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Social Psychological and Personality Science published online 13 October 2010

DOI: 10.1177/1948550610387162

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Social Psychological and
Personality Science
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DOI: 10.1177/1948550610387162
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V. Michelle Russell¹ and James K. McNulty¹

Abstract

A robust literature indicates that neuroticism has numerous negative implications for romantic relationships. But are there factors that can protect intimates from such implications? Given that negative affect accounts for part of the association between neuroticism and relationship distress, and given that the positive affect associated with sex may negate that negative affect, the authors predicted that sexual frequency would moderate the association between neuroticism and relationship satisfaction. A total of 72 newlywed couples reported their marital satisfaction and sexual frequency up to seven times over the first 4 years of marriage. Consistent with predictions, a lagged multilevel analysis revealed that although neuroticism was negatively associated with marital satisfaction on average, it was unrelated to marital satisfaction when couples had engaged in relatively frequent sex over the past 6 months. These findings join others in highlighting the importance of attending to the broader context of the relationship to developing a complete understanding of relationships.

Keywords

sex, neuroticism, marriage, longitudinal, personality

For intimates who are high in neuroticism, maintaining a satisfying intimate relationship can be difficult. A consistent body of research documents that neuroticism is associated with numerous negative interpersonal outcomes, such as more negative interpersonal perceptions and experiences (Caughlin, Huston, & Houts, 2000; McNulty, 2008b), lower levels of relationship satisfaction (Bouchard, Lussier, & Sabourin, 1999; Caughlin et al., 2000; Donnellan, Conger, & Bryant, 2004; Fisher & McNulty, 2008; Karney & Bradbury, 1997; Rogge, Bradbury, Hahlweg, Engl, & Thurmaier, 2006; Russell & Wells, 1994), lower levels of sexual satisfaction (Costa, Fagan, Piedmont, Ponticas, & Wise, 1992; Fisher & McNulty, 2008; Goldenberg, Pyszczynski, McCoy, Greenberg, & Solomon, 1999; Heaven, Fitzpatrick, Craig, Kelly, & Sebar, 2000; Schenk & Pfrang, 1986), and a greater likelihood of divorce (Jockin, McGue, & Lykken, 1996; Kelly & Conley, 1987; Kurdek, 1993; Rogge et al., 2006). Such effects are so strong and consistent, in fact, that neuroticism appears to be more strongly associated with marital outcomes than any other personality factor (Karney & Bradbury, 1995).

Yet despite the strength and consistency of such associations, they are not perfect, suggesting that some intimates remain satisfied in their relationships despite high levels of neuroticism. Nevertheless, we are aware of no studies that provide evidence of any factors that may protect intimates from the negative implications of their neuroticism. The current study attempted to provide such information by testing the role of one potential moderator in buffering intimates against the negative implications of neuroticism—frequent sex.

Neuroticism, Negative Affect, and the Buffering Role of Frequent Sex

According to Costa and McCrae (1992), neuroticism is “a general tendency to experience negative affects” (p. 14). There is a theoretical reason to believe that such negative affect explains at least part of the association between neuroticism and negative relationship outcomes. According to the affect infusion model (Forgas, 1995), affect shapes people’s judgments of their experiences, such that positive affect leads to more positive evaluations whereas negative affect leads to more negative evaluations. Indeed, not only does existing research indicate that affect shapes relationship satisfaction in such ways (Forgas, Levinger, & Moylan, 1994), but several studies demonstrate that negative affect accounts for at least part of the robust negative association between neuroticism and negative interpersonal outcomes (Caughlin et al., 2000; Jones, 2004).

Given the role of negative affect in the association between neuroticism and negative interpersonal outcomes, any factor that promotes positive affect, or otherwise negates negative

¹University of Tennessee, Knoxville, TN, USA

Corresponding Author:

V. Michelle Russell, University of Tennessee, Department of Psychology, 1404 Circle Drive, Austin Peay Building, Knoxville, TN 37996
Email: vrussell@utk.edu

affect, may protect intimates against the negative implications of neuroticism. Accordingly, there is a theoretical reason to believe sex may be one such factor. Specifically, evolutionary perspectives suggest that people evolved to experience positive affect in contexts that promote reproductive fitness (see Nesse & Ellsworth, 2009). Given the direct link between sexual intercourse and reproduction, it makes sense that people would have evolved a tendency to experience positive affect in contexts associated with frequent sex.

Several studies support this possibility. For example, several studies indicate that sex is associated with the release of oxytocin (Carmichael et al., 1987) and endogenous opioids (Sbarra & Hazan, 2008), chemicals associated with less negative affect and more positive affect (Koepp et al., 2009; Scantamburlo et al., 2007). Moreover, other studies have directly linked sex to more positive and less negative affect (Blanchflower & Oswald, 2004; Burleson, Trevathan, & Todd, 2007; Gallup, Burch, & Platek, 2002; Laumann, Michaels, Gagnon, & Michaels, 1994). In a daily diary study (Burleson et al., 2007), for example, sexual behaviors on one day predicted less negative mood the next day.

Overview of the Current Study

Given evidence that negative affect accounts for part of the association between neuroticism and relationship distress, and given evidence that sex promotes positive affect that may negate such negative affect, the current study used data from a longitudinal study of 72 newlywed couples to examine whether sexual frequency moderates the association between neuroticism and marital satisfaction. At baseline, all spouses reported their levels of neuroticism, the frequency with which they had engaged in sex over the past 6 months, and their marital satisfaction. Then, all spouses reported their marital satisfaction and sexual frequency again approximately every 6 months for approximately 4 years. Although we expected neuroticism to be associated with lower levels of relationship satisfaction over the course of the study on average, we predicted that association would be moderated by the frequency with which couples engaged in sex, such that neuroticism would be less strongly negatively associated with marital satisfaction at times when couples reported having engaged in more frequent sex over the past 6 months compared to times when couples reported having engaged in less frequent sex over the past 6 months.

Method

Participants

Participants were 72 newlywed couples married for less than 6 months ($M = 3.2$, $SD = 1.6$).¹ All participants were recruited from communities in and around north-central Ohio using advertisements in community newspapers and bridal shops and through letters sent to couples who had applied for marriage licenses in nearby counties. Responding couples were screened via a telephone interview to determine eligibility according to

the following criteria important to the broader aims of the study: (a) this was the first marriage for each partner, (b) the couple had been married fewer than 6 months, (c) each partner was at least 18 years of age, (d) each partner spoke English and had completed at least 10 years of education (to ensure comprehension of the questionnaires), and (e) the couple had no immediate plans to move out of the area.

At baseline, husbands were 24.9 years old ($SD = 4.4$) on average and had completed 14.2 years ($SD = 2.5$) of education; 74% were employed full-time and 11% were full-time students. Of the husbands, 93% were Caucasian, 4% were African American, and 3% identified as Other. Wives were 23.5 years old ($SD = 3.8$) on average and had completed 14.7 years ($SD = 2.2$) of education; 49% were employed full-time and 26% were full-time students. Of the wives, 96% were Caucasian and 4% were African American. The average combined income of the couples was less than \$35,000 per year.

Procedure

Participants were mailed a packet of questionnaires to complete at home and bring with them to a laboratory session where they completed a consent form approved by the local human participants review board and participated in a variety of tasks beyond the scope of the current analyses. The packet contained self-report measures of neuroticism, sexual frequency, and marital satisfaction and a letter instructing couples to complete their questionnaires independently of one another. Every 6 to 8 months subsequent to the initial assessment, participants were again mailed a packet of questionnaires that contained the same measures of sexual frequency and marital satisfaction. Participants were paid \$80 for participating in the first phase of data collection and \$50 for participating in each of the subsequent phases. Although the study included an eighth and final wave of data collection, sexual frequency was not assessed at that wave. Thus, the current analyses are based on up to seven reports spanning the first 4 years of marriage.

Measures

Neuroticism. The Neuroticism subscale of the Big Five Personality Inventory (Goldberg, 1999) was used to assess neuroticism at baseline. This instrument consists of 10 questions to which participants respond, indicating the extent of their agreement on a scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), with higher scores indicating a greater degree of neuroticism. Sample items include “I get upset easily” and “I change my mood a lot.” Internal consistency was high (coefficient alpha was .90 for husbands and .88 for wives).

Sexual frequency. Sexual frequency was estimated with the average of two items at every wave of data collection. Specifically, both members of the couple were asked to provide a numerical estimate of the number of times they had engaged in sexual intercourse with their spouse over the past 6 months. Husbands’ and wives’ reports of sexual frequency were

consistently significantly positively correlated with one another (r s ranged from .30 to .69, weighted average $r = .58$) and did not differ from one another systematically (t s ranged from -1.09 , ns , to -1.52 , ns). Mean absolute values of discrepancies in partners' reports ranged from 15.20 to 23.91 instances of sexual intercourse.

Marital satisfaction. Global marital satisfaction was assessed using the Quality Marriage Index (Norton, 1983). This instrument contains six items that ask spouses to report the extent of their agreement with general statements about their marriage. Sample items include "We have a good marriage" and "My relationship with my partner makes me happy." Five items ask participants to respond according to a 7-point scale, whereas one item asks participants to respond according to a 10-point scale. Thus, scores could range from 6 to 45, with higher scores reflecting more marital satisfaction. Internal consistency was high (across assessments, husbands' and wives' alpha was at least .90).

Quality of nonsexual aspects of the marriage. Because the quality of other, nonsexual aspects of the relationship may account for any associations that emerge between sexual frequency and relationship satisfaction, we assessed and controlled for participants' reports of the quality of 18 nonsexual domains of their relationships at every time point using a modified version of the Inventory of Marital Problems (Geiss & O'Leary, 1981). This version lists 18 nonsexual domains of a relationship (e.g., showing affection, trust, communication) and asks participants to rate each item on a scale from 1 (*not a problem*) to 11 (*major problem*). Spouses' ratings of all items were reversed and averaged to form an index of average nonsexual relationship quality that could range from 1 to 11, where higher scores reflected higher levels of nonsexual marital quality.

Attachment security. Given that previous analyses of the baseline data obtained from this sample demonstrated that sexual frequency moderated the effects of attachment insecurity on marital satisfaction (see Little, McNulty, & Russell, 2010), we assessed attachment insecurity at baseline using the Experiences in Close Relationships scale (ECR; Brennan, Clark, & Shaver, 1998) and controlled for the extent to which attachment anxiety and attachment avoidance, as well as the Attachment Anxiety \times Sexual Frequency and Attachment Avoidance \times Sexual Frequency interactions, accounted for marital satisfaction. The ECR measures attachment on two dimensions: Attachment Avoidance and Attachment Anxiety. The Anxiety subscale is derived from 18 statements that describe the degree of concern partners have about losing a partner or frustration over an inability to become sufficiently close to a partner, and the Avoidance subscale is derived from 18 statements that describe the extent to which partners attempt to maintain a distance from a partner. Participants were asked to rate how much they agreed or disagreed with these statements on a 7-point Likert-type scale (1 = *disagree strongly*, 7 = *agree strongly*). Means were formed with higher scores indicating more

attachment insecurity. Internal consistency was high for both husbands' and wives' anxiety and avoidance (coefficient alphas were .91 for husbands' anxiety, .92 for wives' anxiety, .92 for husbands' avoidance, and .94 for wives' avoidance).

Analysis Strategy

One way to address the current hypothesis would be to estimate the interactive effects of neuroticism reported at baseline and sexual frequency reported at baseline on marital satisfaction reported at baseline. We decided against this option, however, because it would have ignored six waves of relevant marital satisfaction and sexual frequency data and 4 years of marriage and would not have helped us rule out the possibility that any effects that emerged did so because higher levels of initial relationship satisfaction led to more frequent sex among more neurotic intimates. An alternative way to address the current hypothesis that would control for initial levels of marital satisfaction would be to examine the interactive effects of neuroticism at baseline and sexual frequency at baseline on changes in satisfaction over time. We decided against this option as well, however, because the sexual activity that occurred most recently, not the sexual frequency that occurred just before baseline, should be most likely to moderate the extent to which neuroticism accounts for marital satisfaction.

Thus, we tested our primary hypothesis that the frequency of sex moderates the implications of spouses' neuroticism for their marital satisfaction by using a lagged, three-level model to examine the extent to which couples' reports of the frequency with which they engaged in sex over that past 6 months moderated the extent to which their neuroticism was associated with the satisfaction they reported at the end of that 6 months, controlling for the satisfaction they reported at the previous assessment. In the first level of the model, we regressed spouses' marital satisfaction reported at Waves 2 through 7 onto couples' reports of the number of times they engaged in sexual intercourse over the 6 months prior to each assessment, controlling for spouses' satisfaction at the prior assessment (Waves 1–6). Then in the second level of the model, we entered baseline levels of neuroticism to moderate the association between sexual frequency and marital satisfaction. The nonindependence of husbands' and wives' data was controlled in the third level of the model. Accordingly, the cross-level Neuroticism \times Sexual Frequency interaction estimated the extent to which the frequency with which couples engaged in sex over the past 6 months moderated the implications of their neuroticism for their marital satisfaction as reported immediately after that 6 months, controlling for the level of satisfaction they reported at the previous assessment. Notably, deviance tests comparing models that allowed different parameters to vary randomly across people (Level 2) and across couples (Level 3) indicated that allowing the association between frequency of sex and marital satisfaction to vary across couples did not improve the fit of the model. Thus, that random effect was dropped from the model.

Table 1. Correlations

	1	2	3	4	5	6	7	8
1. Neuroticism	.05	.28*	.12	-.40*	-.17	.06	-.46**	-.01
2. Attachment anxiety	.52**	.19	.60**	-.61**	-.55**	-.15	-.29†	.16
3. Attachment avoidance	.45**	.55**	.27*	-.44**	-.59**	-.23†	-.34*	-.14
4. Quality of nonsexual domains	-.43**	-.50**	-.66**	.39*	.55*	.15	.45**	.13
5. Baseline marital satisfaction	-.37**	-.50**	-.62**	.66**	.41**	.07	.35*	-.06
6. Baseline sexual frequency	-.23†	-.12	.09	-.23†	.08	.65**	-.26†	.36*
7. Time 7 marital satisfaction	-.04	-.23	-.23	.35*	.58**	-.07	.51**	.05
8. Time 7 sexual frequency	.06	-.05	-.05	-.23	-.03	.09	.13	.29†

Correlations for wives are presented above the diagonal; correlations for husbands are presented below the diagonal; correlations between wives and husbands are presented on the diagonal in bold.

† $p < .10$.

* $p < .05$.

** $p < .01$.

Table 2. Descriptive Statistics for Neuroticism and Covariates at Baseline

Measure	Husbands		Wives	
	M	SD	M	SD
Neuroticism	2.37	0.83	3.02	0.77
Attachment anxiety	2.14	0.97	2.02	0.85
Attachment avoidance	2.07	0.88	1.83	0.68
Quality of nonsexual domains	7.93	1.49	8.06	1.15

Results

Preliminary Analyses and Descriptive Statistics

Correlations among the variables of interest are presented in Table 1. Neuroticism was negatively associated with baseline satisfaction and sexual frequency among husbands and with Time 7 satisfaction among wives. Neuroticism was also positively associated with own attachment anxiety and own attachment avoidance and negatively associated with the quality of nonsexual domains of the relationship among husbands and positively associated with own attachment anxiety and negatively associated with the quality of nonsexual domains of the relationship among wives. Those variables, in turn, were all associated with baseline marital satisfaction, supporting the need to control their influence in the analyses. With the exception of neuroticism and attachment anxiety, all cross-spouse correlations were positive and significant.²

Descriptive statistics are presented in Tables 2 and 3. As can be seen in Table 2, wives reported mean neuroticism scores close to the midpoint and husbands reported mean neuroticism scores below the midpoint. A paired samples t test revealed that wives reported significantly more neuroticism than did husbands, $t(71) = -5.05$, $p < .001$. Not surprisingly, spouses reported relatively high levels of attachment security. Paired samples t tests revealed that husbands and wives did not differ in their mean levels of attachment anxiety, $t(71) = 0.87$, $p = .39$, but that husbands reported significantly more attachment avoidance than did wives, $t(71) = 2.20$, $p < .05$.³

As can be seen in Table 3, both husbands and wives reported relatively high levels of marital satisfaction and sexual frequency in the initial stages of the study that tended to decline over the course of the study. Nevertheless, as can also be seen in Table 3, a substantial number of spouses did not provide data during the latter stages of data collection. In fact, by Time 7, 10 (13%) marriages had ended and an additional 18 (25%) wives and 19 (26%) husbands did not participate. Nevertheless, husbands and wives not reporting at Time 7 did not differ from those reporting at Time 7 in baseline marital satisfaction, for husbands, $t(70) = 0.63$, ns ; for wives, $t(69) = 0.26$, ns , or baseline sexual frequency, for husbands, $t(70) = 1.73$, $p = .09$; for wives, $t(70) = 0.98$, ns . Furthermore, the multilevel model that tested the primary hypothesis was able to estimate associations for individuals completing at least two consecutive assessments. Accordingly, all 144 spouses were included in the primary analysis.

Describing Trajectories of Marital Satisfaction and Sexual Frequency

Before turning to that analysis, however, we first conducted standard three-level growth curve analyses to estimate whether marital satisfaction and sexual frequency actually changed systematically over the course of the study or whether the apparent trends in Table 3 reflected attrition bias. Consistent with the apparent trends, the sample experienced significant declines in both marital satisfaction, $B = -0.08$, $SE = 0.02$, $t(71) = -5.02$, $p < .001$, $r = .51$, and sexual frequency, $B = -0.29$, $SE = 0.09$, $t(71) = -3.17$, $p < .01$, $r = .35$. Husbands and wives did not differ in changes in marital satisfaction, $B = -0.01$, $SE = 0.01$, $t(142) = -0.34$, $p = .73$, $r = .03$, or their reports of sexual frequency, $B = -0.06$, $SE = 0.12$, $t(142) = -0.54$, $p = .59$, $r = .04$.⁴

Does Frequent Sex Moderate the Association Between Neuroticism and Marital Satisfaction?

We tested the hypothesis that the frequency with which spouses engaged in sexual intercourse moderated the implications of

Table 3. Descriptive Statistics for Marital Satisfaction and Sexual Frequency Across Waves of Measurement

Marital satisfaction	Time 1	Time 2	Time 3	Time 4	Time 5	Time 6	Time 7
Husbands							
<i>M</i>	40.97	40.04	39.62	39.71	37.65	38.81	38.68
<i>SD</i>	4.81	5.95	6.93	5.92	8.20	5.73	5.42
<i>n</i>	72	69	66	59	55	53	40
Wives							
<i>M</i>	41.74	40.49	39.63	37.98	38.95	37.75	39.44
<i>SD</i>	4.99	5.22	6.60	7.57	5.96	7.25	4.46
<i>n</i>	71	72	67	62	55	53	43
Sexual frequency							
Husbands							
<i>M</i>	49.50	47.48	32.90	38.87	36.53	38.83	41.77
<i>SD</i>	37.68	31.13	30.87	35.35	34.99	38.57	35.61
<i>n</i>	72	60	68	54	51	41	44
Wives							
<i>M</i>	51.59	45.24	45.05	37.98	40.98	39.24	35.21
<i>SD</i>	37.11	28.66	48.51	28.72	39.25	37.84	33.46
<i>n</i>	71	66	60	58	54	41	43

their neuroticism for their marital satisfaction by estimating the following first level of a three-level model,

$$\begin{aligned}
 Y_{ij} \text{ (Marital Satisfaction at Next Assessment)} = & \\
 & \pi_{0j} \text{ (Intercept)} \\
 & + \pi_{1j} \text{ (Marital satisfaction at previous assessment)} \\
 & + \pi_{2j} \text{ (Sexual Frequency between Previous and Next Assessment)} \\
 & + e_j
 \end{aligned} \tag{1}$$

where neuroticism was entered to account for variance in every parameter estimated in the Level 2 equations.

Results are reported in Table 4. Not surprisingly, neuroticism was negatively associated with reports of satisfaction on average. Nevertheless, as predicted, that main effect was qualified by a significant positive Neuroticism \times Sexual Frequency interaction. The strength of this interaction did not differ across husbands and wives, $B = -0.12^{-2}$, $SE = 0.27^{-2}$, $t(140) = -0.43$, ns , $r = .04$. To view the nature of the interaction, we plotted the predicted future marital satisfaction scores for spouses one standard deviation above and below the mean on neuroticism and sexual frequency. This plot is depicted in Figure 1. As can be seen in the left half of that plot, more neurotic spouses who reported engaging in less frequent sex over the previous assessment interval were less satisfied with their marriages than less neurotic spouses who reported engaging in less frequent sex over that interval. Simple slopes analyses confirmed that this difference was statistically significant, $B = -1.54^{-1}$, $SE = 0.50^{-1}$, $t(142) = -3.06$, $p < .01$, $r = .25$. However, as can be seen in the right half of the plot, that difference in satisfaction was minimized among those spouses reporting more frequent sex. In fact, simple slopes analyses revealed that neuroticism was unrelated to marital satisfaction at assessments after which

Table 4. Main and Interactive Effects of Neuroticism and Sexual Frequency on Marital Satisfaction

Variable	B	SE	r
Intercept ^a	39.05	0.42	—
Initial marital satisfaction ^b	0.18	0.06	.35**
Neuroticism ^a	-7.37 ⁻²	2.22 ⁻²	-.27**
Sexual frequency ^a	0.94 ⁻²	1.30 ⁻²	.06
Initial marital satisfaction \times neuroticism ^a	-0.35 ⁻²	0.41 ⁻²	-.07
Sexual frequency \times neuroticism ^a	0.25 ⁻²	0.11 ⁻²	.18*

^a $df = 142$.

^b $df = 71$.

$r = \sqrt{\frac{t^2}{t^2 + df}}$

* $p < .05$.

** $p < .01$.

couples reported more frequent sex, $B = 0.62^{-2}$, $SE = 3.24^{-2}$, $t(142) = 0.19$, ns , $r = .02$. Furthermore, simple slopes analyses also revealed that frequent sex was marginally positively associated with marital satisfaction among partners high in neuroticism, $B = 3.11^{-2}$, $SE = 1.83^{-2}$, $t(142) = 1.70$, $p < .10$, $r = .14$, but unrelated to marital satisfaction among partners low in neuroticism, $B = -1.23^{-2}$, $SE = 1.39^{-2}$, $t(142) = -0.89$, ns , $r = .07$.

Given the correlational nature of these longitudinal effects, we conducted one final analysis to help rule out various third variables as explanations of the significant Neuroticism \times Sexual Frequency interaction. Specifically, we again estimated the Neuroticism \times Sexual Frequency interaction in a lagged multilevel model but this time controlled for the influence of (a) wave of data collection and (b) the quality of nonsexual aspects of the relationship at Level 1 and for (c) participant sex, (d) attachment anxiety, (e) attachment avoidance, and all their cross-level interactions at Level 2. The Neuroticism \times Sexual Frequency interaction remained marginally significant even controlling all these other effects, $B = 0.22^{-2}$, $SE = 0.12^{-2}$, $t(139) = 1.75$, $p < .10$, $r = .15$.

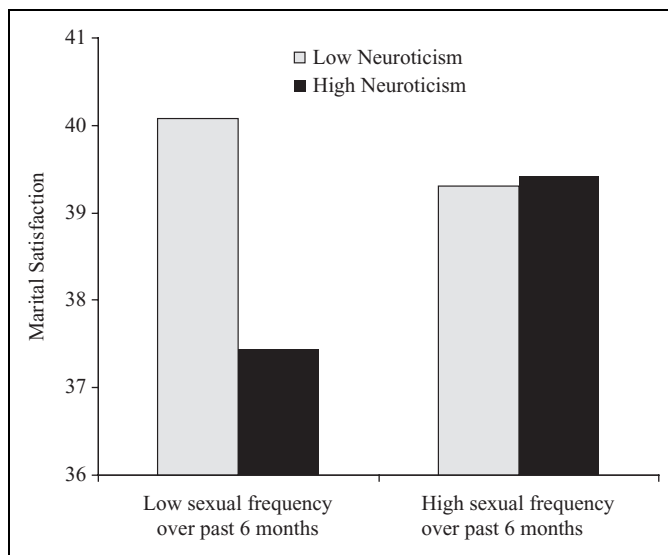


Figure 1. Interactive effects of neuroticism and sexual frequency on marital satisfaction

Discussion

Summary of Results

Neuroticism is consistently associated with negative relationship outcomes (Fisher & McNulty, 2008; Karney & Bradbury, 1995; Kelly & Conley, 1987; Kurdek, 1993; McNulty, 2008b). Those associations are never perfect, however, suggesting some neurotic individuals are able to maintain satisfying relationships. The current 4-year longitudinal study suggests one factor that may buffer neurotic individuals against their neuroticism—frequent sex. Specifically, results indicated that the frequency with which couples engaged in sexual intercourse with one another over each 6-month interval moderated the implications of their neuroticism for their marital satisfaction reported after that interval, controlling for their satisfaction reported prior to that interval. Although neuroticism was negatively associated with marital satisfaction after intervals during which partners reported engaging in either less frequent sex or mean levels of sex, neuroticism was unrelated to changes in marital satisfaction after intervals during which partners engaged in more frequent sex.

Theoretical Implications and Directions for Future Research

The current findings have important theoretical implications. Specifically, they join others (Hellmuth & McNulty, 2008; Little et al., 2010; McNulty, 2008a, 2010; McNulty, O'Mara, & Karney, 2008; McNulty & Russell, 2010; Saavedra, Chapman, & Rogge, 2010) in highlighting the importance of considering the broader context of the relationship in which various traits and processes are embedded when studying when and how those traits and processes are associated with relationship outcomes. For example, Hellmuth and McNulty (2008) reported that the negative effects of neuroticism on intimate

partner violence are limited to spouses who demonstrate fewer problem-solving skills or experience more stress.

The current work also joins recent work (Fisher & McNulty, 2008; Little et al., 2010; Meltzer & McNulty, 2010) in highlighting the importance of a particularly important aspect of that broader context—the sexual relationship. For example, Meltzer and McNulty (2010) recently reported that sexual frequency and sexual satisfaction accounted for the rather strong effects of women's body image on husbands' and wives' marital satisfaction. Furthermore, although attachment insecurity is consistently associated with lower relationship satisfaction (see Cassidy & Shaver, 1999), Little et al. (2010) reported that both attachment anxiety and attachment avoidance were unassociated with marital satisfaction among spouses reporting more satisfying or frequent sex.

Nevertheless, the current findings also leave several questions to be addressed in future research. First, although the prediction that sex should buffer intimates against the negative implications of neuroticism was based on empirical evidence that neuroticism harms relationships by increasing partners' experiences with negative affect and empirical evidence that sex promotes more positive affect, we did not examine whether changes in affect actually accounted for the effects that emerged here. Accordingly, it remains possible that sex moderated the effects of neuroticism for some other reason. For example, although a subsequent analysis indicated that the *initial* quality of nonsexual domains, such as trust and communication, did not account for the effects that emerged here, it remains possible that changes in sexual frequency led to changes in relationship quality that accounted for these effects. Future research may benefit from directly examining the role of affect in mediating the extent to which sexual frequency moderates the effects of neuroticism and relationship satisfaction.

Second, if affect is the mechanism through which frequent sex protects intimates from neuroticism, future research may also benefit from examining other factors that may buffer intimates from neuroticism by reducing negative affect. For example, more neurotic spouses may benefit from learning skills such as distress tolerance, emotion modulation, or meditation. Indeed, meditation techniques are used in mindfulness-based relationship therapies that appear to work to improve relationship satisfaction among some couples (Carson, Carson, Gil, & Baucom, 2004).

Strengths and Limitations

Our confidence in the reported results is enhanced by a number of strengths of the design and methodology. First, the interactive effects of neuroticism and sexual frequency on marital satisfaction emerged in a sample of newlywed couples, participants for whom the outcome was real and consequential. Second, the interactive effects of neuroticism and sexual frequency emerged on the marital satisfaction that was reported *after* the interval during which the sex was reported to have occurred and controlling for initial levels of satisfaction, helping to rule out the alternative interpretation that relationship satisfaction caused more frequent sex among more neurotic individuals. Finally, the interactive

effects of neuroticism and sexual frequency also remained controlling for the main and interactive effects of time, participant sex, the quality of nonsexual domains of the relationship, and attachment insecurity, helping to rule out the alternative interpretation that the effects were spurious because of other qualities of the neurotic intimates who were having more frequent sex.

Despite these strengths, several factors limit interpretations and generalizations of these findings until they can be replicated and extended. First, although the use of longitudinal data helped rule out the possibility that satisfaction predicted greater sex among more neurotic intimates, and although the control of time, participant sex, the quality of nonsexual domains of the relationship, and attachment insecurity helped rule out the possibility that those qualities accounted for the results that emerged here, these results are correlational and thus cannot support strong causal conclusions. Second, our sample was predominantly Caucasian and Christian, somewhat limiting the ability to generalize these findings to other populations. Finally, although the dramatic changes that occur during the newlywed period offered important variability necessary to test and demonstrate our effects, they also make that period a unique one from which these findings may be less likely to generalize.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interests with respect to the authorship and/or publication of this article.

Financial Disclosure/Funding

Preparation of this article was supported by the National Science Foundation through a Graduate Research Fellowship to V. Michelle Russell and by the National Institute of Child Health and Development Grant HD058314 awarded to James K. McNulty.

Notes

1. Data describing participants from this sample have been presented in several previously published articles (Baker & McNulty, 2010; Fisher & McNulty, 2008; Frye, McNulty, & Karney, 2008; Little, McNulty, & Russell, 2010; Luchies, Finkel, McNulty, & Kumashiro, 2010; McNulty, 2008a, 2008b; McNulty & Fisher, 2008; McNulty & Hellmuth, 2008; McNulty & Russell, 2010). Two of these articles also described associations involving these couples' neuroticism scores and reported the same difference between husbands' and wives' neuroticism scores that is reported here (Fisher & McNulty, 2008; McNulty, 2008b), and Fisher and McNulty (2008) described the association between neuroticism and marital satisfaction at Waves 1 and 3. Nevertheless, this is the first report to describe the interactive effects of sexual frequency and neuroticism on marital satisfaction at any wave of data collection. Furthermore, although another article reported the same differences between husbands' and wives' attachment scores that are reported here and described significant interactive effects of sexual frequency and attachment insecurity on marital satisfaction among these couples at baseline (Little et al., 2010), we report subsequent analyses here that demonstrate that the interactive effect of sexual frequency and neuroticism is independent from that effect.
2. See Note 1.
3. See Note 1.
4. See Note 1.

References

- Baker, L., & McNulty, J. K. (2010). Shyness and marriage: Does shyness shape even established relationships? *Personality and Social Psychology Bulletin, 36*, 665-676.
- Blanchflower, D. G., & Oswald, A. J. (2004). *Money, sex, and happiness: An empirical study* (Working Paper No. 10499). Cambridge, MA: National Bureau of Economic Research.
- Bouchard, G., Lussier, Y., & Sabourin, S. (1999). Personality and marital adjustment: Utility of the five-factor model of personality. *Journal of Marriage and Family, 61*, 651-660.
- Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult attachment: An integrative overview. In J. A. Simpson & W. S. Rholes (Eds.), *Attachment theory and close relationships* (2nd ed., pp. 46-76). Thousand Oaks, CA: Sage.
- Burleson, M. H., Trevathan, W. R., & Todd, M. (2007). In the mood for love or vice versa? Exploring the relations among sexual activity, physical affection, affect, and stress in the daily lives of mid-aged women. *Archives of Sexual Behavior, 36*, 357-368.
- Carmichael, M. S., Humbert, R., Dixen, J., Palmisano, G., Greenleaf, W., & Davidson, J. M. (1987). Plasma oxytocin increases in the human sexual response. *Journal of Clinical Endocrinology and Metabolism, 64*, 27-31.
- Carson, J. W., Carson, K. M., Gil, K. M., & Baucom, D. H. (2004). Mindfulness-based relationship enhancement. *Behavior Therapy, 35*, 471-494.
- Cassidy, J., & Shaver, P. R. (1999). *Handbook of attachment: Theory, research, and clinical applications*. New York, NY: Guilford.
- Caughlin, J. P., Huston, T. L., & Houts, R. M. (2000). How does personality matter in marriage? An examination of trait anxiety, interpersonal negativity, and marital satisfaction. *Journal of Personality and Social Psychology, 78*, 326-336.
- Costa, P. T., Fagan, P. J., Piedmont, R. L., Ponticas, Y., & Wise, T. N. (1992). The five-factor model of personality and sexual functioning in outpatient men and women. *Psychiatric Medicine, 10*, 199-215.
- Costa, P. T., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO-PIR): Professional manual*. Lutz, FL: Psychological Assessment Resources.
- Donnellan, M. B., Conger, R. D., & Bryant, C. M. (2004). The Big Five and enduring marriages. *Journal of Research in Personality, 38*, 481-504.
- Fisher, T. D., & McNulty, J. K. (2008). Neuroticism and marital satisfaction: The mediating role played by the sexual relationship. *Journal of Family Psychology, 22*, 112-122.
- Forgas, J. P. (1995). Mood and judgment: The affect infusion model (AIM). *Psychological Bulletin, 117*, 39-66.
- Forgas, J. P., Levinger, G., & Moylan, S. J. (1994). Feeling good and feeling close: Affective states and the perception of relationships. *Personal Relationships, 2*, 165-185.
- Frye, N. E., McNulty, J. K., & Karney, B. R. (2008). How do constraints on leaving a marriage affect behavior within the marriage? *Journal of Family Psychology, 22*, 153-161.
- Gallup, G. G., Burch, R. L., & Platek, S. M. (2002). Does semen have antidepressant properties? *Archives of Sexual Behavior, 31*, 289-293.

- Geiss, S. K., & O'Leary, D. K. (1981). Therapist ratings of frequency and severity of marital problems: Implications for research. *Journal of Marital and Family Therapy*, 7, 515-520.
- Goldberg, L. R. (1999). A broad-bandwidth, public-domain, personality inventory measuring the lower-level facets of several five-factor models. In I. Mervielde, I. Deary, Fruyt, De F. & F. Ostendorf (Eds.), *Personality psychology in Europe* (Vol. 7, pp. 7-28). Tilburg, Netherlands: Tilburg University Press.
- Goldenberg, J. L., Pyszczynski, T., McCoy, S. K., Greenberg, J., & Solomon, S. (1999). Death, sex, love, and neuroticism: Why is sex such a problem? *Journal of Personality and Social Psychology*, 77, 1171-1187.
- Heaven, P. C. L., Fitzpatrick, J., Craig, F. L., Kelly, P., & Sebar, G. (2000). Five personality factors and sex: Preliminary findings. *Personality and Individual Differences*, 28, 1133-1141.
- Hellmuth, J. C., & McNulty, J. K. (2008). Neuroticism, marital violence, and the moderating role of stress and behavioral skills. *Journal of Personality and Social Psychology*, 95, 166-180.
- Jockin, V., McGue, M., & Lykken, D. T. (1996). Personality and divorce: A genetic analysis. *Journal of Personality and Social Psychology*, 71, 288-299.
- Jones, J. T. (2004). Interpersonal traits and interpersonal behaviors as predictors of marital satisfaction in a meditational model. *Dissertation Abstracts International*, 64, 5787.
- Karney, B. R., & Bradbury, T. N. (1995). The longitudinal course of marital quality and stability: A review of theory, method, and research. *Psychological Bulletin*, 118, 3-34.
- Karney, B. R., & Bradbury, T. N. (1997). Neuroticism, marital interaction, and the trajectory of marital satisfaction. *Journal of Personality and Social Psychology*, 72, 1075-1092.
- Kelly, E. L., & Conley, J. J. (1987). Personality and compatibility: A prospective analysis of marital stability and marital satisfaction. *Journal of Personality and Social Psychology*, 52, 27-40.
- Koepf, M. J., Hammers, A., Lawrence, A. D., Asselin, M. C., Grasby, P. M., & Bench, C. J. (2009). Evidence for endogenous opioid release in the amygdala during positive emotion. *NeuroImage*, 44, 252-256.
- Kurdek, L. A. (1993). Predicting marital dissolution: A 5-year prospective longitudinal study of newlywed couples. *Journal of Personality and Social Psychology*, 64, 221-242.
- Laumann, E. O., Michaels, R. T., Gagnon, J. H., & Michaels, S. (1994). *National Health and Social Life Survey*. Chicago, IL: University of Chicago Press.
- Little, K. C., McNulty, J. K., & Russell, V. M. (2010). Sex buffers newlyweds from the negative implications of attachment insecurity. *Personality and Social Psychology Bulletin*, 36, 484-498.
- Luchies, L. B., Finkel, E. J., McNulty, J. K., & Kumashiro, M. (2010). The doormat effect: When forgiving erodes self-respect and self-concept clarity. *Journal of Personality and Social Psychology*, 98, 734-749.
- McNulty, J. K. (2008a). Forgiveness in marriage: Putting the benefits into context. *Journal of Family Psychology*, 22, 171-175.
- McNulty, J. K. (2008b). Neuroticism and interpersonal negativity: The independent contributions of perceptions and behaviors. *Personality and Social Psychology Bulletin*, 34, 1439-1450.
- McNulty, J. K. (2010). When positive processes hurt relationships. *Current Directions in Psychological Science*, 19, 167-171.
- McNulty, J. K., & Fisher, T. D. (2008). Gender differences in response to sexual expectancies and changes in sexual frequency: A short-term longitudinal investigation of sexual satisfaction in newly married heterosexual couples. *Archives of Sexual Behavior*, 37, 229-240.
- McNulty, J. K., & Hellmuth, J. C. (2008). Emotion regulation and intimate partner violence in newlyweds. *Journal of Family Psychology*, 22, 794-797.
- McNulty, J. K., O'Mara, E. M., & Karney, B. R. (2008). Benevolent cognitions as a strategy of relationship maintenance: "Don't sweat the small stuff" . . . But it is not all small stuff. *Journal of Personality and Social Psychology*, 94, 631-646.
- McNulty, J. K., & Russell, V. M. (2010). When "negative" behaviors are positive: A contextual analysis of the long-term effects of problem-solving behaviors on changes in relationship satisfaction. *Journal of Personality and Social Psychology*, 98, 587-604.
- Meltzer, A. L., & McNulty, J. K. (2010). Body image and marital satisfaction: Evidence for the mediating role of sexual frequency and sexual satisfaction. *Journal of Family Psychology*, 24, 156-164.
- Nesse, R. M., & Ellsworth, P. C. (2009). Evolution, emotions, and emotional disorders. *American Psychologist*, 64, 129-139.
- Norton, R. (1983). Measuring marital quality: A critical look at the dependent variable. *Journal of Marriage and Family*, 45, 141-151.
- Rogge, R. D., Bradbury, T. N., Hahlweg, K., Engl, J., & Thurmaier, F. (2006). Predicting marital distress and dissolution: Refining the two-factor hypothesis. *Journal of Family Psychology*, 20, 156-159.
- Russell, R. J. H., & Wells, P. A. (1994). Personality and quality of marriage. *British Journal of Psychology*, 85, 161-168.
- Saavedra, M. C., Chapman, K. E., & Rogge, R. D. (2010). Clarifying links between attachment and relationship quality: Hostile conflict and mindfulness as moderators. *Journal of Family Psychology*, 24, 380-390.
- Sbarra, D. A., & Hazan, C. (2008). Coregulation, dysregulation, self-regulation: An integrative analysis and empirical agenda for understanding adult attachment, separation, loss, and recovery. *Personality and Social Psychology Review*, 12, 141-167.
- Scantamburlo, G., Hansenne, M., Fuchs, S., Pitchot, W., Maréchal, P., Pequeux, C., . . . Legros, J. J. (2007). Plasma oxytocin levels and anxiety in patients with major depression. *Psychoneuroendocrinology*, 32, 407-410.
- Schenk, J., & Pfrang, H. (1986). Extraversion, neuroticism, and sexual behavior: Interrelationships in a sample of young men. *Archives of Sexual Behavior*, 15, 449-455.

Bios

V. Michelle Russell is a PhD student in the Department of Psychology at the University of Tennessee and a NSF graduate research fellow.

James K. McNulty is an associate professor in the Department of Psychology at the University of Tennessee. He received his PhD in social psychology at the University of Florida and studies processes involved in the maintenance and deterioration of relationship satisfaction.