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EMPIRICAL ARTICLE

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Are moderate levels of stress particularly dangerous for relationship satisfaction? A conceptual replication of Tesser and Beach (1998)

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Abstract

The well-documented negative impact of daily stressors on relational well-being, juxtaposed with emerging evidence indicating that major stressors can have a positive impact on relational well-being, suggests that the association between stress and relational well-being may not be monotonic. Tesser and Beach originally raised this possibility in a 1998 study in which they found that the association between stress and individual well-being was linear, whereas the association with relational well-being was non-linear. The current study sought to conceptually replicate this study within the context of the COVID-19 pandemic by examining associations between stress and individual versus relational well-being, using a sample of 654 individuals who were in a committed relationship in the early weeks of the pandemic. Results were somewhat consistent with those of the original study: the association between stress and depression was linear, but the association between stress and relationship satisfaction was non-linear. However, the form of the association between stress and relationship satisfaction was different than observed in the original study. These results point toward the need to better understand how the severity of a stressor impacts relational outcomes, including the characteristics of stress that lead to stress spillover and the circumstances under which relational outcomes are resilient to high levels of stress.

KEYWORDS
couples, depression, stress, relationship satisfaction, COVID-19

1 | INTRODUCTION

Understanding the impact of external stress on intimate relationships has been of longstanding interest, with stress playing a central role in prominent theories of relationship functioning (e.g., VSA: Karney & Bradbury, 1995; ABC-X: McCubbin & Patterson, 1983). A great deal of research has demonstrated that external stressors can spill over to negatively affect relational processes and outcomes, but this research has been conducted almost exclusively in the context of minor stressors and daily hassles, such as getting stuck in traffic or having an unpleasant interaction with a coworker (Randall & Bodenmann, 2017). However, new research focusing on severe stressors has identified positive relational outcomes for couples who experience a major stressor. For example, couples who lived through a major hurricane experienced increases in their relationship satisfaction from before to after the hurricane (Williamson et al., 2021) and couples dealing with frequent racial discrimination behaved more supportively toward each other over a 2-year period (Clavél et al., 2017). The well-documented negative impact of more mundane daily stressors, juxtaposed with emerging evidence for the positive impact of major or severe stressors, suggests the intriguing possibility that the association between stress and relational well-being is not linear.

In fact, Tesser and Beach (1998) raised this possibility 25 years ago, theorizing that the way that stress impacts relational well-being differs in nature from the impact of stress on other areas of life, such as individual well-being. For example, in the domain of individual well-being, stress has a straightforward association with mood, such that higher levels of stress are associated with an increase in depressive symptoms (Hammen, 2005). However, Tesser and Beach hypothesized a unique pattern of association between stress and relational well-being: at low to moderate levels there is a negative impact of stress on relational well-being because the individual is not aware of the impact of the stressor, but when the stressor grows severe enough to reach conscious awareness then the impact on relational well-being becomes attenuated rather than continuing to increase. In an empirical test of this idea, Tesser and Beach indeed found that the association between stress and depression was positive and monotonic, whereas the association with relationship satisfaction was nonlinear.

In order to reconcile the emerging evidence about differential impacts of minor versus major stressors on relationships, and resurface within the literature the idea that moderate levels of stress may be most likely to spill over and damage the relationship, the current study seeks to conceptually replicate the Tesser and Beach (1998) study. Specifically, we examine associations between stress and individual versus relational well-being within the context of the COVID-19 pandemic, using a sample of 654 individuals who were in a committed relationship in the early weeks of the pandemic. The COVID-19 pandemic provides the ideal setting to test this idea because although all individuals experienced the stressor, the level of perceived stress generated by the pandemic differed across individuals (Liu et al., 2022).

2 | METHOD

2.1 | Participants and procedure

The sample was comprised of N = 654 individuals recruited using the online research platform Prolific (www.prolific.co). Inclusion criteria were: currently in a romantic relationship, residing in the United States, and age 18 or over. Data collection occurred on April 26–29, 2020, during the early weeks of the COVID-19 pandemic. The study took 10 min on average to complete, and participants were paid $2.00. The study was approved by the University of Texas

at Austin Institutional Review Board. This sample has been described previously in Williamson (2020) and sample demographic characteristics are provided in Table 1.

2.2 | Measures

Relationship Satisfaction: Global sentiment towards the relationship was measured with the four-item version of the Couples Satisfaction Index (CSI-4; Funk & Rogge, 2007). The items assessed global satisfaction (e.g., "I have a warm and comfortable relationship with my partner") and were rated on a 6-point scale (with the exception of one item that is rated on a 7-point scale) with higher scores indicating higher levels of satisfaction. Items were summed to form the scale score, with a possible range of 0–25. Cronbach's alpha was 0.95.

Pandemic Stress: The level of pandemic-induced stress was measured with a single item. Participants were asked "Taking everything into consideration, how stressful overall would you say your experience with the coronavirus pandemic has been on a scale of 0–10, where 0 means not at all stressful and 10 means the most stressful thing you can imagine? You can use any number between 0–10."

Depression: Levels of depressive symptoms were measured with the Patient Health Questionnaire (PHQ-2; Kroenke et al., 2003). Participants were asked "Over the past 2 weeks, how often have you been bothered by any of the following problems?" followed by the items "Little interest or pleasure in doing things" and "Feeling down, depressed or hopeless." Response options were 0 = *Not at all*, 1 = *Several days*, 2 = *More than half the days*, 3 = *Nearly every day*. Items were summed to form the scale score, with a possible range of 0–6. Cronbach's alpha was 0.81.

3 | RESULTS

3.1 | Descriptive statistics

There was a broad range of relationship functioning, as expected from a large, socioeconomically diverse, community sample of couples across relationship stages (M = 15.3, SD = 4.5). Levels of stress generated by the pandemic were moderate on average, but varied across the sample (M = 5.6, SD = 2.2). Finally, average levels of depression were generally low (M = 1.6, SD = 1.5).

3.2 | Association between pandemic stress and relational well-being

We first set out to replicate the approach taken by Tesser and Beach, by plotting the mean of relationship satisfaction at each level of stress and visually examining the pattern (see Figure 1 Panel A) to see if it matched their hypothesis that "with increasing negative life events, judged satisfaction with relationships will first decrease then jump to a more positive level followed by a final decrease" (p. 48). The pattern does not match this description, but does show a non-linear association.

Next, we tried to understand the underlying function of the association between stress and relationship satisfaction using more modern statistical models. Given that Tesser and Beach theorized that there are points of discontinuity in the association between stress and relationship satisfaction, we began by fitting a piecewise model. As seen in Figure 1 Panel A, there appear to be points of discontinuity at which judgments of relationship satisfaction change direction from decreasing to increasing at scores of three and eight on pandemic stress. Thus, we first tested a model with three splines (0–3, 4–8, and 9–10) and jumps at 3 and 8. Results of this model (Table 2, Model 1) indicated that the jumps were not significant, which means that there was no change in intercept at each of the knots. We next fitted a model with the same three splines, but no jumps at the knots. Results of this model (Table 2, Model 2)

TABLE 1 Demographic characteristics of participants.

Variable	Mean or Proportion
Gender	
Female	60%
Male	38.5%
Other (including nonbinary and transgender)	1.5%
Gender of partner	
Different gender	92%
Same gender	8%
Age (years)	*M* = 40.3 (SD = 13.2), range = 23–79
Relationship status	
Married	64%
Engaged	7%
Dating	30%
Cohabitation status	
Living together	89%
Not living together	9%
Living together because of the pandemic	2%
Relationship length (years)	*M* = 13 (SD = 11), range = 0–50
Children under 18 in the home	41%
Number of children	*M* = 1.79 (SD = 0.84), range = 1–5
Age of youngest child (years)	*M* = 6.5 (SD = 4.9), range = 0–17
Race/ethnicity	
American Indian/Alaskan native	<1%
Asian/Asian American	4%
Black/African American	5%
Hispanic/Latino	5%
Mixed race/ethnicity	3%
Native Hawaiian/Pacific Islander	<1%
Other	<1%
White	82%
Education	
High school degree or less	9%
Some college or associate's degree	30%
Bachelor's degree	36%
Graduate degree	25%
Annual household income	
< $20,000	10%
$20,000-$40,000	23%
$40,000–$60,000	20%
$60,000–$80,000	15%
$80,000–100,000	12%
>$100,000	20%

TABLE 1 (Continued)

Variable	Mean or Proportion
Employment status	
Employed and still working at their workplace	25%
Employed but working from home because of the pandemic	38%
Unemployed prior to the pandemic	23%
Unemployed because of the pandemic	12%
Student	3%

Note: $N = 654$

TABLE 2 Results of piecewise models of the association between pandemic stress and relationship satisfaction.

	Model 1			Model 2			Model 3		
	b	*p*	95% CI	*b*	*p*	95% CI	*b*	*p*	95% CI
Spline 1	−0.51	0.557	−2.21, 1.19	0.52	0.207	−1.32, 0.29	−0.15	0.099	−0.32, 0.03
Knot 1	−0.04	0.979	−2.97, 2.89	---	---	---	---	---	---
Spline 2	−0.06	0.675	−0.36, 0.24	−0.08	0.473	−0.31, 0.15	1.22	0.011	0.28, 2.15
Knot 2	−0.14	0.836	−1.42, 1.15	---	---	---	---	---	---
Spline 3	1.19	0.023	0.17, 2.22	1.15	0.017	0.21, 2.09	---	---	---
Constant	16.93	<0.001	14.14, 19.71	16.93	<0.001	14.81, 19.06	16.06	<0.001	15.04, 17.08
Adjusted *R*2	0.005			0.008			0.008		
RMSE	4.533			4.526			4.525		
AIC	3803.569			3799.612			3798.46		
BIC	3830.412			3817.508			3811.881		

Note: $N = 654$.

Abbreviations: AIC, Akaike Information Criterion; BIC, Bayesian Information Criterion; RMSE, Root Mean Square Error.

indicated that the slopes of the first two splines were not significantly different from zero, and the slope of the third spline was significant and positive. We tested whether the slopes of the first two splines were significantly different from each other, and found that they did not differ ($F(1, 644) = 0.84$, $p = 0.359$) which indicates that these two sections should be combined into a single spline. Thus, we next fitted a model with only two splines (0–8 and 9–10). Results of this model (Table 2, Model 3) indicated that relationship satisfaction does not change as pandemic stress increases from 0 to 8, but satisfaction begins to increase as stress increases from 8 to 10.

As seen in Figure 1 Panel B, the final piecewise model may not be a good fit for the most extreme values of stress. In particular, the mean level of relationship satisfaction at stress scores of 0 and 9 fall outside of the 95% CI of the piecewise model. Thus, we next tested whether a quadratic model would better capture the association between stress and relationship satisfaction. There was a significant quadratic association between pandemic stress and relationship satisfaction (see Table 3), with a vertex at a stress score of 5.6[1]. A test for the presence of a U-shaped effect was significant ($t = 1.87$, $p = 0.031$; Lind & Mehlum, 2010) and the slopes of the lower and upper portions of the curve were significant (lower slope = −0.71, $t = -2.12$, $p = 0.017$; upper slope = 0.56, $t = 1.86$, $p = 0.031$). However, the quadratic model still did not appear to be the best fit, with multiple means falling outside the 95% CI (see Figure 1 Panel C).

Finally, we tested whether a fractional polynomial model, which provides a more flexible range of functional forms than a quadratic model (Royston, 2017; Royston & Altman, 1994), would better capture the association between relationship satisfaction and stress. Results indicate that a model of the form (3, 3) was the best fit for the

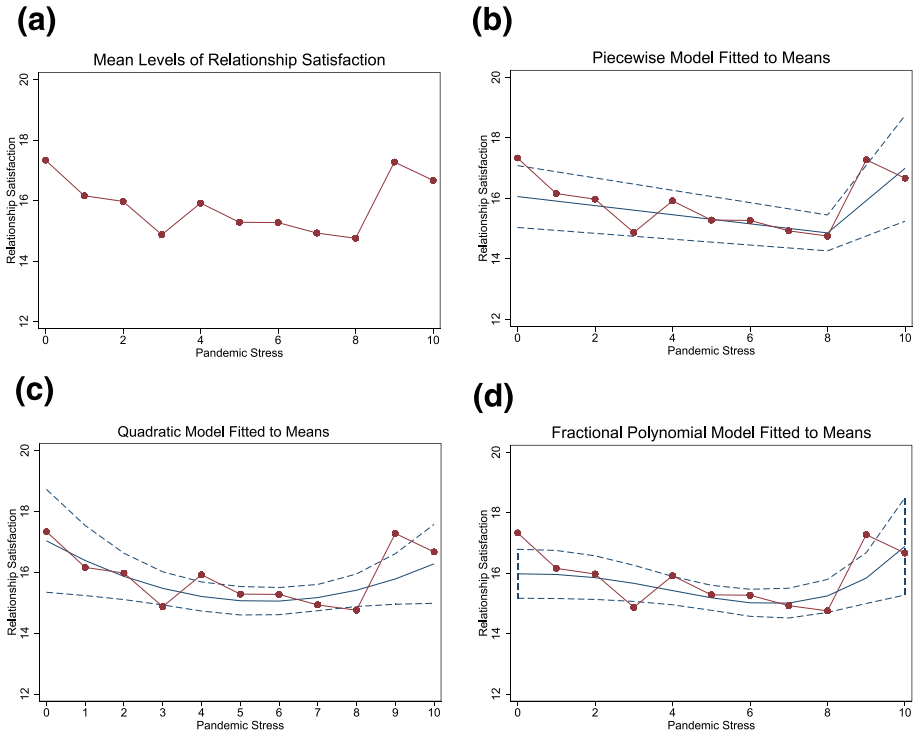

FIGURE 1 Graphs of the tested models. Dashed lines represent 95% confidence intervals.

TABLE 3 Results of quadratic and fractional polynomial models of the association between pandemic stress and relationship satisfaction.

	Quadratic model			Fractional polynomial model			
Coefficient	***b***	***p***	**95% CI**	**Coefficient**	***b***	***p***	**95% CI**
Linear term	−0.71	0.034	−1.37, −0.05	β_1 (X^3)	−0.02	0.026	−0.04, −0.01
Quadratic term	0.06	0.039	0.003, 0.124	β_2 (X^3)	0.01	0.024	0.01, 0.02
Constant	17.03	<0.001	15.34, 18.72	Constant	15.98	<0.001	15.17, 16.79
Adjusted R^2	0.004				0.005		
RMSE	4.535				4.532		
AIC	3801.335				3800.489		
BIC	3814.757				3813.911		

Note: $N = 654$.

Abbreviations: AIC, Akaike Information Criterion; BIC, Bayesian Information Criterion; RMSE, Root Mean Square Error.

data (see Table 3), which means that the association takes the form of two cubic functions (i.e., $y = \beta_0 + \beta_1 (X^3) + \beta 2 (X^3)$; see Figure 1 Panel D).

Comparing the fit statistics of the three models (Tables 2 and 3) indicates that the fit of all models was very similar across AIC, BIC, RMSE and adjusted R^2. None of the models supported the pattern described by Tesser and Beach of a decrease followed by a jump to a more positive level followed by a final decrease. All models did indicate significant nonlinearity in the association between stress and relationship satisfaction, but the pattern was one of decreasing satisfaction until a moderate point of stress, following by increasing satisfaction at higher levels of stress.

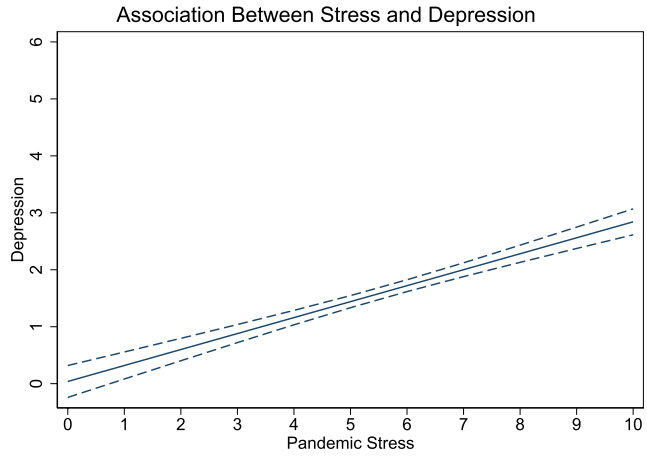

FIGURE 2 Linear regression model of the association between pandemic stress and depression. Dashed lines represent 95% confidence intervals.

3.3 | Association between pandemic stress and individual well-being

There was a significant linear association between stress and depression, such that participants who reported higher levels of pandemic stress also reported higher levels of depression ($\beta = 0.28$, SE = 0.02, $p < 0.001$, $\eta^2 = 0.18$), consistent with the original result of Tesser and Beach (see Figure 2). A test for a quadratic association between stress and depression was not significant ($\beta = 0.002$, SE = 0.009, $p = 0.843$).

4 | DISCUSSION

The impact of external stress on romantic relationships is typically conceptualized as being purely adverse; for example, stress is said to erode the time partners spend together, decrease effective communication, and lead to deterioration in relationship satisfaction (Neff & Karney, 2017). However, in a 1998 study, Tesser and Beach theorized that this monotonic impact of stress may be true for individual well-being, but it is not true of the way that stress impacts relational well-being. They hypothesized that stress and relationship satisfaction have a non-linear association, with moderate levels of stress being particularly dangerous for relationship well-being. The current study sought to conceptually replicate these findings within the context of the COVID-19 pandemic. Results were fairly consistent with those of the original study: the association between stress and depression was linear, but the association between stress and relationship satisfaction was non-linear, with the lowest levels of satisfaction occurring at moderate levels of stress.

However, one important difference from the original study is that Tesser and Beach found that relationship satisfaction turns downward again at the highest levels of stress (scores of 9 and 10 on a 10-point scale). Their results appear visually like a cubic function (though they did not explicitly test the form of the function), whereas the current study found only a quadratic association, with high levels of stress being associated with high levels of relationship satisfaction. It is possible that the different nature of the stressors examined in the two studies could explain the different effect observed at high levels of stress. The COVID-19 pandemic was experienced as a collective societal event whereas the stressors measured in the original study were idiosyncratic to each couple. Collective traumas are known to foster greater closeness between individuals who experience them together (Bonanno et al., 2010) and attachment theory indicates that people should be drawn toward their loved ones during times of crisis (Hazan & Shaver, 1994). Thus it is possible that individuals who were experiencing high levels of stress from the pandemic had increased feelings of closeness and gratitude for having a partner to deal with this extremely stressful event.

Another possible explanation is a difference in the salience of the stressors. In the early weeks of the pandemic, COVID-19 had permeated every aspect of daily life, possibly rendering it as more salient than the personal stressors measured in the original study. Tesser and Beach theorized that when stress is less salient it is most able to spill over to the relationship. Though the current study was unable to directly test whether the salience of the stressor explains its effect on relational well-being, a recent study of couples during the first year of the pandemic generally supports this interpretation: women who blamed the pandemic for their current stressors/problems exhibited reduced stress spillover (Neff et al., 2022). Other research has also found that stressors that are highly salient, affect large numbers of people, and are relatively uncontrollable, allow individuals to more easily attribute their problems to the stressful circumstances rather than their relationship (Clavél et al., 2017; Diamond & Hicks, 2012). Thus, the improved ability to recognize stress spillover may be a protective factor that can develop in the face of major stressors, rendering relationships more resilient to the harmful effects of the stress that accompanies major stressors.

Overall, the current study highlights the potential of moderate levels of stress to negatively impact relationships and points toward the need to better understand the impact of severe stress on relationships. More research into the nuances of the characteristics and circumstances under which stress spillover occurs is needed in order to help couples successfully deal with the external stressors that they encounter throughout life.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflict of interests to declare.

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ENDNOTE

[1] To calculate the minimum value, the following formula was used: $-b/2a$, where $-b$ is the coefficient for the linear term and a is the coefficient for the quadratic term (Li, 2004).

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