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Untangling the effects of partner responsiveness on health and well-being: The role of perceived control

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Abstract

Perceived partner responsiveness (PPR)—the extent to which people feel understood, cared for, and appreciated—has been identified as an organizing principle in the study of close relationships. Previous work indicates that PPR may benefit physical health and well-being, but *how* PPR is associated with personal benefits is less clear. One cognitive mechanism that may help to explain these associations is perceived control. Here we tested two competing models (moderation vs. mediation) in which we assessed whether perceived control might explain how PPR impacts health, well-being, and mortality in a 20-year longitudinal study of adults ($N = 1{,}186$). We found that PPR has a long-term positive association with health, well-being, and mortality *via* increased perceived control and, in turn, decreased negative affect reactivity to daily stressors. These findings have important implications for understanding the cognitive mechanisms that link PPR to health and well-being.

Keywords

Affective reactivity, health, mortality, perceived control, perceived partner responsiveness, well-being

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Since House, Landis, and Umberson (1988) concluded that "Social relationships, or the relative lack thereof, constitute a major risk factor for health" (p. 541), a considerable amount of theoretical and empirical work has established the potent effects of close relationships on health and well-being (Feeney & Collins, 2015; Miller, Chen, & Cole, 2009; Pietromonaco, Uchino, & Dunkel-Schetter, 2013). To consider how romantic relationships predict health and well-being, theoretical models, such as the strength and strain model of marital quality and health (Slatcher & Selcuk, 2017), have proposed that (a) relationship quality and its positive aspects (strengths) are key elements that buffer against deleterious health outcomes and (b) different psychological and biological mechanisms are responsible for their effects.

Among the positive aspects of close relationships, perceived partner responsiveness (PPR)—that is, the extent to which people believe that others (e.g., their romantic partners) understand, validate, and care for them—has been identified as an important relational strength that imparts personal benefits (Reis, 2012; Slatcher & Selcuk, 2017). For example, a few studies, using data from a sample of adults in the Midlife Development in the United States (MIDUS) study, have found links between PPR and higher eudaimonic well-being (Selcuk, Gunaydin, Ong, & Almeida, 2016; Tasfiliz et al., 2018), steeper (i.e., "healthier") daily cortisol activity (Slatcher, Selcuk, & Ong, 2015), better subjective sleep quality (Selcuk, Stanton, Slatcher, & Ong, 2017), and a lower risk of mortality (Stanton, Selcuk, Farrell, Slatcher, & Ong, 2019).

Despite these implications, the conditions under which PPR may confer health protection remain poorly understood (Slatcher & Schoebi, 2017). To address this gap, recent studies have sought to identify psychological mechanisms (e.g., cognitions and emotions) that contribute to our understanding of PPR's effects. Researchers have focused, in particular, on analyzing the mediating role of affective reactivity—the extent to which people feel, express, and regulate positive affect (PA) and negative affect (NA) in response to the stressful experiences they face in daily life (Farrell, Imami, Stanton, & Slatcher, 2018). For example, lower NA and greater PA reactivity to stress have been linked to greater eudaimonic well-being (Selcuk et al., 2016), fewer chronic health problems (Piazza, Charles, Sliwinski, Mogle, & Almeida, 2013), and better sleep quality (Ong et al., 2013). Of particular importance to the present study, Stanton, Selcuk, Farrell, Slatcher, and Ong (2019) found that PPR predicted 20-year follow-up longevity prospectively *via* reduced NA reactivity. This suggests that alleviation of NA to daily stressors is a mechanism through which PPR enhances health and well-being. However, this research leaves open the question as to *how* PPR facilitates affective regulation. In the current research, we extend previous findings by proposing, for the first time, a cognitive mechanism that may explain how feeling accepted and understood (PPR) can lead to improved affective reactivity to daily stressors, which, in turn, positively impacts health, well-being, and mortality over time: perceived control.

Perceived control as a link between PPR, affective reactivity, health, and well-being

Perceptions of control refer to beliefs about one's capability to bring about a given outcome (Levenson, 1981; Skinner, 1996). These beliefs are based on perceptions of constraints that people find in their environment and on perceptions of individuals' abilities or mastery to control and change their life circumstances (Lachman, 2006). The attributions that people make about their own control have been positively associated with better functional health, fewer chronic problems, and reduced mortality rates over time (Gerstorf et al., 2014; Infurna, Gerstorf, Ram, Schupp, & Wagner, 2011; Kifer, Heller, Perunovic, & Galinsky, 2013).

Importantly, several theoretical frameworks propose that the effectiveness of perceived control for well-being and health depends partially on its capacity to soothe negative reactivity to daily stressors (Baumeister, Vohs, & Tice, 2007; Cohen & Wills, 1985; Steele, 1988; Tighe, Dautovic, & Allen, 2015). For example, Lachman's (2006) integrative conceptual model—based on cognitive behavioral theory (Bandura, 1997)—considers perceived control as an enabling factor that reinforces the individual's self as competent and capable of controlling outcomes, which, in turn, promotes effective strategies (e.g., emotional regulation) for dealing with stress and facilitates numerous outcomes, including well-being and health. In other words, control beliefs encourage the exertion of effort, bolstering motivation, and self-regulation (Bandura, 1997). Specifically, individuals who perceive themselves as having more control are thought to make better use of resources to deal with daily challenges, leading to an enhanced ability to downregulate the impact of daily stressors. Conversely, individuals who perceive lower control over their lives are more vigilant and continuously monitor their environment for threats in an effort to increase control (Baumeister et al., 2007; Keltner, Gruenfeld, & Anderson, 2003). As a consequence, they may experience higher levels of anxiety and a lower sense of self-efficacy when facing challenges, which is typically manifested in difficulties with downregulating emotional reactivity to stressors (Galinsky, Gruenfeld, & Magee, 2003; Keltner et al., 2003). To illustrate this point, a few empirical studies have begun to document the relevance of perceived control for affective reactivity (Koffer et al., 2019; Tighe et al., 2015). Although there may be a link between perceived control and broad affective reactivity, the associations between control and NA reactivity are particularly strong. For example, Drewelies et al. (2018), Hay and Diehl (2010), and Neupert, Almeida, and Charles (2007), using daily diary studies, found that higher daily perceived control (operationalized as mastery beliefs) was associated with lower NA reactivity to daily stressors. Conversely, the findings regarding links between perceived control and PA are more mixed. Whereas some authors have theorized that perceptions of control should be associated with a decrease in affective reactivity regardless of their negative or positive valence (Pressman & Cohen, 2005), to our knowledge, recent studies have not found clear evidence about the links between perceived control and PA reactivity. Taken together, prior research suggests that greater perceived control is related to reduced affective reactivity (mainly NA reactivity) to stressors in daily life, leading to an improvement in health and well-being.

Rival explanations for associations between PPR and perceived control

Although the links between perceived control and affect, as well as PPR and health, have been clearly articulated in the current literature, very little work, to date, has paid attention to the ways in which PPR and perceived control relate to one another. Here we draw from diverse theoretical perspectives on close relationships—such as attachment theory (Bowlby, 1988), interdependence theory (Drigotas, Rusbult, Wieselquist, & Whitton, 1999), and models of social support (Cohen & Wills, 1985)—and propose that PPR should be linked to well-being and health, at least in part, *via* positive effects on one's perceived control.

Despite their differences, these separate lines of theoretical reasoning make a common underlying argument that partner's positive feedback and validation may inspire and increase one's feelings of control as a self-resource, which helps people to respond in an adaptive manner. For example, interdependence theory argues that people's attributions and emotions are affected by their interpersonal interactions which may gratify (vs. frustrate) their own self-concept and, in turn, help each person's strivings toward their goals (Van Lange & Rusbult, 2012). Attachment theory adds that responsive figures, such as romantic partners in adulthood, satisfy a fundamental belongingness need (Baumeister & Leary, 1995) which, in turn, makes people feel a sense of security—a psychological state characterized by calmness and safety—that enhances well-being and health (Selcuk et al., 2016). This sense of felt security leads to a "secure base" (Bowlby, 1988) that boosts people's perceptions about their own autonomy, efficacy, and mastery—key elements of control perceptions (Lachman, 2006). In other words, individuals who feel loved, cared for, and appreciated by their partners should be better able to cultivate a strong sense of capability and control of their life situation. The perceived control that follows from such value affirmations could serve as turning points for an individual's daily interactions by helping people reduce their physiological stress (e.g., affective reactivity) and, therefore, pursue goals that would contribute to their longer term personal growth (Baumeister et al., 2007; Chen & Feeley, 2012). Supporting this view, individuals who perceived their partner as more responsive in a discussion of personal goals later reported higher confidence and efficacy in achieving these goals (Feeney, 2004). Overall, the existing findings provide indirect support for interdependence and attachment theories' contention that PPR is linked to core aspects of perceived control. However, to our knowledge, no studies have directly investigated the link between PPR and perceived control. We theorize that PPR should directly increase perceived control, which, in turn, fosters improved affective reactivity regulation and, ultimately, greater well-being and better health (*a serial mediation model*; Figure 1, Panel A).

Besides the direct sense of security that a responsive partner may provide, an additional basic function of PPR is to downregulate negative emotions to bolster feelings of security (Slatcher & Schoebi, 2017; Slatcher & Selcuk, 2017). A normative function of relationships is stress buffering—that is, an attachment figure's ability to help downregulate one's reactivity to stressful events (Cohen & Wills, 1985). Simpson and Overall (2014) suggest that when stressful events activate an individual's insecure response tendencies, a partner may enact certain buffering behaviors to downregulate these momentary insecurities. Therefore, one could also imagine that, rather than directly fostering higher feelings of control, PPR could serve as a buffer for stressful situations emerging from lack of control (Beck, 2014). Indeed, when individuals encounter stressful events, a sensible strategy for those involved in romantic relationships is to turn to their partner to cope with the stress. Partners' responsive behavior can enable people

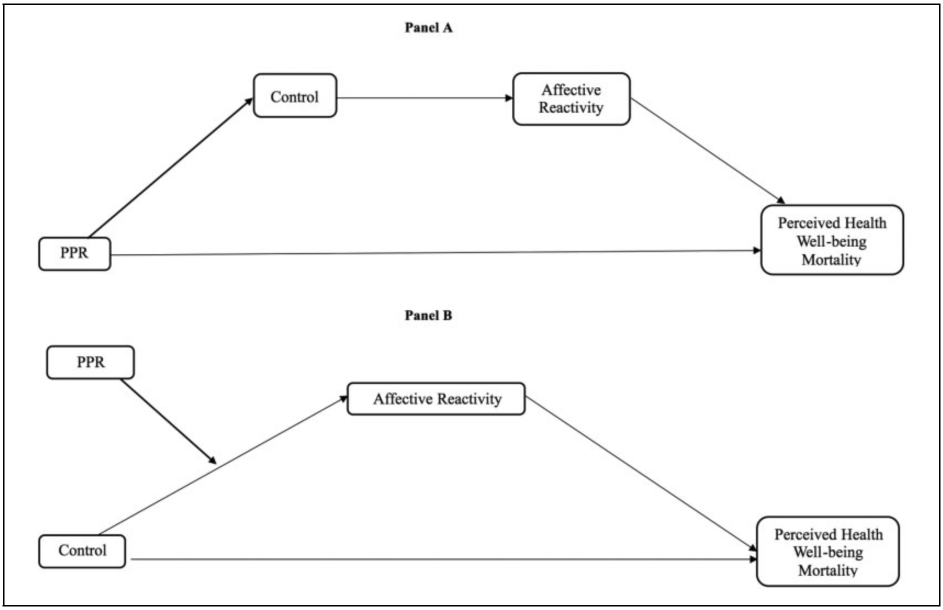

Figure 1. Proposed theoretical models. *Panel A* (a serial mediation model): PPR indirectly influences health, well-being, and mortality *via* the increase of perceived control and the reduction of affective reactivity to daily stressors; *Panel B* (a moderated mediation model): PPR buffers the negative effect of low perceived control on perceived health, well-being, and mortality *via* the reduction of affective reactivity to daily stressors. PPR = perceived partner responsiveness.

to deal with threatening events and restores felt security (Coan, Schaefer, & Davidson, 2006). According to social support models (Cohen & Wills, 1985), people's beliefs that their partners understand, validate, and care for them can be associated with positive outcomes by reducing perceptions of uncontrollability and social threat, ultimately buffering stress responses (Cohen & Wills, 1985; Hostinar, Sullivan, & Gunnar, 2014). Based on these ideas, we sought to test a competing theoretical model (*a moderated mediation model*; Figure 1, Panel B) that would predict that PPR should attenuate the negative perceptions of not having control, which, in turn, improves affective reactivity regulation, well-being, health, and mortality.

The present research

In the current study, we examined the associations among PPR, perceived control, NA and PA reactivity, health, well-being, and mortality over a 20-year period in a large sample of married and cohabitating couples in the U.S.. We hypothesized that greater levels of PPR at Wave 1 (W1) would be associated with better health, well-being, and lower mortality at Wave 3 (W3; 20-year follow-up). In addition, extending previous literature that has already established prospective associations between PPR, affective reactivity, health, and well-being (e.g., Selcuk et al., 2016; Stanton et al., 2019), we propose a cognitive mechanism—perceived control—to explain how PPR impacts health and well-being outcomes *via* reduced affective reactivity to daily stressors. Specifically, we tested whether PPR influences long-term health, well-being, and mortality *via* the increase of perceived control and the prospective reduction of emotional reactivity to daily stressors (serial mediation models) versus an alternative model that PPR buffers the negative effect of lacking control on health, well-being, and mortality *via* the reduction of emotional reactivity to daily stressors (moderated mediation models).

Method

Sample and procedure

Participants were drawn from the MIDUS project. MIDUS is a three-wave panel survey on health and well-being among adults between the ages of 25 years and 74 years. MIDUS respondents provided demographic information during a phone interview and completed the main measures as part of a self-administered survey in 1995–1996 (W1), 2004–2006 (Wave 2; W2), and 2013–2014 (W3). W1 comprises 7,108 individuals, W2 contains 4,963 adults, and W3 comprises 3,294 adults who were 20-year follow-ups of W1. In the current study, participants were selected if they completed data for PPR and perceived control at W1 and W2, and daily NA and PA reactivity at W2. The final sample consisted of 1,186 individuals (52.4% female, $M = 47.38$, $SD = 11.81$). Most participants (97.4%) were married or cohabiting with a partner.

Primary measures

Perceived partner responsiveness. In line with prior work (e.g., Selcuk et al., 2016; Slatcher et al., 2015), PPR was assessed at W1 and W2 using 3 items from the MIDUS self-administered questionnaire ("How much does your spouse or partner really care about you?", "How much does he or she understand the way you feel about things?", and "How much does he or she appreciate you?"). These items match the three core components of responsiveness (i.e., understanding, validating, and caring) identified in the literature (Reis, 2012). Individuals rated their responses on a scale of 1 (*a lot*) to 4 (*not at all*); PPR scores at each wave were created by reverse-scoring the 3 items and averaging across them, such that higher scores indicated greater PPR; $\alpha = .82$ (W1) and $\alpha = .84$ (W2).

Perceived control. In W1 and W2, participants answered questions regarding two dimensions (Lachman & Weaver, 1998): personal mastery (e.g., "I can do just about anything I really set my mind to") and perceived constraints (e.g., "There is little I can do to change the important things in my life"). Individuals rated their responses on a scale of 1 (*strongly agree*) to 7 (*strongly disagree*). Perceived control scores at each wave were created by calculating the mean of the 12 items. Items from "personal constraints" were reverse-coded so that higher scores represent higher levels of the overall perceived control, $\alpha = .83$ (W1) and $\alpha = .85$ (W2).

Negative and positive affect reactivity. In line with prior work (e.g., Charles, Piazza, Mogle, Sliwinski, & Almeida, 2013; Stanton et al., 2019), we created the NA and PA reactivity at W2. Participants completed the Daily Inventory of Stressful Events each day for 8 days. Specifically, they pointed out (1) whether they experienced a type stressor that day (e.g., relational conflict, a problem, or perceived discrimination; 0 = *no*, 1 = *yes*) and (2) ranked how often they experienced 13 PA states (e.g., proud) and 14 NA states (e.g., worthless) each day on a scale of 0 (*none of the time*) to 4 (*all of the time*). After that, using a two-level multilevel model, daily NA and PA reactivity were calculated—coded as two separate within-person slopes. The Level 1 models tested NA and PA as a function of stress exposure. The intercepts represented NA and PA experienced on nonstressor days, whereas the slopes represented the change in NA and PA from a nonstressor to a stressor day. The Level 2 models, adjusting for between-person stress exposure in average NA and PA, estimated sample averages of the intercepts and slopes. Therefore, to measure the individuals' reactivity levels experienced, given both their usual levels of NA and PA and the amount of stress they were exposed to, within-person daily NA and PA reactivity scores reflect between-person differences in both stress exposure and NA and PA.

Perceived health. Perceived health was assessed at W3 using a single item: "How would you rate your health these days?" Individuals rated their responses on a scale of 0 (*the worst possible health*) to 10 (*the best possible health*). Higher scores represent better health. Global self-ratings of health similar to this one have been found to strongly predict poor health trajectories in older adults (Benyamini & Idler, 1999).

Hedonic well-being. Following prior work (e.g., Gallagher, Lopez, & Preacher, 2009), we computed a composite measure of hedonic well-being at W3 by combining participants' ratings of life satisfaction (Prenda & Lachman, 2001) and positive and negative affect over the past 30 days (Watson, Clark, & Tellegen, 1988). Life satisfaction was measured by a single item (e.g., "Rate your life overall"), ranging from 0 (*worst*) to 10 (*best*). Positive and negative affect were captured with 10 items (e.g., "full of life") and 11 items (e.g., "afraid") respectively, ranging from 1 (*all of the time*) to 5 (*any time*). To compute the hedonic well-being score, we reverse-scored negative affect, standardized each subscale, and used pooled standard deviations, $\alpha = .78$.

Eudaimonic well-being. Eudaimonic well-being was assessed at W3 using Ryff's Psychological Well-Being Scales (1989). For the purpose of this study, we created a eudaimonic well-being measure composed by three dimensions: personal growth (e.g., "For me, life has been a continuous process of learning, changing, and growth"), purpose in life (e.g., "I have a sense of direction and purpose in life"), and self-acceptance (e.g., "I like most parts of my personality"). Each subscale included 7 items rated on a 7-point scale, 1 (*strongly agree*) to 7 (*strongly disagree*). Subscale scores were constructed by reverse-scoring and averaging across items, $\alpha = .86$. Ryff's Psychological Well-Being Scales (1989) also assess autonomy, environmental mastery, and positive relations with others. However, following prior work (e.g., Selcuk et al., 2016), these subscales were excluded from analyses to avoid artificially inflating the predictive role of PPR and perceived control in eudaimonic well-being.

Mortality. Names of individuals who could not be contacted for a follow-up survey at W3 were submitted to the National Death Index through October 2015 to ascertain whether participants were deceased (0 = *no*, 1 = *yes*). In our sample of 1,186 individuals, 90 (7.6%) were identified as deceased at W3.

Covariate measures

To ensure that findings of the current study cannot be attributed to known confounding variables, we included as covariates several W1 variables that have previously been associated with health, well-being, or mortality (Piazza et al., 2013; Selcuk et al., 2016; Stanton et al., 2019).

Demographic covariates. Demographic variables included sex (0 = *male*, 1 = *female*; 52.4% female), age (*M* = 47.38, *SD* = 11.81), education (5.4% completed elementary school, 49.1% completed high school, 28.7% completed college/university, and 16.9% pursued a postgraduate degree), race (0 = *White*, 1= *other race*; 94.4% White), and annual income (*M* = US$86,010.64, *SD* = US$60,584.69, *Mdn* = US$70,000.00).

Personality covariates. Personality traits (agency, agreeableness, extraversion, and neuroticism) were measured by using the Midlife Development Inventory (MIDI) Personality Scales, an adjective list specifically designed for the MIDUS project (Lachman & Weaver, 1997). All personality items were rated on scales of 1 (*a lot*) to 4 (*not at all*). Agency (α = .82), agreeableness (α = .79), extraversion (α = .78), and neuroticism (α = .76) scores were created by reverse-scoring and averaging across the items of the relevant subscales.

Relational covariates. Social support provision and receipt were assessed with two 1-item measures (Rossi, 2001). Participants reported the approximate number of hours per month they spent providing or receiving emotional support to/from their partner. Following prior work, outliers on these two open-ended items were winsorized to $\pm$2.5 *SD* of the mean (Slatcher et al., 2015).

Health covariates. Physical health variables were assessed including self-reported cardiovascular conditions (0 = *no*, 1 = *yes*; 7% yes), cancer diagnoses (0 = *no*, 1 = *yes*; 10.2% yes), and the sum of remaining chronic physical health conditions. Mental health was assessed with the depression scale of the Composite International Diagnostic Interview–Short Form (Wang, Berglund, & Kessler, 2000); participants were given a score from 0 (*lowest depression*) to 7 (*highest depression*).

Statistical analysis strategy

Our sample had a total of 2.59% missing data. Given the small portion of missing values and the fact that data were missing completely at random (Little's MCAR test, $\chi^2(370) = 383.05, p = .309$), we used SPSS's expectation maximization (EM) algorithm to replace the missing values in our sample. This technique provides unbiased parameter estimates and improves statistical power of analyses (Scheffer, 2002). All variables with missing data—annual income, support provision and receipt, perceived health, hedonic, and eudaimonic well-being—were continuous, except for cardiovascular conditions and cancer diagnoses. Because the EM algorithm does not allow value replacement for categorical data, mode replacement with the series mean was used to replace those missing values. To facilitate interpretation and to provide estimates of effect size, all continuous variables were standardized.

We first tested associations among study variables using bivariate correlation analyses. We then tested whether W1 PPR predicted W3 outcomes (perceived health, hedonic, eudaimonic well-being, and mortality) *via* W1 perceived control and W2 daily NA reactivity. The same path was tested again in separate analyses replacing NA reactivity with W2 daily PA reactivity. For each path, we ran two serial mediation models—Model 1 without covariates and Model 2 adding covariates[1]—using the PROCESS macro for SPSS, Model 6 (Hayes, 2013). Lastly, we tested the alternative model (moderated mediation models) of the interaction between W1 PPR and W1 perceived control predicting each W3 outcome *via* W2 daily NA and PA reactivity (Model 7 in PROCESS). In both analyses, indirect effects can exist in the absence of a significant total effect (Zhao, Lynch, & Chen, 2010). Bias-corrected confidence intervals (CIs) for indirect associations were estimated based on 5,000 bootstrap samples. CI that does not include 0 indicates a statistically meaningful association.

Results

Descriptive statistics and correlations among study variables may be found in Table 1.

Analyses testing PPR as a predictor of perceived control

Serial mediation analyses were run to test indirect effects of PPR on perceived health, well-being, and mortality *via* greater perceived control and reduced daily affective reactivity (for a graphical representation, see Figure 1, Panel A).

First, controlling for covariates, we found evidence for an indirect effect linking higher PPR to higher perceived health *via* an increase of perceived control and reduction of NA reactivity (95% CI [.001, .004]; see the top half of Figure 2), but not *via* PA reactivity (95% CI [−.001, .001]; see the bottom half of Figure 2). Second, similar results emerged for hedonic well-being *via* perceived control and NA reactivity (95% CI [.001, .008]; see the top half of Figure 3)—but not *via* PA reactivity. After adjusting for covariates, links between PPR and hedonic well-being were eliminated (95% CI [−.001, .002]; see the bottom half of Figure 3). Third, analyses also revealed a significant indirect association between PPR and eudaimonic well-being *via* perceived control and NA

Table 1. Descriptive statistics and correlations among study variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1. W1 PPR	—																						
2. W2 Control	.22**	—																					
3. W2 NA	−.10**	−.31**	—																				
4. W2 PA	.01	−.07*	−.05	—																			
5. W3 Perceived health	.11**	.27**	−.17**	−.03	—																		
6. W3 Hedonic	.25**	.48**	−.38**	−09**	.51**	—																	
7. W3 Eudaimonic	.17**	.58**	−.29**	−.07*	.38**	.69**	—																
8. W3 Mortality[a]	−.01	−.11**	.10**	.01	−.09**	−.05	−.09**	—															
9. W1 Age	.08**	.00	−.09**	−.00	−.08**	.15**	.02	.34**	—														
10. W1 Gender[b]	−.15**	−.09**	.04	−.06*	−.02	.02	.00	−.08**	−.12**	—													
11. W1 Education	.03	.14**	−.13**	−.03	.16**	.11**	.19**	−.07*	−.03	−.12**	—												
12. W1 Economic income	.03	.19**	−.06*	−.01	.21**	.08*	.17**	−.15**	−.21**	−.36**	.23**	—											
13. W1 Race[c]	−.05	.01	.09**	−.01	.01	.00	.03	.00	−.06*	−.03	.01	.04	—										
14. W1 Agency	.07*	.23**	−.10**	−.07*	.04	.16**	.29**	.04	.05	−.13**	.06*	.15**	.07*	—									
15. W1 Agreeableness	.11**	.09**	−.02	−.12**	.06*	.18**	.23**	−.01	.06*	.27**	−.05	−.13**	−.04	.14**	—								
16. W1 Extraversion	.14**	.22**	−.09**	−.15**	.09**	.22**	.31**	−.03	.03	.06*	−.03	.01	.02	.52**	.54**	—							
17. W1 Neuroticism	−.17**	−.31**	.29**	−.00	−.17**	−.39**	−.29**	−.01	−.21**	.13**	−.14**	−.08**	−.02	−.12**	−.07*	−.19**	—						
18. W1 Support given	−.09**	.01	.01	−.05	.02	.02*	−.01	−.03	−.05	.08**	−.13**	−.06*	.05	−.04	.06*	−.00	.01	—					
19. W1 Support received	−.18**	.01	−.01	−.05	.01	.07**	.01	−.04	−.06	.06*	−.11**	−.05	.05	−.03	.06*	.02	.03	.91**	—				
20. W1 Depression	−.10**	−.14**	.18**	−.02	−.11*	−.22**	−.17**	.00	−.14**	.12**	−.09**	−.09**	.01	−.07*	.01	−.09**	.23**	.03	.02	—			
21. W1 Cancer[d]	.05	−.07*	.02	.02	−.06*	.01	−.06*	.10**	.19**	.02	−.04	−.05	−.01	.02	.08**	.02	−.03	.03	.01	−.04	—		
22. W1 Cardiovascular[d]	−.01	−.04	.02	−.01	−.16**	−.08**	−.11**	.15**	.16**	−.02	−.03	.13**	−.06	−.04	.03	−.01	.03	.04	.04	.04	.04	—	
23. W1 Chronic conditions	−.11**	−.19**	.17**	.04	−.31**	−.29**	−.23**	.09**	.09**	.17**	−.14**	−.17**	.03	−.05	.03	−.10**	.26**	.03	.02	.22**	.08**	.16**	—
M	3.62	5.62	.16	.15	2.17	.00	.00	—	47.38	—	—	86.010	—	2.68	3.47	3.21	2.17	77.70	25.82	.57	—	—	2.20
SD	0.51	0.95	0.09	0.05	0.88	1.00	1.00	—	11.81	—	—	60.584	—	0.66	0.47	0.56	0.65	18.09	53.26	1.67	—	—	2.22

Note. Higher scores on continuous variables indicate greater standing on the variable (e.g., greater PPR). Continuous variables are standardized. $N = 1,186$. W1 = Wave 1; W2 = Wave 2; W3 = Wave 3; PPR = perceived partner responsiveness; NA = negative affect; PA = positive affect.

[a]0 = *not deceased*, 1 = *deceased*.

[b]0 = *female*, 1 = *male*.

[c]0 = *White*, 1 = *non-White*.

[d]0 = *no*, 1 = *yes*.

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

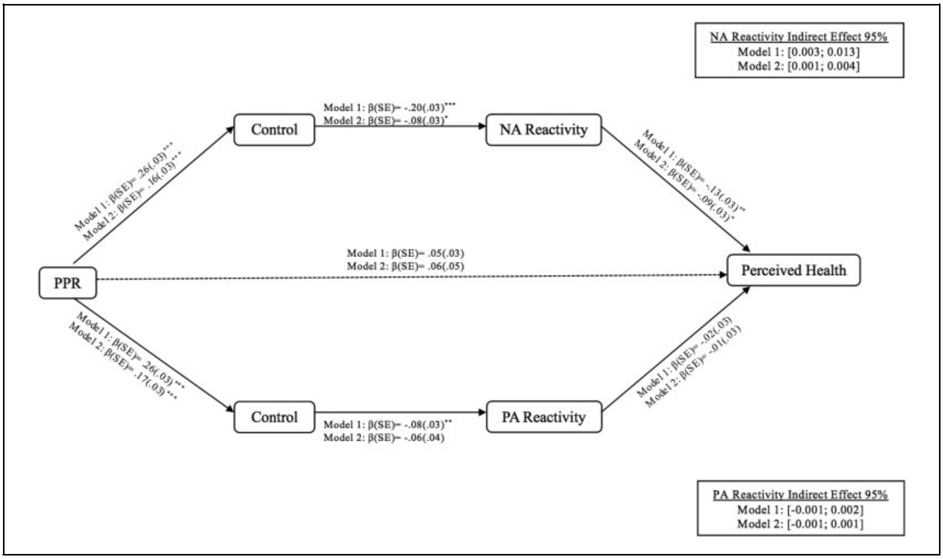

Figure 2. Direct and indirect associations between W1 PPR, W1 perceived control, W2 daily NA and PA reactivity, and W3 perceived health. Model 1 = analysis without covariates; Model 2 = analysis adding covariates. In these models, a CI that does not include 0 indicates a statistically meaningful association. **p* < .05; ***p* < .01; ****p* < .001. *N* = 1,186. *SE* = standard error; PPR = perceived partner responsiveness; W1 = Wave 1; W2 = Wave 2; W3 = Wave 3; PA = positive affect.

reactivity in the predicted direction after controlling for covariates (95% CI [.001, .005]; see the top half of Figure 4). However, indirect effects *via* perceived control and PA reactivity were not significant (95% CI [−.001, .001]; see the bottom half of Figure 4). Finally, a significant indirect association between PPR and mortality *via* an increase of perceived control and the reduction of NA reactivity emerged, which also remained significant adjusting for all covariates (95% CI [−.018, −.001]; see the top half of Figure 5)—but not *via* PA reactivity (95% CI [−.004, .004]; see the bottom half of Figure 5).

In summary, as predicted, greater levels of PPR were associated with the increase of perceived control at W1[2] and the reduction of NA reactivity to daily stressors at W2 (10-year follow-up), which, in turn, predicted better health and well-being, and a decreased mortality risk 10 years later (20-year follow-up, i.e., W3)[3].

Additional analyses. To gain a better understanding of the direction of our findings, we explored the directionality of the serial mediation by testing reverse mediation models, in which W1 perceived control served as the predictor, W1 PPR as first mediator, and W2 PA and NA reactivity as second serial mediators. These analyses showed that, adjusting for covariates, none of the indirect effects significantly predicted perceived health *via* NA reactivity (95% CI [−.001, .002]) or PA reactivity (95% CI [−.001, .001]); hedonic well-being *via* NA reactivity (95% CI [−0.002, 0.004]) or PA reactivity (95% CI

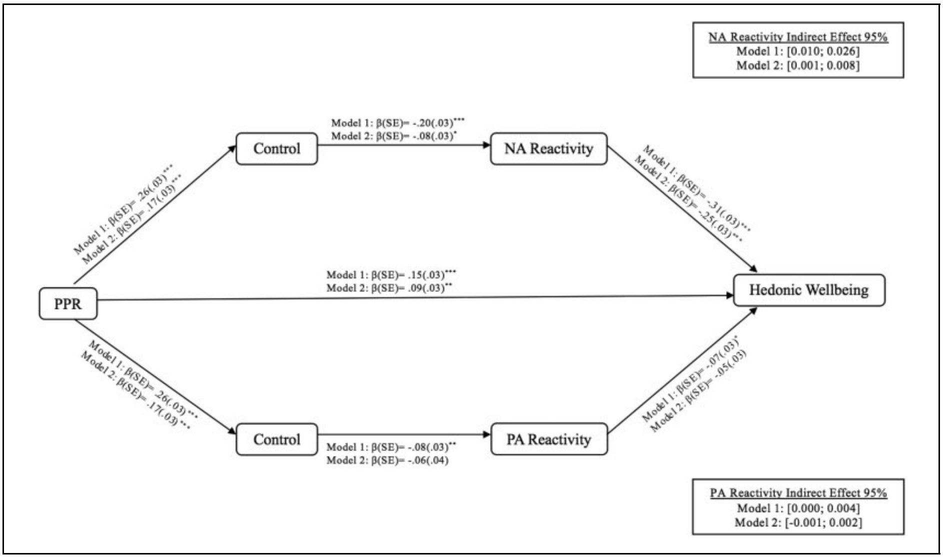

Figure 3. Direct and indirect associations between W1 PPR, W1 perceived control, W2 daily NA and PA reactivity, and W3 hedonic well-being. Model 1 = analysis without covariates; Model 2 = analysis adding covariates. In these models, a CI that does not include 0 indicates a statistically meaningful association. *p < .05; **p < .01; ***p < .001. N = 1,186. *SE* = standard error; PPR = perceived partner responsiveness; W1 = Wave 1; W2 = Wave 2; W3 = Wave 3; PA = positive affect; NA = negative affect.

[−.002, .001]); eudaimonic well-being *via* NA reactivity (95% CI [−.001, .002]) or PA reactivity (95% CI [−.001, .001]); or mortality *via* NA reactivity (95% CI [−.009, .004]) or PA reactivity (95% CI [−.005, .002]). These analyses suggest that greater PPR leads to better health and well-being *via* greater perceived control rather than greater perceived control leading to better health *via* greater PPR.

Alternative model testing PPR as a moderator of perceived control's effects

We next ran moderated mediation models (for a graphical representation, see Figure 1, Panel B), adjusting for covariates, to test the alternative hypothesis that PPR moderates the indirect effect of perceived control on health, well-being, and mortality *via* the reduction of affective reactivity to daily stressors.

Analyses revealed that PPR did not moderate the relationship between perceived control and NA reactivity ($\beta = -.01$, $p = .445$, 95% CI = [−.031, .071]), nor PA reactivity ($\beta = -.02$, $p = .354$, 95% CI = [−.085, .030]). Consequently, we did not find a conditional indirect effect of perceived control on (1) health *via* NA reactivity, at low (95% CI [−.000, .021]) or at high (95% CI: [−.001, .020]) levels of PPR, nor *via* PA reactivity, at low (95% CI [−.003, .004]) or at high (95% CI [−.003, .004]) levels of PPR; (2) hedonic well-being *via* NA reactivity, at low (95% CI [−.001, .046]) or at high (95% CI [−.004, .047]) levels of PPR, nor *via* PA reactivity, at low (95% CI [−.001,

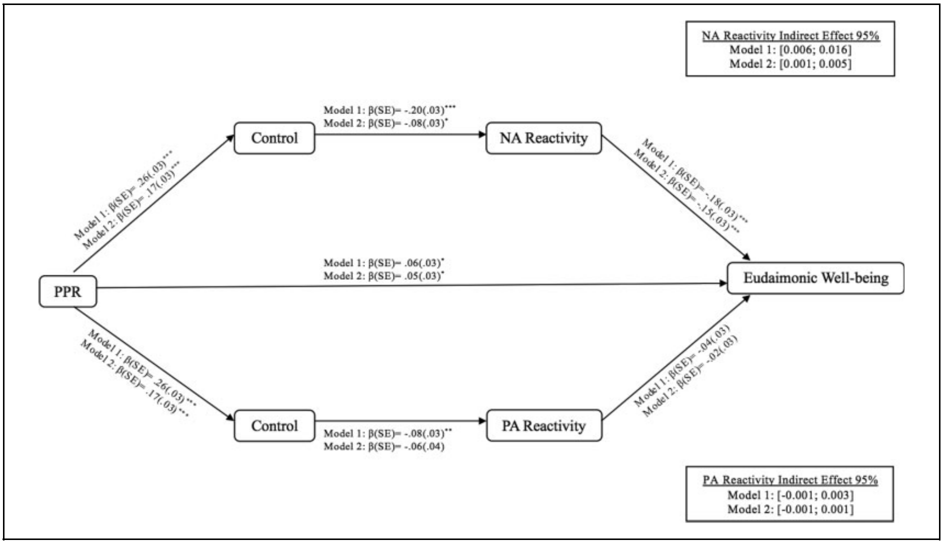

Figure 4. Direct and indirect associations between W1 PPR, W1 perceived control, W2 daily NA and PA reactivity, and W3 eudaimonic well-being. Model 1 = analysis without covariates; Model 2 = analysis adding covariates. In these models, a CI that does not include 0 indicates a statistically meaningful association. $*p < .05$; $**p < .01$; $***p < .001$. $N = 1,186$. *SE* = standard error; PPR = perceived partner responsiveness; W1 = Wave 1; W2 = Wave 2; W3 = Wave 3; PA = positive affect; NA = negative affect.

.011]) or at high (95% CI [−.002, .013]) levels of PPR; (3) eudaimonic well-being *via* NA reactivity, at low (95% CI [−.001, .029]) or at high (95% CI [−.002, .030]) levels of PPR, nor *via* PA reactivity, at low (95% CI [−.001, .006]) or at high (95% CI [−.001, .008]) levels of PPR; and (4) mortality *via* NA reactivity, at low (95% CI [−.109, .001]) or at high (95% CI [−.108, .004]) levels of PPR, nor *via* PA reactivity, at low (95% CI [−.013, .033]) or at high (95% CI [−.014, .035]) levels of PPR.

Taken together, these findings suggest that PPR does not interact with perceived control to predict health and well-being *via* affective reactivity, but rather that greater PPR leads to greater perceived control and, in turn, to better health and well-being *via* decreased negative affect reactivity to daily stressors.

Discussion

Strong social ties are predictive of health and well-being (Holt-Lunstad, Smith, & Layton, 2010) and satisfy affiliation and relatedness needs that are essential to having a happy life (Baumeister & Leary, 1995). There is strong prior evidence that PPR has a positive effect on adult health, well-being, and mortality (Selcuk et al., 2016; Slatcher et al., 2015; Stanton et al., 2019; Tasfiliz et al., 2018). However, identifying the cognitive mechanisms underlying these associations has been elusive (Slatcher & Schoebi, 2017). To address this gap, we tested two competing models in which we assessed whether perceived control helps to explain how a key relationship strength (PPR) leads to reduced

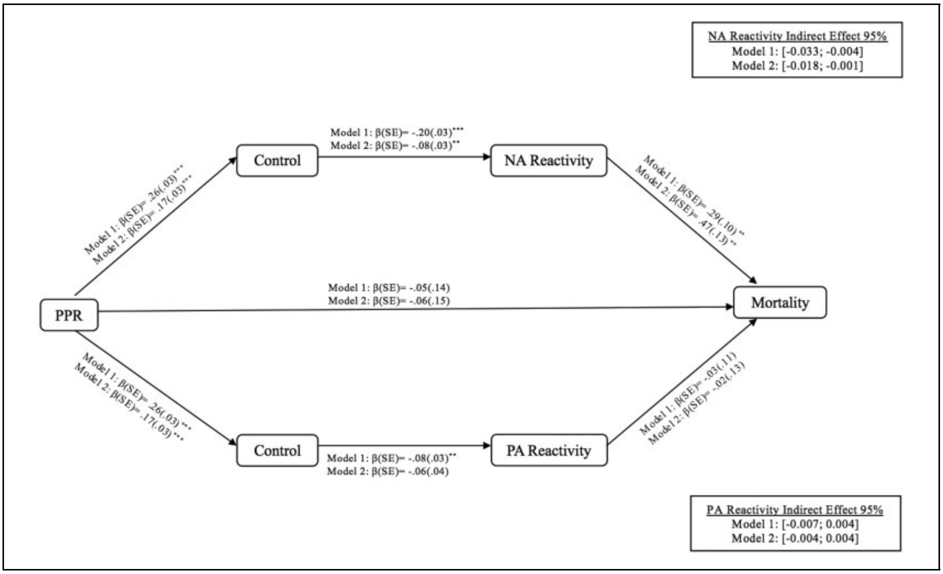

Figure 5. Direct and indirect associations between W1 PPR, W1 perceived control, W2 daily NA and PA reactivity, and W3 mortality. Model 1 = analysis without covariates; Model 2 = analysis adding covariates. In these models, a CI that does not include 0 indicates a statistically meaningful association. *p < .05; **p < .01; ***p < .001. N = 1,186. *SE* = standard error; PPR = perceived partner responsiveness; W1 = Wave 1; W2 = Wave 2; W3 = Wave 3; PA = positive affect; NA = negative affect.

affective reactivity to daily stressors, which ultimately predicts perceived health, well-being, and mortality over a 20-year period. In one set of analyses, we tested whether PPR might buffer the negative effect of lacking perceived control on health and well-being *via* the reduction of emotional reactivity to daily stressors (moderated mediation models); in the other, we tested whether PPR indirectly influences health and well-being *via* an increase of perceived control and the reduction of emotional reactivity to daily stressors (serial mediation models).

In a large sample of adults in committed romantic relationships, we found that PPR did not moderate the relationship between perceived control, PA and NA reactivity and perceived health, well-being, or mortality. Rather, PPR showed a salutary effect on health, well-being, and mortality *via* increasing perceived control and, in turn, down-regulating the NA reactivity to daily stressful experiences. No significant results were found regarding PA reactivity. Note that these findings remained strong even after controlling for potential confounds known to be associated with health and well-being.

The present findings advance our understanding of how a core relationship process—PPR—impacts health and well-being. First, our findings corroborate prior work that has established separate associations between PPR, health, well-being, and mortality using MIDUS data (Selcuk et al., 2016; Stanton et al., 2019). In communal relationships, people want their partners to care about their welfare and non-contingently respond to their needs and goal strivings (Mills & Clark, 2001). The belief that a relationship partner is attentive and behaviorally responsive satisfies expectations for a communal relationship and, moreover, provides core validation of the self, leading to feelings of warmth, intimacy, acceptance, and trust (Laurenceau, Barrett, & Pietromonaco, 1998; Tasfiliz et al., 2018), especially if PPR is sustained across time. That PPR contributes so strongly to adult well-being—often indirectly—provides critical evidence that PPR is a viable organizing principle in the study of relationships (Reis, 2012; Slatcher & Selcuk, 2017).

Second, the most noteworthy finding from this study is the identification of an important cognitive mechanism that drives PPR-affect regulation links—perceived control—to explain the longitudinal effects of romantic relationship processes on a broad array of health and well-being outcomes in a single prospective investigation. Our research extends previous work that has already analyzed the longitudinal association between PPR and mortality *via* affective reactivity in MIDUS (Stanton et al., 2019). Specifically, our results suggest that perceptions of control—influenced by PPR—may help people downregulate their emotional reactivity to daily threatening situations in general, regardless of the positive or negative direction of the emotions, which may help with maintaining physiological homeostasis—associated to a higher health and well-being (Pressman & Cohen, 2005). However, these results suggest, in line with previous findings, the associations between perceived control, affect reactivity, and health and well-being are driven by NA rather than PA reactivity (Drewelies et al., 2018; Hay & Diehl, 2010; Neupert, Almeida, & Charles, 2007). A possible explanation for PA's lack of effect on health and well-being comes from the type of the events, mainly negative and associated with NA (e.g., daily conflicts, perceived discrimination, etc.), from which affective reactivity was calculated. It would be interesting to test whether the same patterns would be found when people face *positive* daily situations (e.g., success at work, exciting good news, etc.).

Another contribution of the current work is that by testing two theoretically plausible models (mediation model vs. moderation model), we were able to identify the specific way in which PPR and perceived control predict health and well-being through affective reactivity. Specifically, PPR appears to encourage a sense of control and mastery, rather than buffer stress generated by lack of control. These findings support the idea that perceptions of belonging, validation, and care in one's personal relationships may serve as a source for developing efficacy in daily pursuits. Indeed, several theoretical and empirical findings suggest this possibility. First, the attachment perspective (Feeney, 2004; Simpson & Overall, 2014) argues that a secure model of the self is fostered when one feels accepted, valued, and validated by an attachment figure (e.g., a romantic partner in adulthood) that is responsive to one's needs (Collins, Ford, Guichard, & Allard, 2006; Reis, 2012). This view is supported by a series of empirical findings which shows that, when partners serve as a secure base, individuals display lower perceptions of stress and vigilance during laboratory-staged stressors (Kane, McCall, Collins, & Blasovich, 2012), and higher self-efficacy in daily goal pursuit (Feeney, 2004). Second, self-affirmation theory states that other positive feedback and validation reinforce the individual's self as competent and capable of controlling outcomes, which help people to respond in an adaptive manner (Steele, 1988). Specifically, Baumeister, Vohs, and Tice (2007) argued that other's self-affirmation—similar to PPR—boosts perceived control as self-resource, which consequently has wide-ranging implications for outcomes, such as the reduction of daily physiological stress, which can facilitate longer term health goals. Finally, recent perspectives from the self-regulation literature also emphasize the idea that one's romantic partner serves as a key resource for improving one's well-being (Fitzsimons, Finkel, & Vandellen, 2015) and that positive aspects of romantic relationships can promote successful goal pursuit by increasing perceptions of control (Hofmann, Finkel, & Fitzsimons, 2015). Accordingly, our findings suggest that PPR should act to foster security when it cultivates a greater sense of capability and control to pursue personally meaningful goals which, ultimately, fosters positive personal outcomes.

Identifying cognitive mechanisms underlying the links between romantic relationships, health, and well-being has been challenging. However, in our view, increased efforts in this line of work are necessary to better understand these processes. While in the present research we have focused on control attributions, there are many other cognitive mechanisms known to be shaped by relationship functioning that need future attention. According to Farrell and Stanton (2019), a promising cognitive pathway is through intervening to modify insecure attachment orientations. Attachment orientations constitute internal working models about the self that may guide insecure and stressed people's cognitions, emotions, and, moreover, how they cope with their daily life. Based on the Attachment Security Enhancement Model (Arriaga, Kumashiro, Simpson, & Overall, 2018), we suggest that PPR—comprised by tailored responses to address anxious or avoidant thoughts and feelings—may encourage insecure individuals and foster a sense of security for them which, *via* enhanced self-efficacy, may improve their well-being and health (Mikulincer, Shaver, Bar-On, & Sahdra, 2014). However, future research is needed to test this idea by more directly connecting PPR and attachment processes in studies of links among PPR, health, and well-being. Additionally, future studies should analyze how implicit theories about the malleability of control could be incorporated in the previous processes. The study of the diverse cognitive (e.g., control, attachment orientations, attributions, etc.) and emotional mechanisms (e.g., emotional regulation) may, ultimately, facilitate the design of interventions to improve relationships as a pathway to better well-being and health (Williamson, Altman, Hsueh, & Bradbury, 2016).

Before concluding, limitations of the current research should be noted. These data are correlational, so the direction of the associations between PPR and perceived control cannot be claimed with certainty. However, to address this issue, we tested reverse models in which perceived control served as the predictor of PPR. Given that these additional analyses were not significant, as well as the fact that PPR was assessed 10 years and 20 years, respectively, before both the mediating and outcome variables, and that we controlled for many possible confounds, the findings from this study provide strong empirical support for our serial mediation model (Figure 1, Panel A). A second limitation of the current study involves the generalizability of the findings, given that the MIDUS sample includes (1) primarily White and (2) healthy individuals with (3) high socioeconomic status. Previous studies have already established that, when facing challenges outside of their marriages (e.g., problems related to income and employment), even couples with adequate coping skills may have difficulty exercising those skills effectively (Karney & Bradbury, 2005). These stressful situations may have a high impact on relationship processes and may even undermine the many benefits that intimacy processes (e.g., PPR) provide. Therefore, future studies would benefit not only from replicating these findings in a more socioeconomically diverse sample but also by capturing the dyadic properties of actual interactions besides the individual's motivated construal of those interactions.

Finally, the proportion of mortality in the sample and the sizes of indirect associations between PPR and health or well-being are small. However, they are comparable to those reported in previous studies and thus, a potential limitation of any study including health outcomes (Robles, Slatcher, Trombello, & McGinn, 2014; Stanton et al., 2019). Despite these limitations, we should highlight that, although small, these associations are still meaningful because PPR exerts its effect daily so this small repeated exposure, controlled by a wide array of covariates, may lead to important long-term consequences (Selcuk et al., 2016). Furthermore, the large sample size of MIDUS, with data across three waves over a 20-year period, including in a single prospective investigation-intensive daily diary measures, self-reported health and well-being, and mortality are important strengths of this study.

In sum, PPR is a key process involved in the promotion of secure relationships. The present findings introduce a cognitive mechanism—perceived control— that increases our understanding of how PPR may help boost salutary health and well-being outcomes. We expect that this research will open up interesting avenues for future work on the psychological mechanisms—both cognitive and emotional—that emerge from close relationships, and the ways in which they can help people to achieve long-term well-being and health.

Declaration of conflicting interests

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Open research statement

As part of IARR's encouragement of open research practices, the author(s) have provided the following information: This research was not pre-registered. The data used in the research are available. The data can be obtained at: https://osf.io/urh2k/?view_only=eff525721cad40c098c80e29355c5f9f or by emailing: maalfe@ugr.es. The materials used in the research are available. The materials can be obtained at: http://midus.wisc.edu/index.php or by emailing: maalfe@ugr.es.

Notes

1. Covariates included demographics, personality, relational, health, and positive affect reactivity when testing negative affect reactivity as mediator, and *vice versa* when testing PA reactivity.
2. We also explored indirect effects of Wave 1 (W1) perceived partner responsiveness (PPR) in the outcomes through Wave 2 (W2) perceived control, W2 daily NA and PA reactivity and Wave 3 (W3) outcomes. Mediation models with perceived control and PA reactivity were not significant for 95% CI perceived health [−.001, .001], hedonic well-being [−.001, .001], eudaimonic well-being [−.001, .001], and mortality [−.003, .004]. However, there was a significant indirect association between W1 PPR and W3 perceived health (95% CI [.001, .005]), hedonic well-being (95% CI [.003, .012]), eudaimonic well-being (95% CI [.001, .005]), and mortality (95% CI [−.029, −.003]) through W2 perceived control and W2 daily NA reactivity; thus, the serial mediation findings reported in the results held whether perceived control was assessed at W1 or W2.
3. Because PPR can change longitudinally, to clarify whether PPR is sustained across time and therefore more likely to produce the proposed benefit, we calculated a residualized change score to represent the change in W1–W2 PPR over the decade by regressing W2 PPR on W1 PPR. Finally, we tested the effect of W1–W2 PPR change in the outcomes through W2 Perceived Control, W2 daily NA and PA reactivity and W3 outcomes. Mediation models with perceived control and PA reactivity were not significant for 95% CI: perceived health [−.001, . 001]), hedonic well-being [−.001, .002], eudaimonic well-being [−.001, .001], and mortality [−.004, .004]. However, analyses revealed a significant and stronger indirect association between W1–W2 PPR (compared to absolute levels of PPR) and W3 perceived health (95% CI [.001, .005]), hedonic well-being (95% CI [.004, .012]), eudaimonic well-being (95% CI [.001, .006]), and mortality (95% CI [−.032, −.003]) through W2 perceived control and W2 daily NA reactivity.

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