am afraid my partner may abandon me". The items were rated on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Mean scores were computed such that higher values reflected higher anxiety (α = 0.88) or avoidance (α = 0.87).

1.2.2. Cognitive impairment

Cognitive impairment was measured with a shortened version of the Patient-Reported Outcomes in Cognitive Impairment (PROCOG©), which is a validated questionnaire for mild to moderate cognitive decline (Frank et al., 2006). The PROCOG© is divided into six domains examining the characteristics and impact of cognitive impairment, such as affect (α = 0.91; e.g., "How often do your memory or thinking problems make you sad?"), skill loss (α = 0.93; e.g., "Have you stopped doing things you used to enjoy because you are experiencing memory or thinking problems?"), semantic memory (α = 0.77; e.g., "Do you walk into a room and forget why you went there?"), memory for recent events (α = 0.89; e.g., "How difficult is it to remember what you just read?"), cognitive function (α = 0.88; e.g., "Do you misplace things?"), and social impact (α = 0.78; e.g., "Do family members and friends say you repeat the same stories and jokes?"). The original scale included 55 items. However, to ease the burden of the participants when taking part in our study that included different scales, we preregistered using a shortened scale by choosing the five items of each domain with the highest factor loadings for the respective construct measured (Frank et al., 2006), resulting in a 30-item scale. Each item was measured on a 5-point Likert scale ranging from 0 (*none of the time*) to 4 (*all of the time*). Because our sample was non-clinical, we slightly rephrased ten items due to their implication that participants had already been suffering from memory problems. We computed mean scores, such that higher means reflect cognitive impairment in each of these domains.

1.2.3. Dementia symptoms

We used six self-rated (α = 0.82) and six partner-rated (α = 0.77) items (same items for both targets) adapted from the historical questions of the General Practitioner Assessment of Cognition (Brodaty et al., 2002), which is a medical screening tool designed to detect dementia in patients. Example items for self-reports included, "Do you have more trouble recalling conversations a few days later?" and for partner-reports "Is your spouse less able to manage his/her medication

Table 1
Descriptive Statistics and Bivariate Correlations of Study Variables.

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1 Anxiety	2.04	1.31	–																		
2 Avoidance	2.42	1.16	**0.59**	–																	
3 Affect	1.38	0.64	**0.24**	**0.17**	–																
4 Skill loss	1.18	0.52	**0.19**	**0.15**	**0.74**	–															
5 Semantic memory	1.61	0.57	**0.23**	**0.18**	**0.70**	**0.61**	–														
6 Memory for recent events	1.33	0.54	**0.21**	**0.16**	**0.75**	**0.75**	**0.74**	–													
7 Cognitive function	1.64	0.66	**0.25**	**0.22**	**0.72**	**0.59**	**0.77**	**0.74**	–												
8 Social impact	1.28	0.47	**0.27**	**0.22**	**0.74**	**0.76**	**0.70**	**0.76**	**0.67**	–											
9 Dementia	1.82	0.39	0.02	0.02	**−0.14**	**−0.13**	**−0.12**	**−0.14**	**−0.09**	**−0.10**	–										
symptoms self																					
10 Dementia	1.87	0.35	−0.05	**−0.08**	**−0.08**	**−0.07**	**−0.08**	**−0.09**	**−0.07**	**−0.09**	**0.39**	–									
symptoms partner																					
11 Memory	6.72	3.49	−0.05	**−0.07**	**−0.19**	**−0.18**	**−0.21**	**−0.16**	**−0.18**	**−0.15**	0.03	−0.01	–								
performance																					
12 Stress	2.08	0.79	**0.36**	**0.32**	**0.40**	**0.32**	**0.34**	**0.36**	**0.39**	**0.36**	**−0.08**	−0.05	**−0.13**	–							
13 Relationship	35.83	13.18	**−0.10**	−0.02	−0.03	−0.03	0.02	−0.03	−0.02	−0.02	−0.04	−0.02	0.02	**−0.09**	–						
duration																					
14 Education	4.85	1.68	**−0.07**	**−0.07**	**−0.06**	**−0.06**	**−0.07**	**−0.07**	**−0.10**	**−0.07**	−0.05	−0.05	**0.08**	**−0.13**	0.01	–					
15 Income	3.78	1.12	**−0.07**	**−0.09**	**−0.10**	**−0.07**	**−0.12**	**−0.08**	**−0.13**	**−0.08**	−0.01	−0.03	**0.11**	**−0.18**	−0.01	**0.39**	–				
16 Age	64.69	7.35	**−0.13**	−0.03	**−0.06**	−0.05	0.00	−0.06	**−0.07**	**−0.07**	−0.05	−0.05	0.00	**−0.13**	**0.57**	**0.07**	−0.04	–			
17 Race	0.10	0.30	0.01	0.02	0.00	0.00	−0.02	0.01	−0.01	0.01	0.03	0.01	0.02	0.01	**−0.12**	0.02	−0.03	**−0.16**			
18 BMI	28.42	6.33	0.04	0.00	**0.08**	**0.07**	**0.07**	**0.12**	**0.12**	**0.09**	−0.04	0.01	**−0.07**	**0.06**	−0.04	**−0.12**	**−0.13**	**−0.10**	−0.02	–	
19 Self-rated health	3.32	0.97	**−0.22**	**−0.19**	**−0.32**	**−0.24**	**−0.29**	**−0.27**	**−0.31**	**−0.28**	**0.09**	**0.07**	**0.15**	**−0.33**	0.01	**0.20**	**0.26**	0.03	−0.04	**−0.32**	–

Note. Correlations in bold are significant ($p < .01$). Relationship duration, income, and age were averaged across couple members. Race was coded 0 for White and 1 for Non-White.

independently?" The items were answered with response formats of *Yes*, *No*, and *Don't know*. Each item was framed in terms of how the person is now compared to 5–10 years ago. The original screener asks participants to rate their dementia symptoms compared to "a few years ago". However, because we specifically targeted a sample of older adults, we wanted to ensure that the referenced time period more likely reflected a cognitively healthy time in the participant's life and therefore used the reference period of 5–10 years ago. Only between 0.8 and 4.3% of respondents chose *"Don't know"* in their self-reported items, and between 1.2 and 3.5% chose this option for their partner-reported items. Thus, answers including *"Don't know"* were treated as missing values. Affirmative answers (i.e., *yes*) were coded as 1, negating answers (i.e., *no*) as 0. Sum scores ranging from 0 to 6 gave an indication of the numbers of the dementia symptoms. The correlation between one partner's self-reported dementia symptoms and their partner's partner-reported dementia symptoms was $r = 0.25$.

1.2.4. Memory performance

To measure memory performance, the participants were asked to read 15 words that were shown consecutively for 2 seconds, with a 1-second break in between. Immediately afterwards, the participants were asked to recall as many words as possible (Conway et al., 2007). These open-formatted answers were coded by two graduate students. Correct answers were awarded when the word was spelled correctly or misspelled slightly but was still recognizable. The fifteen words were: *Toad, Tuna, Postage, Witch, Dinosaur, Screen, Chief, Athlete, Mermaid, Package, Branch, Duck, Carriage, Pool, Pillow*. These words were randomly selected of a pool of 1,638 positively and neutrally valanced nouns, this word pool was developed for the Penn Electrophysiology of Encoding and Retrieval Study (PEERS; Healey & Kahana, 2014; Lohnas & Kahana, 2011; Miller et al., 2012). Possible scores ranged between zero and 15 correct answers.

1.2.5. Stress

The Short Form Perceived Stress Scale was used to measure the stress participants perceived within the last month (Warttig et al., 2013). This scale includes four items, an example item is "In the last month, how often have you felt that things were going your way?". The items were rated on a 5-point Likert scale with the following answering options: 1 (*never*), 2 (*almost never*), 3 (*sometimes*), 4 (*fairly often*), and 5 (*very often*). Responses were averaged such that higher scores reflected greater stress ($\alpha = 0.63$).

1.2.6. Relationship satisfaction

For the robustness analyses reported later in this study, we used relationship satisfaction as an additional control variable and mediator (in a supplemental analysis). Relationship satisfaction was measured with the Relationship Assessment Scale (Hendrick, 1988), a seven-item instrument that assesses how satisfied couple members are with their romantic relationship in general. Participants rated the items on a scale ranging from 1 (signifying low satisfaction) to 5 (signifying high satisfaction). For example, one item read: "How good is your relationship compared to most?" and was rated on a scale from 1 (*poor*) to 5 (*excellent*). Responses were averaged such that higher scores reflected higher relationship satisfaction ($\alpha = 0.92$). Based on the high correlation between partners' relationship satisfaction ($r = 0.82$), we used the average relationship satisfaction score across partners of each couple as an additional control variable for each of the models tested in our main analyses and as an additional mediator to the mediation models with stress.

1.2.7. Control variables

The following control variables were considered due to their link to either attachment and cognitive functioning (e.g., Chopik et al., 2019; Deary et al., 2009; Hadden et al., 2014; Zahodne et al., 2015). *Relationship length* in years was averaged across couple members' reports. *Education* was assessed with nine answering options: no high school (coded as *1*), some high school (*2*), high school graduate or diploma (*3*), trade/technical/vocational training (*4*), associate college degree (*5*), Bachelor's degree (*6*), Master's degree (*7*), professional degree (*8*), and doctorate degree (*9*). Partners' education levels were not collinear with each other ($r = 0.68$); therefore, we entered each partner's own education as covariate. *Income* was measured with five annual household income options: Less than $20,000 (coded as *1*), $20,000–$34.999 (*2*), $35,000–49,999 (*3*), $50,000–99,999 (*4*), and more than $100,000 (*5*). The mean of both partners' incomes was used because it was highly correlated ($r = 0.93$) as most partners shared a household. *Age* of both partners was obtained in years. Given that partners' age correlated highly ($r = 0.84$), we used the couple's average age as covariate. *Race* was assessed with the question, "How would you describe your ethnic (or racial) background?" Participants chose from the following options: *White*, *Hispanic or Latino*, *Black or African American*, *Native American or American Indian*, *Asian/Pacific Islander*, *Other*, and *Not sure/Don't Know* (handled as missing values). For the analyses, given the relatively small number of non-White participants, race was coded White (*0*) and Non-White (*1*). The body mass index (*BMI)* scores of participants was obtained by asking them about their height and weight. The BMI was then calculated: weight (lbs) / [height (in)]^2 × 703. One person had an extreme BMI score of 94.7, which was omitted and treated as a missing value. *Self-rated health* was measured with one question: "Would you say your health is…?" answered on a 5-point Likert scale: 1 (*poor*), 2 (*fair*), 3 (*good*), 4 (*very good*), and 5 (*excellent*).

1.3. Analytic approach

We used an actor–partner interdependence model (APIM) approach (Kenny et al., 2006) to test for the link between both partners' anxiety and avoidance and their cognitive impairment, dementia symptoms, and memory performance. In the APIM, *actor* effects refer to intrapersonal effects in couple members, and *partner* effects refer to interpersonal effects between couple members. We computed three different sets of analyses.

The first set of analyses included (1) a model with both partners' anxiety and avoidance as predictors of both partners' mean scores on the six cognitive impairment domains (from the PROCOG©) as dependent variables (see Fig. 1 for illustration). (2) We also estimated a model with both partners' anxiety and avoidance scores as predictors of both partners' self-rated and partner-rated dementia symptoms. Finally, (3) we tested a model that included both partners' anxiety and avoidance as predictors of both partners'

memory performance (via the word recall task) as dependent variables. These three APIMs were tested controlling for demographic variables (relationship length, education, income, age, race).

In a second set of analyses, we added BMI and self-rated health as control variables to the three previous models to see whether the estimates were affected by these health-related control variables. Previous research has shown that higher BMI is a risk factor for the development of dementia-related disease (Lee et al., 2010). In addition to this more objective measure of overall health, we used self-rated health as a subjective health measure to ensure that the results are not colored by participants' perception of their general health status.

In a third set of analyses, mediation via stress was tested with actor–partner interdependence mediation models (APIMeMs; Ledermann et al., 2011) with both partners' stress added as mediating variables. The APIMeM estimates four types of indirect effects: actor-actor, partner-actor, actor-partner, and partner-partner effects. A significant actor-actor indirect effect denotes a significant mediational effect via an actor effect from the predictor (i.e., attachment partner 1) to the mediator (i.e., stress partner 1) combined with an actor effect from the mediator to the dependent variable (e.g., memory performance partner 1). A significant partner-actor indirect effect denotes a significant mediational effect via two direct effects: a partner effect from one

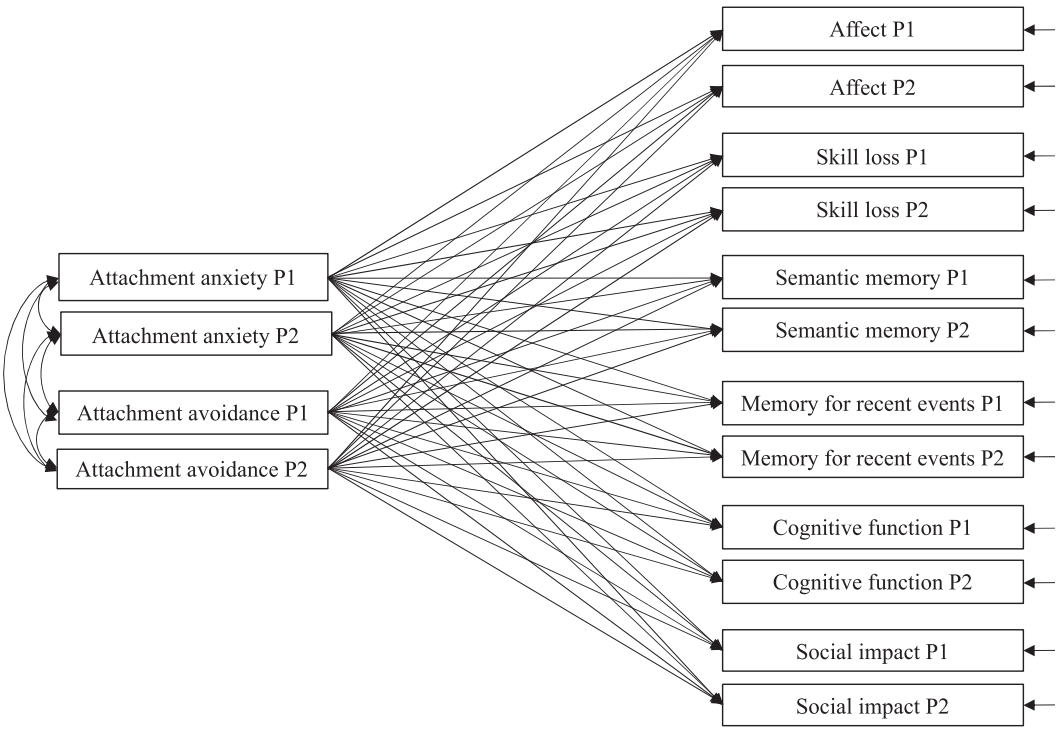

Fig. 1. *Example Illustration of the Actor-Partner Interdependence Model with Insecure Attachment as Predictors and Cognitive Impairment Domains as Outcomes Note.* We controlled for relationship length, education of both partners, income, age, and race. Partners' own education and race served as control variables of their own outcomes. All dependent variables' error variances were correlated.

partner's predictor to the other partner's mediator variable (i.e., attachment partner 1 on stress partner 2) and an actor effect from that mediator to that partner's dependent variable (e.g., stress partner 2 on memory performance partner 2). The same principles apply for the actor-partner (e.g., attachment partner 1 > stress partner 1 > memory performance partner 2) and partner-partner (e.g., attachment partner 1 > stress partner 2 > memory performance partner 1) indirect effects. These indirect effects were tested with bias-corrected bootstrap confidence intervals based on 5,000 bootstrap samples. In each APIMeM we controlled for relationship length, education, income, age, and race. For the analyses, we divided relationship length, age, and BMI by 10 to reach comparable variances in the models. Due to the large number of effects estimated, we adjusted the *p*-level to 0.01 and report 99% confidence intervals. We also report the main analyses without covariates in the Supplemental Material.

1.3.1. Gender and relationship type

Before conducting the main analyses, we wanted to formally test whether the female-male couple members were distinguishable in the constructs measured and the effects tested given that previous research suggests gender differences in attachment orientations, stress, and cognitive health (Chen et al., 2009; Cohen & Janicki-Deverts, 2012; Del Giudice, 2011). Because these analyses indicated that the female-male couple members were indistinguishable (see Supplemental Material), our models included the data of all 1,043 couples. Couple members were treated as indistinguishable, meaning that their actor and partner effects, means/intercepts, and (residual) variances were set equal across couple members (Olsen & Kenny, 2006; Sadler et al., 2011).

1.4. Power analyses

To determine the power of a sample of $N_{couples} = 1{,}043$, we used the APIM power analysis tool by Ackerman and Kenny (2016). Since no couple study exists from which to infer the size of actor *and* partner effects of attachment on cognitive impairment, we based our effect size expectations on the study of Waldinger et al. (2015) who found a correlation of −0.12 for men and 0.41 for women between secure attachment and memory. To be conservative in our power analysis, we considered actor effects of 0.10 and partner effects of 0.08 to be more appropriate. To infer the correlation between partners' attachment, we used the average (0.34) of the correlations reported by Hudson et al. (2014), which was 0.24 for anxious and 0.43 for avoidant attachment. We used 0.50 for the correlation of the error terms in the outcome variables, based on a dyadic study reporting $r = 0.48$ between aging couple members' cognitive ability (Bourassa et al., 2015). The *p*-level was set to 0.01. This rendered a power of 0.99 for actor and 0.89 for partner effects. The smallest actor and partner effects that could be tested with a sample of 1,043 couples while retaining a power of 0.80 was an effect of 0.073. However, because various predictors, control variables, dependent variables, and mediators were entered into the models, power is likely to be lower.

2. Results

Full details regarding the model fits and comparisons, can be found in the Supplemental Material. The APIM results of insecure attachment and cognitive functioning can be found in Table 2.[2] A consistent pattern of significant actor effects emerged for anxiety and all cognitive impairment domains. In other words, more anxious people tended to report cognitive impairment in the domains of affect, skill loss, semantic memory, memory for recent events, cognitive function, and social

[2] The model results additionally controlling for BMI and self-reported health are reported in the Supplemental Material. Estimates of the models with these additional controls were comparable (with the exceptions of two effects that were smaller and no longer significant [i.e., actor effect of anxiety on skill loss; partner effect of avoidance on memory for recent events]) in the direction and significance to the estimates reported in Table 2. In addition, we also report model results without covariates in the Supplemental Material.

Table 2
Results of Actor-Partner Interdependence Models with Anxious and Avoidant Attachment as Predictors of Cognitive Functioning.

Outcome variables	Attachment anxiety					
	Actor effect			Partner effect		
	β	*b* [99% CI]	*p*	β	*b* [99% CI]	*p*
Cognitive impairment						
Affect	**0.16**	**0.08** [0.04, 0.12]	<0.001	0.05	0.03 [-0.02, 0.07]	0.141
Skill loss	**0.12**	**0.05** [0.01, 0.08]	0.002	0.05	0.02 [-0.02, 0.06]	0.191
Semantic memory	**0.16**	**0.07** [0.03, 0.11]	<0.001	0.01	0.00 [-0.03, 0.04]	0.789
Memory for recent events	**0.14**	**0.06** [0.02, 0.10]	<0.001	0.05	0.02 [-0.02, 0.05]	0.151
Cognitive function	**0.13**	**0.06** [0.02, 0.11]	0.001	0.06	0.03 [-0.02, 0.07]	0.092
Social impact	**0.16**	**0.06** [0.02, 0.09]	<0.001	0.07	0.02 [-0.01, 0.06]	0.055
Dementia symptoms						
Self-report	-0.01	-0.01 [-0.10, 0.09]	0.864	0.00	0.00 [-0.09, 0.09]	0.920
Partner-report	0.00	0.00 [-0.10, 0.10]	0.959	0.08	0.09 [-0.01, 0.19]	0.014
Memory performance	-0.01	-0.02 [-0.19, 0.15]	0.789	0.01	0.01 [-0.15, 0.18]	0.849

Outcome variables	Attachment avoidance					
	Actor effect			Partner effect		
	β	*b* [99% CI]	*p*	β	*b* [99% CI]	*p*
Cognitive impairment						
Affect	0.00	0.00 [-0.05, 0.05]	0.924	0.07	0.04 [-0.01, 0.09]	0.059
Skill loss	-0.02	-0.01 [-0.05, 0.03]	0.615	0.09	0.04 [-0.002, 0.08]	0.014
Semantic memory	-0.01	0.00 [-0.05, 0.04]	0.794	**0.13**	**0.06** [0.02, 0.11]	<0.001
Memory for recent events	-0.01	-0.01 [-0.05, 0.04]	0.750	**0.09**	**0.04** [0.00, 0.09]	0.009
Cognitive function	0.02	0.01 [-0.04, 0.06]	0.637	**0.13**	**0.07** [0.02, 0.12]	<0.001
Social impact	0.00	0.00 [-0.03, 0.04]	0.920	**0.12**	**0.05** [0.01, 0.08]	<0.001
Dementia symptoms						
Self-report	0.01	0.02 [-0.10, 0.14]	0.665	0.02	0.02 [-0.09, 0.14]	0.583
Partner-report	**0.12**	**0.17** [0.06, 0.28]	<0.001	0.03	0.04 [-0.07, 0.15]	0.321
Memory performance	-0.02	-0.05 [-0.25, 0.14]	0.484	**-0.10**	**-0.25** [-0.45, -0.05]	0.001

Note. Self-reported dementia symptoms refer to each partner's own cognitive functioning, while partner-reported dementia symptoms refer to each person's report on their partner's cognitive functioning. Estimates in bold are significant ($p < .01$). The models controlled for relationship length, education, income, age, and race.

impact. Anxiety was, however, not related to self- or partner-reported dementia symptoms or memory performance and showed no significant partner effects. For avoidance, a different pattern emerged: For four of the six cognitive impairment domains and memory performance, significant partner effects emerged. Individuals with more avoidant partners were more likely to report cognitive impairment in the domains semantic memory, memory of recent events, cognitive function, and social impact, and they also were more likely to show worse performance in the word recall task. No significant actor effects emerged between avoidance and the cognitive impairment, dementia symptoms, and memory performance. The one exception was for partner-reports of dementia symptoms: highly avoidant people reported more dementia symptoms in their partners.

It is worth noting that the results suggest distinct effects depending on the cognitive measure. For anxiety, we found effects for the cognitive impairment measure, while for avoidance, we found effects for the cognitive impairment, partner-reported dementia symptoms, and memory performance measures but not for self-reported dementia symptoms.

The results of the APIMeMs' direct effects between insecure attachment and stress can be found in Table 3a. Across all models, significant actor effects between anxiety and stress emerged, in that more anxious people were more likely to report higher stress levels. In addition, we found significant actor and partner effects between avoidance and stress. In other words, more avoidant participants reported higher stress levels themselves, and so did their partners.

The results of the APIMeM's direct effects between stress and cognitive functioning can be found in Table 3b. Significant actor effects for all cognitive impairment domains emerged: Persons who reported higher stress levels were more likely to report cognitive impairment in the domains of affect, skill loss, semantic memory, memory for recent events, cognitive function, and social impact. We found one partner effect between stress and cognitive impairment: If a partner reported higher stress levels, the other partner more likely reported decline in the cognitive function domain. Regarding dementia symptoms, a significant actor effect for self-reported symptoms and a significant partner effect for partner-reported symptoms emerged. If people reported higher levels of stress, they were more likely to report more dementia symptoms for themselves, and if their partner was more stressed, they reported more dementia symptoms for their partner. Finally, stress was linked to both partners' memory performance. If one partner reported higher stress levels, both partners tended to recall fewer words in the word recall task.

The indirect effects of the APIMeMs (e.g., attachment → stress → cognitive functioning) can be found in Table 3a (for actor-actor and partner-actor indirect effects) and 3b (for actor-partner and partner-partner indirect effects). Significant indirect effects between anxiety,

Table 3a
Direct Effects of Actor-Partner Interdependence Mediation Models Between Attachment Anxiety and Avoidance and Stress.

Outcome variables	Attachment anxiety					
	Actor effect			Partner effect		
	β	*b* [99% CI]	*p*	β	*b* [99% CI]	*p*
Cognitive impairment	**0.20**	**0.12** [0.08, 0.17]	<0.001	0.02	0.01 [−0.03, 0.06]	0.468
Dementia symptoms	**0.20**	**0.12** [0.08, 0.17]	<0.001	0.02	0.01 [−0.03, 0.06]	0.468
Memory performance	**0.20**	**0.12** [0.08, 0.17]	<0.001	0.02	0.01 [−0.03, 0.06]	0.468
Outcome variables	Attachment avoidance					
	Actor effect			Partner effect		
	β	*b* [99% CI]	*p*	β	*b* [99% CI]	*p*
Cognitive impairment	**0.08**	**0.06** [0.001, 0.11]	0.008	**0.14**	**0.09** [0.04, 0.15]	<0.001
Dementia symptoms	**0.08**	**0.06** [0.001, 0.11]	0.008	**0.14**	**0.09** [0.04, 0.15]	<0.001
Memory performance	**0.08**	**0.06** [0.001, 0.11]	0.008	**0.14**	**0.09** [0.04, 0.15]	<0.001

Note. Estimates in bold are significant ($p < .01$). The models controlled for relationship length, education, income, age, and race.

stress, and cognitive functioning emerged in the form of actor-actor (Table 4a; all cognitive impairment domains, and self-reported dementia symptoms) and few actor-partner indirect effects (Table 4b; cognitive function domain, partner-reported dementia symptoms, and memory performance). In other words, anxiety was associated with stress in people, which, in turn, was linked to their cognitive functioning (and in a few cases to their partners' cognitive functioning). For avoidance, no significant actor-actor indirect effects emerged (see Table 4a). For all cognitive impairment domains and for the self-reported dementia symptoms, significant partner-actor indirect effects of avoidance were found. In other words, one person's avoidance was positively associated with their partners' stress levels, which in turn was linked to their partner's cognitive impairment and self-reported dementia symptoms. Further, for avoidance, no actor-partner effects emerged and only a few partner-partner indirect effects were found (see Table 4b). These emerged for the cognitive function domain, partner-reported dementia symptoms, and memory performance. Put differently, higher avoidance in one person was associated with their partner's higher stress levels, which was linked back to the initial person's reports of decline in the cognitive function domain, partners' reports of more dementia symptoms in their partner, and lower memory performance.[3]

[3] Even though we could examine the female-male couples together with the male-male and female-female couples in one model, previous literature suggests disparities in terms of physical and mental health in older individuals identifying as lesbian, gay, and bisexual (Fredriksen-Goldsen et al., 2013; Hoy-Ellis & Fredriksen-Goldsen, 2016). Thus, we examined whether belonging to a same-gender vs. other-gender relationship predicted cognitive health outcomes and stress in couple members. In general, we did not find that relationship type predicted these outcomes ($ps > 0.01$). Relationship type predicted the cognitive impairment domain of skill loss. In other words, individuals belonging to a same-gender relationship were more likely to report skill loss ($M = 1.24$, $SD = 0.59$) compared to individuals from other-gender relationships ($M = 1.15$, $SD = 0.46$; $t(1408.4) = -3.39$, $p < .001$). However, this effect was small ($d = 0.16$). Nevertheless, controlling for relationship type in the main analyses including cognitive impairment as outcomes did generally not change the direction, strength, and significance of effects. Only two effects, which had been close to the significance cut-off, were non-significant in these analyses: The partner effect between avoidance and memory for recent events changed from $p = .009$ to $p = .013$, and in the APIMeM, the actor effect between attachment avoidance and stress changed from $p = .008$ to $p = .011$, crossing the significance threshold.

2.1. Post-hoc robustness analyses

Based on the theoretical assumptions that the attachment-health link might be explained by relationship processes (Pietromonaco et al., 2013b), we tested whether the associations between insecure attachment, stress, and cognitive health are accounted for by the couple's relationship satisfaction. For that purpose, we used couple members' average scores of their relationship satisfaction as additional control variables. Full details regarding these analyses can be found in the Supplemental Material. Controlling for relationship satisfaction, we found that the link between anxiety and cognitive functioning, anxiety and stress, and stress and cognitive functioning remained robust. The link between avoidance and partner-reported dementia symptoms and the effects regarding avoidance and stress were not significant at the $p < .01$ level, rendering the indirect partner-actor effects for avoidance non-significant.

Another possibility based on previous theorizing (Pietromonaco et al., 2013b) is that relationship satisfaction could be an additional mediating variable between insecure attachment and cognitive health. In an exploratory analysis, we tested this possibility by adding relationship satisfaction of the couple as additional mediator to the mediation models with cognitive impairment, dementia symptoms, and cognitive performance as outcomes. Significant indirect effects were found only for cognitive performance and not the other outcomes. In other words, avoidance and anxiety were negatively linked to relationship satisfaction, which was negatively linked to cognitive performance (for full details, see Supplemental Material).

3. Discussion

The present study examined a large sample of middle-aged and older romantic couples investigating how insecure attachment is linked to cognitive impairment, dementia symptoms, and memory performance—a set of self-reported, partner-reported, and objective cognitive measures. We also investigated whether stress was linked to both insecure attachment and cognitive functioning. Finally, in our post-hoc robustness analyses, we examined whether these associations could be accounted for by the couples' relationship satisfaction.

3.1. Prominent findings and implications

Four main results are noteworthy. First, anxious individuals tended to report more cognitive impairment but there was no association with their partners' cognitive functioning, suggesting that the link between

Table 3b
Direct Effects of Actor-Partner Interdependence Mediation Models Between Stress and Cognitive Functioning.

Outcome variables	Actor effect			Partner effect		
	β	*b* [99% CI]	*p*	β	*b* [99% CI]	*p*
Cognitive impairment						
Affect	**0.32**	**0.26** [0.20, 0.33]	<0.001	0.07	0.06 [−0.002, 0.11]	0.013
Skill loss	**0.24**	**0.16** [0.11, 0.21]	<0.001	0.05	0.04 [−0.01, 0.08]	0.047
Semantic memory	**0.25**	**0.19** [0.13, 0.24]	<0.001	0.05	0.04 [−0.01, 0.08]	0.045
Memory for recent events	**0.28**	**0.19** [0.14, 0.24]	<0.001	0.06	0.04 [−0.01, 0.09]	0.024
Cognitive function	**0.27**	**0.23** [0.17, 0.28]	<0.001	**0.08**	**0.07** [0.02, 0.12]	0.001
Social impact	**0.26**	**0.16** [0.11, 0.20]	<0.001	0.05	0.03 [−0.01, 0.07]	0.032
Dementia symptoms						
Self-report	**0.13**	**0.28** [0.12, 0.44]	<0.001	0.00	0.00 [−0.16, 0.16]	0.996
Partner-report	0.00	0.00 [−0.14, 0.14]	0.999	**0.13**	**0.26** [0.12, 0.41]	<0.001
Memory performance	**−0.07**	**−0.27** [−0.52, −0.02]	0.006	**−0.11**	**−0.44** [−0.68, −0.21]	<0.001

Note. Self-reported dementia symptoms refer to each partner's own cognitive functioning, while partner-reported dementia symptoms refer to each person's report on their partner's cognitive functioning. Estimates in bold are significant ($p < .01$). The models controlled for relationship length, education, income, age, and race.

anxiety and cognitive impairment might be intrapersonal. This finding is in line with a theoretical model related to health anxiety suggesting that anxiously attached individuals tend to experience more worry and anxiety about their health (Noyes et al., 2003; Sherry et al., 2014). The intrapersonal association was also underlined when stress was included: People's anxiety was linked to their heightened stress levels which were associated with their cognitive impairment. Interestingly, these results remained robust while controlling for relationship satisfaction. It could be that the link between attachment anxiety and cognitive impairment might have a physiological and affective intrapersonal component (Pietromonaco et al., 2013b), which may have been captured with couple members' stress reports in the present study while operating largely independently of their relationship evaluations.

Second, avoidant individuals did not show a tendency for cognitive impairment, but they had partners that were more likely to report cognitive impairment and demonstrate worse memory performance. The paucity of actor effects between avoidance and cognitive health is in line with previous inconsistent results of avoidance and negative health outcomes among individuals (Stanton & Campbell, 2014). Such lack of associations could be due to avoidant individuals' deactivation

Table 4a
Actor-Actor and Partner-Actor Indirect Effects of Actor-Partner Interdependence Mediation Models with Anxious and Avoidant Attachment as Predictors of Cognitive Functioning.

Outcome variables	Attachment anxiety					
	Actor-actor indirect effect			Partner-actor indirect effect		
	β	*b* [99% CI]	*p*	β	*b* [99% CI]	*p*
Cognitive impairment						
Affect	**0.07**	**0.03** [0.02, 0.05]	<0.001	0.01	0.00 [−0.01, 0.02]	0.467
Skill loss	**0.05**	**0.02** [0.01, 0.03]	<0.001	0.01	0.00 [−0.01, 0.01]	0.466
Semantic memory	**0.05**	**0.02** [0.01, 0.03]	<0.001	0.01	0.00 [−0.01, 0.01]	0.468
Memory for recent events	**0.06**	**0.02** [0.01, 0.03]	<0.001	0.01	0.00 [−0.01, 0.01]	0.468
Cognitive function	**0.06**	**0.03** [0.02, 0.04]	<0.001	0.01	0.00 [−0.01, 0.01]	0.469
Social impact	**0.05**	**0.02** [0.01, 0.03]	<0.001	0.01	0.00 [−0.01, 0.01]	0.466
Dementia symptoms						
Self-report	**0.03**	**0.03** [0.01, 0.06]	<0.001	0.00	0.00 [−0.01, 0.02]	0.474
Partner-report	0.00	0.00 [−0.02, 0.02]	0.999	0.00	0.00 [−0.002, 0.002]	0.999
Memory performance	−0.01	−0.03 [−0.07, 0.001]	0.012	0.00	0.00 [−0.02, 0.01]	0.484

Outcome variables	Attachment avoidance					
	Actor-actor indirect effect			Partner-actor indirect effect		
	β	*b* [99% CI]	*p*	β	*b* [99% CI]	*p*
Cognitive impairment						
Affect	0.03	0.01 [0.00, 0.03]	0.011	**0.04**	**0.02** [0.01, 0.04]	<0.001
Skill loss	0.02	0.01 [0.00, 0.02]	0.014	**0.03**	**0.02** [0.01, 0.03]	<0.001
Semantic memory	0.02	0.01 [0.00, 0.02]	0.011	**0.04**	**0.02** [0.01, 0.03]	<0.001
Memory for recent events	0.02	0.01 [0.00, 0.02]	0.012	**0.04**	**0.02** [0.01, 0.03]	<0.001
Cognitive function	0.02	0.01 [0.00, 0.03]	0.010	**0.04**	**0.02** [0.01, 0.04]	<0.001
Social impact	0.02	0.01 [0.00, 0.02]	0.012	**0.04**	**0.01** [0.01, 0.02]	<0.001
Dementia symptoms						
Self- report	0.01	0.02 [−0.002, 0.03]	0.024	**0.02**	**0.03** [0.01, 0.05]	0.002
Partner-report	0.00	0.00 [−0.01, 0.01]	0.999	0.00	0.00 [−0.01, 0.01]	0.999
Memory performance	−0.01	−0.01 [−0.03, 0.01]	0.052	−0.01	−0.03 [−0.05, 0.003]	0.020

Note. Self-reported dementia symptoms refer to each partner's own cognitive functioning, while partner-reported dementia symptoms refer to each person's report on their partner's cognitive functioning. Estimates in bold are significant ($p < .01$). The models controlled for relationship length, education, income, age, and race.

Table 4b
Actor-Partner and Partner-Partner Indirect Effects of Actor-Partner Interdependence Mediation Models with Anxious and Avoidant Attachment as Predictors of Cognitive Functioning.

Outcome variables	Attachment anxiety					
	Actor-partner indirect effect			Partner-partner indirect effect		
	β	*b* [99% CI]	*p*	β	*b* [99% CI]	*p*
Cognitive impairment						
Affect	0.01	0.01 [0.00, 0.01]	0.016	0.00	0.00 [−0.002, 0.003]	0.474
Skill loss	0.01	0.00 [−0.001, 0.01]	0.048	0.00	0.00 [−0.001, 0.002]	0.476
Semantic memory	0.01	0.00 [−0.001, 0.01]	0.048	0.00	0.00 [−0.001, 0.002]	0.484
Memory for recent events	0.01	0.01 [−0.001, 0.01]	0.031	0.00	0.00 [−0.001, 0.002]	0.476
Cognitive function	**0.02**	**0.01** [0.001, 0.02]	0.003	0.00	0.00 [−0.002, 0.004]	0.472
Social impact	0.01	0.00 [−0.001, 0.01]	0.034	0.00	0.00 [−0.001, 0.002]	0.474
Dementia symptoms						
Self-report	0.00	0.00 [−0.02, 0.02]	0.996	0.00	0.00 [−0.002, 0.002]	0.996
Partner-report	**0.03**	**0.03** [0.01, 0.05]	<0.001	0.00	0.00 [−0.01, 0.02]	0.469
Memory performance	**−0.02**	**−0.05** [−0.09, −0.02]	<0.001	0.00	−0.01 [−0.03, 0.01]	0.473

Outcome variables	Attachment avoidance					
	Actor-partner indirect effect			Partner-partner indirect effect		
	β	*b* [99% CI]	*p*	β	*b* [99% CI]	*p*
Cognitive impairment						
Affect	0.01	0.00 [−0.002, 0.01]	0.089	0.01	0.01 [−0.001, 0.01]	0.037
Skill loss	0.00	0.00 [−0.001, 0.01]	0.137	0.01	0.00 [−0.002, 0.01]	0.081
Semantic memory	0.00	0.00 [−0.001, 0.01]	0.132	0.01	0.00 [−0.001, 0.01]	0.071
Memory for recent events	0.01	0.00 [−0.001, 0.01]	0.105	0.01	0.00 [−0.001, 0.01]	0.048
Cognitive function	0.01	0.00 [−0.001, 0.01]	0.048	**0.01**	**0.01** [0.00, 0.01]	0.009
Social impact	0.00	0.00 [−0.001, 0.01]	0.113	0.01	0.00 [−0.001, 0.01]	0.063
Dementia symptoms						
Self-report	0.00	0.00 [−0.01, 0.01]	0.996	0.00	0.00 [−0.02, 0.02]	0.996
Partner-report	0.01	0.01 [−0.002, 0.03]	0.023	**0.02**	**0.02** [0.004, 0.04]	0.002
Memory performance	−0.01	−0.02 [−0.05, 0.003]	0.023	**−0.02**	**−0.04** [−0.07, −0.01]	0.001

Note. Self-reported dementia symptoms refer to each partner's own cognitive functioning, while partner-reported dementia symptoms refer to each person's report on their partner's cognitive functioning. Estimates in bold are significant ($p < .01$). The models controlled for relationship length, education, income, age, and race.

strategies, such as inhibiting or suppressing any threat-related (and in our case health-related) concerns (Mikulincer & Shaver, 2007). It is noteworthy, however, that partner effects between avoidance and self-reported cognitive impairment and objective memory performance were detected. A partner's avoidance could partly be a risk factor for compromised cognitive functioning via the individual's perceptions of stress (indicated by significant partner-actor indirect effects). In addition, a consistently found psychosocial factor for the pathogenesis of neurogenerative diseases is social isolation (Livingston et al., 2017). Based on couple research on attachment and loneliness (Givertz et al., 2013), it is possible that partners of more avoidant individuals feel more loneliness and are more vulnerable to cognitive functioning decline (e.g., Holwerda et al., 2014; Kuiper et al., 2015; Tilvis et al., 2004). We can only speculate why avoidance was not linked to two of the partner's six cognitive impairment domains (i.e., affect and skill loss). From a statistical viewpoint, it could simply be that these effects are very weak, and we would need an even larger sample to detect them on an adjusted $p < .01$ significance threshold. From a conceptual viewpoint, it could be argued that the affect domain taps into the emotional and the skill domain into the instrumental ramifications of the person's memory problems, which might be more reflective of the person's own coping strategy with their thinking and memory problems, rather than their cognitive decline per se. And thus, these domains might be more removed from the partner's attachment avoidance, compared to the other domains of cognitive decline measured in the present study.

Third, insecure attachment was consistently associated with higher stress, which is in line with previous research (Simpson & Rholes, 2017). While attachment anxiety in one person was linked to the person's own stress, attachment avoidance was linked to *both* partners' stress. We do not know why we could not detect a partner effect between anxiety and stress given that anxious partners' hyperactivating strategies—such as guilt-inducement (Overall et al., 2014)—could potentially be linked to the partner's stress. Future research is needed to replicate our findings. Regarding avoidant attachment, our robustness analyses suggest that the amount of stress that was linked to higher avoidant attachment could be due to experiencing lower relationship satisfaction. Of both attachment dimensions, avoidance is more strongly linked to satisfaction, the feeling of connectedness, and support in relationships (Li & Chan, 2012), which could explain why relationship satisfaction accounted for the links between avoidance and stress.

Fourth, stress was linked to both partners' cognitive functioning, and we found more actor effects than partner effects for the link between stress and cognitive functioning. However, the partner effects related to the cognitive function domain and memory performance, which was objectively measured. Further, stress in one partner seemed to be detected by the other partner in the form of reporting more dementia symptoms. In addition, we found more indirect effects for stress than for relationship satisfaction, suggesting that insecure attachment and cognitive health are more strongly related to the general stress that people experience than to their relationship-specific satisfaction. Future research needs to examine in more detail the role of partners' stress and relationship satisfaction for cognitive functioning in older couples.

4. Limitations

The current study had many strengths. The present study was the first to examine interrelations between the attachment orientations, stress, and cognitive functioning in a large, pre-registered study of

middle-aged and older couples (who were female-male, male-male, and female-female pairs). Couple members provided both self- and partner-reports of cognitive functioning and engaged in an objective performance-based measure of memory functioning. The study also provided some preliminary evidence regarding a potential process through which attachment might affect cognitive health (i.e., both partners' stress). And lastly, the present analysis tested the robustness of the results by adding relationship satisfaction as a control variable and additional mediator to further isolate associations between insecure attachment and cognitive impairment.

However, our findings need to be interpreted in view of some limitations. First, we did not collect medical records from participants' physicians to obtain a more objective and professional evaluation of participants' cognitive health. However, such records might also be incomplete because some participants could qualify for an Alzheimer's or dementia diagnosis but have not yet visited their health care professional. Further, even though the pathways from insecure attachment via stress to cognitive functioning seem intuitive, the exact mechanistic story might be more complicated (Zahodne et al., 2019). It could similarly be the case that worse cognitive health leads to more stress in both partners, especially the partner in the caring role, which, in turn, may contribute to greater insecure attachment. Furthermore, other intermediate factors, such as depression (Mourao et al., 2016), may also play an important part. Thus, a longitudinal study design could capture how insecure attachment, cognitive functioning, stress, and other psychosocial factors co-develop across later adulthood to better understand their potential bidirectional links. Another limitation is that the partner-reported dementia symptoms did not show a strong overlap with the other partner's self-reported dementia symptoms. Especially given that our sample was cognitively healthy, it could be that in this phase of potential cognitive decline onset, there might not be strong congruence between partners' perceptions of each other's cognitive health. Some individuals might experience symptoms that are not visible to their partner, or a person might pick up symptoms in their partner that they, themselves, have not yet noticed. Thus, it would be an important future examination to investigate how partners' perceptions of symptoms overlap across the course of a dementia-related illness. Finally, these longitudinal efforts should examine more racially and culturally diverse samples. This is also one important consideration in terms of the limitations on generalizability: Despite the strengths of our study sample, the results can only be generalized to predominantly white, middle-aged, and older U.S. couples who feel comfortable filling out online questionnaires and participating in word recall tasks on their computer. Aside from this restriction, however, we do not believe that other major limitations on the generalizability of our findings apply.

5. Conclusion

The present study examined the associations between insecure attachment and cognitive functioning in a large and diverse sample of older couples and tested whether stress mediates these associations. We found actor effects between anxiety and cognitive impairment and partner effects between avoidance and cognitive impairment and worse memory performance. Stress emerged as significant mediator in the relation between insecure attachment and cognitive functioning. In particular, the effects between avoidance and stress were accounted for by relationship satisfaction. These results point to modifiable elements in people's psychosocial (i.e., attachment orientations) and intrapsychic (i.e., stress) experiences that seem crucial for healthy cognitive aging.

Funding

Research reported in this publication was supported by the Michigan State University and the National Institute on Aging under Award Number 1R03AG054705-01A1 granted to William J. Chopik. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. This research was also funded by a Postdoc.Mobility Fellowship (P400PS_186724) of the Swiss National Science Foundation granted to Rebekka Weidmann.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Null.

Acknowledgments

We thank Céline Bader, Rosina Wackernagel, and David Johnson for their help with coding the memory task responses.

Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jrp.2022.104233.

References

Ackerman, R. A., Kenny, D. A. (2016, December). APIMPower: An interactive tool for Actor-Partner Interdependence Model power analysis [Computer software]. Available from https://robert-a-ackerman.shinyapps.io/apimpower/.

Andrade-Moraes, C. H., Oliveira-Pinto, A. V., Castro-Fonseca, E., da Silva, C. G., Guimaraes, D. M., Szczupak, D., Parente-Bruno, D. R., Carvalho, L. R. B., Polichiso, L., Gomes, B. V., Oliveira, L. M., Rodriguez, R. D., Leite, R. E. P., Ferretti-Rebustini, R. E. L., Jacob-Filho, W., Pasqualucci, C. A., Grinberg, L. T., & Lent, R. (2013). Cell number changes in Alzheimer's disease relate to dementia, not to plaques and tangles. *Brain, 136*, 3738–3752. https://doi.org/10.1093/brain/awt273

Berkman, L. F. (1995). The role of social relations in health promotion. *Psychosomatic Medicine, 57*, 245–254. https://doi.org/10.1097/00006842-199505000-00006

Besser, A., Neria, Y., & Haynes, M. (2009). Adult attachment, perceived stress, and PTSD among civilians exposed to ongoing terrorist attacks in Southern Israel. *Personality and Individual Differences, 47*(8), 851–857. https://doi.org/10.1016/j.paid.2009.07.003

Bourassa, K. J., Memel, M., Woolverton, C., & Sbarra, D. A. (2015). A dyadic approach to health, cognition, and quality of life in aging adults. *Psychology and Aging, 30*, 449–461. https://doi.org/10.1037/pag0000025

Brodaty, H., Pond, D., Kemp, N. M., Luscombe, G., Harding, L., Berman, K., & Huppert, F. A. (2002). The GPCOG: A new screening test for dementia designed for general practice. *Journal of the American Geriatrics Society, 50*, 530–534. https://doi.org/10.1046/j.1532-5415.2002.50122.x

Cao, Q., Tan, C.-C., Xu, W., Hu, H., Cao, X.-P., Dong, Q., Tan, L., & Yu, J.-T. (2020). The prevalence of dementia: A systematic review and meta-analysis. *Journal of Alzheimer's Disease, 73*, 1157–1166. https://doi.org/10.3233/JAD-191092

Chen, J.-H., Lin, K.-P., & Chen, Y.-C. (2009). Risk factors for dementia. *Journal of the Formosan Medical Association, 108*, 11.

Chopik, W. J., Edelstein, R. S., & Grimm, K. J. (2019). Longitudinal changes in attachment orientation over a 59-year period. *Journal of Personality and Social Psychology*. https://doi.org/10.1037/pspp0000167

Cohen, S., & Janicki-Deverts, D. (2012). Who's stressed? Distributions of psychological stress in the United States in Probability Samples from 1983, 2006, and 2009. *Journal of Applied Social Psychology, 42*, 1320–1334. https://doi.org/10.1111/j.1559-1816.2012.00900.x

Conway, A. R., Jarrold, C., Kane, M. J., Miyake, A., & Tose, J. N. (2007). *Variation in working memory*. Oxford University Press.

Cummings, J. L., & Cole, G. (2002). Alzheimer disease. *JAMA, 287*, 2335–2338. https://doi.org/10.1001/jama.287.18.2335

Deary, I. J., Corley, J., Gow, A. J., Harris, S. E., Houlihan, L. M., Marioni, R. E., Penke, L., Rafnsson, S. B., & Starr, J. M. (2009). Age-associated cognitive decline. *British Medical Bulletin, 92*, 135–152. https://doi.org/10.1093/bmb/ldp033

Del Giudice, M. (2011). Sex differences in romantic attachment: A meta-analysis. *Personality and Social Psychology Bulletin, 37*(2), 193–214. https://doi.org/10.1177/0146167210392789

Ditzen, B., Schmidt, S., Strauss, B., Nater, U. M., Ehlerta, U., & Heinrichs, M. (2008). Adult attachment and social support interact to reduce psychological but not cortisol responses to stress. *Journal of Psychosomatic Research, 64*, 479–486. https://doi.org/10.1016/j.jpsychores.2007.11.011

Ehrlich, K. B. (2019). Attachment and psychoneuroimmunology. *Current Opinion in Psychology, 25*, 96–100. https://doi.org/10.1016/j.copsyc.2018.03.012

Feeney, J. A., & Karantzas, G. C. (2017). Couple conflict: Insights from an attachment perspective. *Current Opinion in Psychology, 13*, 60–64. https://doi.org/10.1016/j.copsyc.2016.04.017

Fraley, R. C., Gillath, O., & Deboeck, P. R. (2021). Do life events lead to enduring changes in adult attachment styles? A naturalistic longitudinal investigation. *Journal of Personality and Social Psychology*. https://doi.org/10.1037/pspi0000326

Fraley, R. C., Heffernan, M. E., Vicary, A. M., & Brumbaugh, C. C. (2011). The experiences in close relationships-relationship structures questionnaire: A method for assessing attachment orientations across relationships. *Psychological Assessment, 23*, 615–625. https://doi.org/10.1037/a0022898

Fraley, R. C., Hudson, N. W., Heffernan, M. E., & Segal, N. (2015). Are adult attachment styles categorical or dimensional? A taxometric analysis of general and relationship-specific attachment orientations. *Journal of Personality and Social Psychology, 109*, 354–368. https://doi.org/10.1037/pspp0000027

Fraley, R. C., & Roisman, G. I. (2019). The development of adult attachment styles: Four lessons. *Current Opinion in Psychology, 25*, 26–30. https://doi.org/10.1016/j.copsyc.2018.02.008

Frank, L., Flynn, J. A., Kleinman, L., Margolis, M. K., Matza, L. S., Beck, C., & Bowman, L. (2006). Validation of a new symptom impact questionnaire for mild to moderate cognitive impairment. *International Psychogeriatrics, 18*, 135–149. https://doi.org/10.1017/S1041610205002887

Fredriksen-Goldsen, K. I., Emlet, C. A., Kim, H.-J., Muraco, A., Erosheva, E. A., Goldsen, J., & Hoy-Ellis, C. P. (2013). The physical and mental health of Lesbian, Gay Male, and Bisexual (LGB) older adults: The role of key health indicators and risk and protective factors. *The Gerontologist, 53*, 664–675. https://doi.org/10.1093/geront/gns123

Girme, Y. U., Overall, N. C., Simpson, J. A., & Fletcher, G. J. O. (2015). "All or nothing": Attachment avoidance and the curvilinear effects of partner support. *Journal of Personality and Social Psychology, 108*, 450–475. https://doi.org/10.1037/a0038866

Givertz, M., Woszidlo, A., Segrin, C., & Knutson, K. (2013). Direct and indirect effects of attachment orientation on relationship quality and loneliness in married couples. *Journal of Social and Personal Relationships, 30*(8), 1096–1120. https://doi.org/10.1177/0265407513482445

Greenberg, M. S., Tanev, K., Marin, M. F., & Pitman, R. K. (2014). Stress, PTSD, and dementia. *Alzheimers & Dementia, 10*, 155–165. https://doi.org/10.1016/j.jalz.2014.04.008

Hadden, B. W., Smith, C. V., & Webster, G. D. (2014). Relationship duration moderates associations between wttachment and relationship quality: Meta-analytic support for the temporal adult romantic attachment model. *Personality and Social Psychology Review, 18*, 42–58. https://doi.org/10.1177/1088868313501885

Healey, M. K., & Kahana, M. J. (2014). Is memory search governed by universal principles or idiosyncratic strategies? *Journal of Experimental Psychology: General, 143*(2), 575–596. https://doi.org/10.1037/a0033715

Hendrick, S. S. (1988). A generic measure of relationship satisfaction. *Journal of Marriage and the Family, 50*, 93–98. https://doi.org/10.2307/352430

Holwerda, T. J., Deeg, D. J. H., Beekman, A. T. F., van Tilburg, T. G., Stek, M. L., Jonker, C., & Schoevers, R. A. (2014). Feelings of loneliness, but not social isolation, predict dementia onset: Results from the Amsterdam Study of the Elderly (AMSTEL). *Journal of Neurology Neurosurgery and Psychiatry, 85*, 135–142. https://doi.org/10.1136/jnnp-2012-302755

Hoy-Ellis, C. P., & Fredriksen-Goldsen, K. I. (2016). Lesbian, gay, & bisexual older adults: Linking internal minority stressors, chronic health conditions, and depression. *Aging & Mental Health, 20*, 1119–1130. https://doi.org/10.1080/13607863.2016.1168362

Hudson, N. W., Fraley, R. C., Brumbaugh, C. C., & Vicary, A. M. (2014). Coregulation in romantic partners' attachment styles: A longitudinal investigation. *Personality and Social Psychology Bulletin, 40*, 845–857. https://doi.org/10.1177/0146167214528989

Irwin, M. R., & Vitiello, M. V. (2019). Implications of sleep disturbance and inflammation for Alzheimer's disease dementia. *The Lancet Neurology, 18*(3), 296–306. https://doi.org/10.1016/S1474-4422(18)30450-2

Jaremka, L. M., Glaser, R., Loving, T. J., Malarkey, W. B., Stowell, J. R., & Kiecolt-Glaser, J. K. (2013). Attachment anxiety is linked to alterations in cortisol production and cellular immunity. *Psychological science, 24*, 272–279. https://doi.org/10.1177/0956797612452571

Johansson, L., Guo, X., Waern, M., Ostling, S., Gustafson, D., Bengtsson, C., & Skoog, I. (2010). Midlife psychological stress and risk of dementia: A 35-year longitudinal population study. *Brain, 133*(8), 2217–2224. https://doi.org/10.1093/brain/awq116

Kenny, D. A., Kashy, D. A., & Cook, W. L. (2006). *Dyadic data analysis (2006-12719-000)*. US: Guilford Press.

Kiecolt-Glaser, J. K., & Wilson, S. J. (2017). Lovesick: How couples' relationships influence health. *Annual Review of Clinical Psychology, 13*(13), 421–443. https://doi.org/10.1146/annurev-clinpsy-032816-045111

Koopman, C., Gore-Felton, C., Marouf, F., Butler, L. D., Field, N., Gill, M., Chen, X.-H., Israelski, D., & Spiegel, D. (2000). Relationships of perceived stress to coping, attachment and social support among HIV-positive persons. *AIDS Care, 12*(5), 663–672. https://doi.org/10.1080/09540120075003833

Kuiper, J. S., Zuidersma, M., Voshaar, R. C. O., Zuidema, S. U., van den Heuvel, E. R., Stolk, R. P., & Smidt, N. (2015). Social relationships and risk of dementia: A systematic review and meta-analysis of longitudinal cohort studies. *Ageing Research Reviews, 22*, 39–57. https://doi.org/10.1016/j.arr.2015.04.006

LaBelle, O. P., Wardecker, B. M., Chopik, W. J., & Edelstein, R. S. (2020). Attachment processes and health. In R. H. Paul, L. E. Salminen, J. Heaps, & L. M. Cohen (Eds.), *The Wiley encyclopedia of health psychology* (1st ed., pp. 31–41). Wiley. https://doi.org/10.1002/9781119057840.ch47.

Ledermann, T., Macho, S., & Kenny, D. A. (2011). Assessing mediation in dyadic data using the actor-partner interdependence model. *Structural Equation Modeling, 18*, 595–612. https://doi.org/10.1080/10705511.2011.607099

Lee, Y., Back, J. H., Kim, J., Kim, S., Na, D. L., Cheong, H., Hong, C. H., & Kim, Y. G. (2010). Systematic review of health behavioral risks and cognitive health in older adults. *International Psychogeriatrics, 22*, 174–187. https://doi.org/10.1017/S1041610209991189

Li, T., & Chan, D. K. S. (2012). How anxious and avoidant attachment affect romantic relationship quality differently: A meta-analytic review. *European Journal of Social Psychology, 42*, 406–419. https://doi.org/10.1002/ejsp.1842

Livingston, G., Sommerlad, A., Orgeta, V., Costafreda, S. G., Huntley, J., Ames, D., Ballard, C., Banerjee, S., Burns, A., Cohen-Mansfield, J., & Cooper, C. (2017). Dementia prevention, intervention, and care. *The Lancet, 390*(10113), 2673–2734. https://doi.org/10.1016/S0140-6736(17)31363-6

Lohnas, L. J., & Kahana, M. J. (2011). *Compound cueing in free recall* (Vol. 40, pp. 12–24) [Data set]. https://doi.org/10.1037/a0033698.

Machado, A., Herrera, A. J., de Pablos, R. M., Espinosa-Oliva, A. M., Sarmiento, M., Ayala, A., Venero, J. L., Santiago, M., Villaran, R. F., Delgado-Cortes, M. J., Arguelles, S., & Cano, J. (2014). Chronic stress as a risk factor for Alzheimer's disease. *Reviews in the Neurosciences, 25*, 785–804. https://doi.org/10.1515/revneuro-2014-0035

Marks, A. D. G., Horrocks, K. A., & Schutte, N. S. (2016). Emotional intelligence mediates the relationship between insecure attachment and subjective health outcomes. *Personality and Individual Differences, 98*, 188–192. https://doi.org/10.1016/j.paid.2016.03.038

McLeod, S., Berry, K., Hodgson, C., & Wearden, A. (2020). Attachment and social support in romantic dyads: A systematic review. *Journal of Clinical Psychology, 76*, 59–101. https://doi.org/10.1002/jclp.22868

McWilliams, L. A., & Bailey, S. J. (2010). Associations between adult attachment ratings and health conditions: Evidence from the National Comorbidity Survey Replication. *Health Psychology, 29*, 446–453. https://doi.org/10.1037/a0020061

Mikulincer, M., & Shaver, P. R. (2007). *Attachment in adulthood: Structure, dynamics, and change*. The Guilford Press.

Miller, J. F., Weidemann, C. T., & Kahana, M. J. (2012). Recall termination in free recall. *Memory & Cognition, 40*(4), 540–550. https://doi.org/10.3758/s13421-011-0178-9

Moreira, H., & Maia, B. R. (2021). Self-critical rumination as a mediator between attachment orientations and perceived stress: Evidence from a cross-cultural validation of the self-critical rumination scale. *Current Psychology, 40*(3), 1071–1082. https://doi.org/10.1007/s12144-018-0025-2

Mourao, R. J., Mansur, G., Malloy-Diniz, L. F., Castro Costa, E., & Diniz, B. S. (2016). Depressive symptoms increase the risk of progression to dementia in subjects with mild cognitive impairment: Systematic review and meta-analysis: MCI, depression and risk of dementia. *International Journal of Geriatric Psychiatry, 31*(8), 905–911. https://doi.org/10.1002/gps.4406

Noyes, R., Stuart, S. P., Langbehn, D. R., Happel, R. L., Longley, S. L., Muller, B. A., & Yagla, S. J. (2003). Test of an interpersonal model of hypochondriasis. *Psychosomatic Medicine, 65*, 292–300. https://doi.org/10.1097/01.Psy.0000058377.50240.64

Olsen, J. A., & Kenny, D. A. (2006). Structural equation modeling with interchangeable dyads. *Psychological Methods, 11*(2), 127–141. https://doi.org/10.1037/1082-989X.11.2.127

O'Neal, C. W., & Wickrama (K. A. S.), K. (2020). The Contribution of Stressful Marital Interactions to Loneliness and Health across Mid-life and Later Adulthood, 0192513X2092192 *Journal of Family Issues*. https://doi.org/10.1177/0192513X20921927.

Overall, N. C., Girme, Y. U., Lemay, E. P., Jr., & Hammond, M. D. (2014). Attachment anxiety and reactions to relationship threat: The benefits and costs of inducing guilt in romantic partners. *Journal of Personality and Social Psychology, 106*, 235–256. https://doi.org/10.1037/a0034371

Pietromonaco, P. R., DeBuse, C. J., & Powers, S. I. (2013). Does attachment get under the skin? Adult romantic attachment and cortisol responses to stress. *Current Directions in Psychological Science, 22*, 63–68. https://doi.org/10.1177/0963721412463229

Pietromonaco, P. R., Uchino, B., & Dunkel Schetter, C. (2013). Close relationship processes and health: Implications of attachment theory for health and disease. *Health Psychology, 32*, 499–513. https://doi.org/10.1037/a0029349

Plassman, B. L., Williams, J. W., Jr., Burke, J. R., Holsinger, T., & Benjamin, S. (2010). Systematic review: Factors associated with risk for and possible prevention of cognitive decline in later life. *Annals of Internal Medicine, 153*(3), 182. https://doi.org/10.7326/0003-4819-153-3-201008030-00258

Powers, S. I., Pietromonaco, P. R., Gunlicks, M., & Sayer, A. (2006). Dating couples' attachment styles and patterns of cortisol reactivity and recovery in response to a relationship conflict. *Journal of personality and social psychology, 90*, 613–628. https://doi.org/10.1037/0022-3514.90.4.613

Quirin, M., Gillath, O., Pruessner, J. C., & Eggert, L. D. (2010). Adult attachment insecurity and hippocampal cell density. *Social Cognitive and Affective Neuroscience, 5*, 39–47. https://doi.org/10.1093/scan/nsp042

Reiner, S. R., Anderson, T. L., Hall, M. E. L., & Hall, T. W. (2010). Adult attachment, God attachment and gender in relation to perceived stress. *Journal of Psychology and Theology, 38*, 175–185. https://doi.org/10.1177/009164711003800302

Robles, T. F., Slatcher, R. B., Trombello, J. M., & McGinn, M. M. (2014). Marital quality and health: A meta-analytic review. *Psychological Bulletin, 140*, 140–187. https://doi.org/10.1037/a0031859

Sadler, P., Ethier, N., & Woody, E. (2011). Tracing the interpersonal web of psychopathology: Dyadic data analysis methods for clinical researchers. *Journal of Experimental Psychopathology, 2*, 95–138. https://doi.org/10.5127/jep.010310

Sherry, D. L., Sherry, S. B., Vincent, N. A., Stewart, S. H., Hadjistavropoulos, H. D., Doucette, S., & Hartling, N. (2014). Anxious attachment and emotional instability

interact to predict health anxiety: An extension of the interpersonal model of health anxiety. *Personality and Individual Differences, 56*, 89–94. https://doi.org/10.1016/j.paid.2013.08.025

Simpson, J. A., & Rholes, W. S. (2017). Adult attachment, stress, and romantic relationships. *Current Opinion in Psychology, 13*, 19–24. https://doi.org/10.1016/j.copsyc.2016.04.006

Simpson, J. A., Rholes, W. S., Orina, M. M., & Grich, J. (2002). Working models of attachment, support giving, and support seeking in a stressful situation. *Personality and Social Psychology Bulletin, 28*(5), 598–608. https://doi.org/10.1177/0146167202288004

Stanton, S. C. E., & Campbell, L. (2014). Psychological and physiological predictors of health in romantic relationships: An attachment perspective. *Journal of Personality, 82*, 528–538. https://doi.org/10.1111/jopy.12056

Thompson, G., Wrath, A., Trinder, K., & Adams, G. C. (2018). The roles of attachment and resilience in perceived stress in medical students. *Canadian Medical. Education Journal, 9*, e69–e77. https://doi.org/10.36834/cmej.43204

Tilvis, R. S., Kahonen-Vare, M. H., Jolkkonen, J., Valvanne, J., Pitkala, K. H., & Strandberg, T. E. (2004). Predictors of cognitive decline and mortality of aged people over a 10-year period. *Journals of Gerontology Series A-Biological Sciences and Medical Sciences, 59*, 268–274.

Uchino, B. N. (2009). Understanding the links between social support and physical health: A life-span perspective with emphasis on the separability of perceived and received support. *Perspectives on Psychological Science, 4*(3), 236–255. https://doi.org/10.1111/j.1745-6924.2009.01122.x

Waldinger, R. J., Cohen, S., Schulz, M. S., & Crowell, J. A. (2015). Security of attachment to spouses in late life: Concurrent and prospective links with cognitive and emotional well-being. *Clinical Psychological Science, 3*, 516–529. https://doi.org/10.1177/2167702614541261

Warttig, S. L., Forshaw, M. J., South, J., & White, A. K. (2013). New, normative, English-sample data for the Short Form Perceived Stress Scale (PSS-4). *Journal of Health Psychology, 18*, 1617–1628. https://doi.org/10.1177/1359105313508346

Widom, C. S., Czaja, S. J., Kozakowski, S. S., & Chauhan, P. (2018). Does adult attachment style mediate the relationship between childhood maltreatment and mental and physical health outcomes? *Child Abuse & Neglect, 76*, 533–545. https://doi.org/10.1016/j.chiabu.2017.05.002

Zahodne, L. B., Ajrouch, K. J., Sharifian, N., & Antonucci, T. C. (2019). Social relations and age-related change in memory. *Psychology and Aging, 34*(6), 751–765. https://doi.org/10.1037/pag0000369

Zahodne, L. B., Stern, Y., & Manly, J. J. (2015). Differing effects of education on cognitive decline in diverse elders with low versus high educational attainment. *Neuropsychology, 29*(4), 649–657. https://doi.org/10.1037/neu0000141