Neuroticism and Interpersonal Negativity: The Independent Contributions of Perceptions and Behaviors

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Why are neurotic intimates likely to have troubled relationships? Do they create greater negativity through their own negative behavior, or do they perceive greater negativity through processes of perceptual construal? The current research addressed this question through a study of newlyweds. Spouses reported their neuroticism and their expectancies for two upcoming problem-solving discussions with their partners, then participated in those discussions, and finally reported their perceptions of how their partners behaved during the discussions. Objective observations revealed that the partners of more neurotic spouses behaved more negatively than the partners of less neurotic spouses. For wives, their own behavior mediated these effects. In addition, once the objective quality of partners' behavior was controlled, more neurotic spouses also reported more negative perceptions of those partners' behavior. For husbands, their own expectancies mediated these effects. That personality uniquely affects relationships through behavioral and perceptual processes suggests that those processes should be studied independently.

Keywords: *neuroticism; marriage; communication; observational; perceptual biases; self-fulfilling prophecy*

For spouses with high levels of neuroticism, navigating the ups and downs of a romantic relationship can be challenging. Studies using various samples and methods have linked neuroticism to difficulties in a number of interpersonal pursuits, such as problem solving (e.g., Karney & Bradbury, 1997), support provisions (e.g., Sullivan, 1997), parenting (Bradley, Whiteside, Brisby, & Caldwell, 1997), and sexual relations (Fisher & McNulty, 2008). Likely due to these and other difficulties, a consistent body of work demonstrates that more neurotic individuals also tend to be less satisfied with their relationships overall (e.g., Bouchard, Lussier, & Sabourin, 1999; Caughlin, Huston, & Houts, 2000; Donnellan, Conger, & Bryant, 2004; Fisher & McNulty, 2008; Karney & Bradbury, 1997; Rogge, Bradbury, Hahlweg, Engl, & Thurmaier, 2006; Russell & Wells, 1994) and more likely to dissolve those relationships over time (e.g., Kelly & Conley, 1987; Rogge et al., 2006).

Despite the consistency of these findings, little is known about *how* neuroticism leads to such outcomes. Costa and McCrae (1992) define neuroticism as "a general tendency to experience negative affects" and suggest that more neurotic individuals are "prone to have irrational ideas, be less able to control their impulses, and to cope more poorly than others with stress" (p. 14). Indeed, both perceptual and behavioral explanations of the effects of neuroticism on relationships have been proposed (see Caughlin et al., 2000). With respect

Author's Note: The research presented in this article was supported by a Seed Grant Award to James K. McNulty from The Ohio State University, Mansfield. The author would like to thank Letitia Clarke, Timothy Dove, Kendra Krichbaum, Kevin McFarland, Lynn Ousley, Michelle Reeder, Jennifer Schurman, Lindsay Smouther, Corwin Thompson, Renee Vidor, Harry Wallace, Karen Walters, and Danielle Wentworth for their assistance in measurement development, data collection, and data entry; and Julianne Hellmuth, Megan Krupp, Michelle Reeder, and Ian Saxton for their assistance in behavioral coding. The author would also like to thank Levi Baker and Carolyn Wenner for their helpful comments on a draft of this article. Correspondence concerning this article should be addressed to James K. McNulty, Department of Psychology, University of Tennessee, 1404 Circle Drive, Austin Peay Building, Knoxville, TN 37996; e-mail: jmcnulty@utk.edu.

PSPB, Vol. 34 No. 11, November 2008 1439-1450
DOI: 10.1177/0146167208322558

to the potential perceptual effects of neuroticism on relationships, intrapersonal explanations (e.g., Terman, Buttenwieser, Ferguson, Johnson, & Wilson, 1938) suggest that people with high levels of neuroticism think in ways that lead to more negative perceptions of their interpersonal experiences, regardless of the objective quality of those experiences. A neurotic husband, for example, may interpret his wife's silence as evidence of negative feelings she has toward him rather than negative feelings she has due to a stressful day at work. With respect to the potential behavioral effects of neuroticism on relationships, interpersonal explanations (e.g., Caughlin et al., 2000) suggest that neurotic individuals actually create more negative interpersonal experiences for themselves by engaging in more negative interpersonal behaviors that get reciprocated by their partners. In a moment of frustration, for example, a neurotic wife may snap at her husband, which may prompt him to respond negatively in return. As detailed in the next sections, a clear picture of whether neuroticism affects relationships through perceptions, behaviors, or both has been obscured by several qualities of prior research.

The goal of the current study was to clarify whether neuroticism leads to interpersonal negativity through behavioral processes, perceptual processes, or both. To this end, the remainder of this introduction is divided into three sections. The first section reviews evidence supportive of the idea that neuroticism leads to interpersonal negativity through biased perceptions and then critiques that evidence based on the data needed to most rigorously test that explanation. The second section reviews evidence supportive of the idea that neuroticism leads to interpersonal negativity by leading to real negative interpersonal experiences and then critiques that evidence based on the data needed to most rigorously test that explanation. The final section describes the current study designed to test whether intimates' levels of neuroticism are associated with (a) objective ratings of their partners' negative behaviors that are mediated by objective ratings of their own negative behaviors and/or (b) biased perceptions of their partners' behaviors, controlling for objective ratings of the negativity of those partners' behavior, that are mediated by their own prior expectancies for those behaviors.

NEUROTICISM AND NEGATIVE PERCEPTIONS

Intrapersonal explanations of the negative effects of neuroticism on relationships suggest that more neurotic intimates are less happy in their relationships because they construe their interpersonal experiences more negatively—even experiences that are not that negative to begin with (e.g., Terman et al., 1938). Recent empirical research supports this possibility. For instance, several studies suggest that more neurotic intimates may make more negative attributions for their partners' behaviors (e.g., Karney & Bradbury, 2000; Karney Bradbury, Fincham, & Sullivan, 1994). In one study, Karney and Bradbury (2000) asked spouses to imagine their spouses engaging in various negative behaviors (e.g., criticism) and then to report the attributions they would make for each behavior. For both husbands and wives, higher levels of neuroticism predicted the tendency to report increasingly negative attributions over time. Furthermore, similar findings have been obtained regarding intimates' perceptions of their partners' actual behaviors (e.g., Caughlin et al., 2000; Donnellan et al., 2004). In one study, Donnellan et al. (2004) asked husbands and wives to report how negatively their partners had behaved over the past month. Again for both husbands and wives, higher levels of neuroticism predicted more negative descriptions of the partner's behaviors.

But our understanding of the role of perceptual processes in the association between neuroticism and negative interpersonal outcomes remains limited by several qualities of this and other prior work. Most notably, although the process of perceptual construal implied by intrapersonal models suggests that neurotic individuals perceive their experiences more negatively than objective observers would perceive those experiences, prior studies have not demonstrated associations between neuroticism and spouses' perceptions of their interpersonal experiences that are independent of the objective quality of those experiences. Accordingly, it remains possible that the negative perceptions reported by neurotic intimates reflect real levels of negativity, the negative experiences that would be expected based on interpersonal models. To demonstrate that neuroticism is associated with perceptual construal rather than accurate reports of negativity, research needs to demonstrate that intimates' neuroticism accounts for variance in their perceptions of their experiences, even after objective ratings of those experiences have been controlled. Caughlin et al. (2000) reported results from a similar analysis, noting that intimates' neuroticism remained associated with their global satisfaction with the relationship, even after a subset of negative partner behaviors had been controlled (e.g., anger, criticism). Nevertheless, given that study controlled only a subset of specific negative behaviors, it remains possible that neurotic intimates' lower levels of global satisfaction reflected other negative partner behaviors not controlled in that study (e.g., lack of partner support provisions, lack of partner conscientiousness), rather than processes of perceptual construal. To most definitively demonstrate that the association between neuroticism and perceptions is independent of experiences, research needs to show an association between neuroticism and

perceptions of more specific experiences, controlling for observations of those same specific experiences.

Prior work on the link between neuroticism and perceptual biases has also overlooked the mechanism of such biases. If neuroticism does lead to processes of perceptual construal, how does it do so? Previous theory and research suggest that interpersonal expectancies could be one source of such construal (e.g., Darley & Gross, 1983; McNulty & Karney, 2002; Miller & Turnbull, 1986). For example, McNulty and Karney (2002) demonstrated that interpersonal expectancies can lead to the construal of relationship interactions. In that study, spouses who expected their upcoming problem-solving interactions to be positive actually evaluated those interactions more positively, whereas spouses who expected their upcoming problem-solving interactions to be negative evaluated those interactions more negatively, controlling for observations of the actual behaviors that partners exchanged during those conversations. Perhaps any perceptual effects of neuroticism operate through the perceptual confirmation of expectancies in similar ways, such that more neurotic intimates hold more negative expectancies for their relationship experiences that lead to more negative perceptions of those experiences independent of the objective quality of those experiences. Consistent with this possibility, neuroticism has been linked to more negative global expectancies in prior research (Marshall, Wortman, Kusulas, Hervig, & Vickers, 1992).

NEUROTICISM AND NEGATIVE EXPERIENCES

Interpersonal explanations of the effects of neuroticism on relationships, however, suggest that more neurotic intimates' negative perceptions of their interpersonal experiences are not due solely to processes of construal but instead reflect the real negative experiences that they create through their own negative behavior (e.g., Caughlin et al., 2000). Consistent with such explanations, compared to less neurotic individuals, more neurotic individuals have been observed to exhibit more negative behaviors in their relationships (Donnellan et al., 2004)—negative behaviors that may elicit negative partner behaviors through negative reciprocity (Gottman, Markman, & Notarius, 1977). Research on related constructs supports this possibility. For instance, research on rejection sensitivity, an interpersonal schema associated with neuroticism in other research (Brookings, Zembar, & Hochstetler, 2003), reveals that intimates who expect their partners to reject them behave in ways that elicit greater negativity from those partners (Downey, Freitas, Michaelis, & Khouri, 1998). Most clearly, though, neuroticism has been associated with greater levels of interpersonal negativity through observations of the behavior of more neurotic intimates' partners. Specifically, Donnellan et al. (2004) observed that the wives of neurotic husbands behaved more negatively than the wives of less neurotic husbands, though the husbands of more neurotic wives did not behave more negatively than the husbands of less neurotic wives.

But like studies supporting intrapersonal explanations of the negative effects of neuroticism on relationship outcomes, prior studies supporting interpersonal explanations of such negative effects have not demonstrated the proposed mechanism of those effects (i.e., neurotic intimates' own behavior). That the partners of more neurotic intimates behave more negatively does not necessarily imply that such behaviors were driven by those intimates' own negative behaviors. The partners of more neurotic intimates may be more neurotic themselves (e.g., Gonzaga, Campos, & Bradbury, 2007), for example, which could account for those partners' levels of negative behavior. To provide stronger support for interpersonal explanations of the effects of neuroticism on relationships, research needs to demonstrate that intimates' own negative behavior mediates any effects observed between their neuroticism and their partners' negative behavior.

OVERVIEW OF THE CURRENT STUDY

Two mechanisms may account for the robust associations observed between neuroticism and negative interpersonal outcomes: More neurotic intimates may behave in ways that elicit more negative experiences, or they may think in ways that lead to biased negative perceptions of their experiences. Several shortcomings of prior research have obscured which process provides the best account of the negative interpersonal effects of neuroticism: (a) No studies have demonstrated that the negative perceptions reported by neurotic intimates are independent of the observed quality of those experiences; (b) no studies have demonstrated the mechanism of any perceptual effects of neuroticism; and (c) no studies have demonstrated that a person's own behavior mediates any effects of neuroticism on partner behavior.

The current research attempted to address these issues through data provided by newly married couples. Just after their wedding, couples completed measures of marital satisfaction and neuroticism, reported their expectancies for each of two problem-solving discussions, engaged in those problem-solving discussions, and immediately reported their perceptions of their partners' behaviors during those discussions. One set of analyses examined the extent to which neuroticism

predicted observations of the partner's behavior that were mediated by his or her own behavior. A second set of analyses examined the extent to which spouses' neuroticism predicted perceptions of the partner's behavior that were mediated by spouses' expectancies for the discussions, controlling for observations of those partners' behaviors. To enhance confidence that any effects observed between neuroticism and perceptions of behavior were not due to marital satisfaction, which tends to be associated with behavior (Huston & Vangelisti, 1991), perceptions (Weiss, 1980), and neuroticism (Karney & Bradbury, 1995), all analyses controlled for reports of marital satisfaction.

Results demonstrating that spouses' neuroticism is associated with observations of their partners' behavior that are mediated by observations of spouses' own behavior, controlling for partners' satisfaction, would provide support for the idea that neuroticism leads to more negative experiences. Results demonstrating that spouses' neuroticism is associated with more negative perceptions of their partners' behaviors, controlling for own satisfaction and observations of partner behaviors, would provide support for the idea that neuroticism leads to more negative perceptions. Of course, interpersonal and intrapersonal models are not mutually exclusive (see Coté & Moskowitz, 1998). Individuals high in neuroticism may elicit negative outcomes from their partners *and* perceive those and other outcomes to be even more negative than they actually are. The strong and pervasive negative associations between neuroticism and negativity described earlier support this possibility. Results demonstrating that neuroticism is associated with more negative objectively rated partner behaviors, and controlling such behaviors, that neuroticism is also associated with residual variance in perceptions of such experiences would provide support for the idea that neuroticism is independently associated with both negative experiences and negative perceptions.

METHOD

Participants

Participants were 72 first-married couples participating in a broader study of marital development. All data collected for the purpose of this study were collected within 6 months after the wedding ($M = 3.2$, $SD = 1.6$). All participants were recruited from communities in and around north-central Ohio using two methods. The first method was to place advertisements in community newspapers and bridal shops, offering up to $410 to couples willing to participate in the study. The second method was to review the applications of couples that had applied for marriage licenses in several nearby counties where marriage licenses are available to the public and contain data on spouses' ages, whether or not this is their first marriage, and the date of the wedding. Couples who were eligible for the study based on these criteria were sent letters offering them up to $410 to participate in the study. Those responding to either method of solicitation were screened in 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 away from the area.

On average, husbands were 24.9 years old ($SD = 4.4$) and had completed 14.2 years ($SD = 2.5$) of education. Seventy-four percent were employed full-time and 11% were full-time students. The median income range identified by husbands was $15,001 to $20,000 per year. Ninety-three percent of husbands were Caucasian, 4% were identified African American, and 3% were identified as other. On average, wives were 23.5 years old ($SD = 3.8$) and had completed 14.7 years ($SD = 2.2$) of education. Forty-nine percent were employed full-time and 26% were full-time students. The median income range identified by wives was $10,001 to $15,000 per year. Ninety-six percent of wives were Caucasian and 4% were African American.

Procedure

Before their laboratory session, participants received by mail a packet of questionnaires to complete at home and bring with them to their appointment. This packet included a consent form approved by the local human subjects review board, self-report measures of neuroticism and marital satisfaction, a letter instructing couples to complete all questionnaires independently of one another and to bring their completed questionnaires to their upcoming laboratory session, and other items beyond the scope of the current study. Upon arriving to that session, spouses participated in two problem-solving discussions designed to assess the frequency of the negative behaviors they exchange during their interactions with each other. Each spouse identified an area of difficulty in the marriage and then both spouses participated in two 10-min videotaped discussions in which they were left alone to "work towards some resolution or agreement" for each area of difficulty. The order of the two interactions was determined through a coin flip. If both spouses chose the same topic, they first discussed that topic and then discussed a

second topic chosen by the spouse whose topic was designated to be discussed second. Immediately before beginning each interaction, spouses reported their expectancies for the overall positivity of discussion. Immediately following each interaction, spouses reported their perceptions of how their partner behaved during the discussion. Couples were paid $80 for participating in this phase of data collection.

Measures

Neuroticism. The Neuroticism subscale of the Big Five Personality Inventory (Goldberg, 1999) was used to assess neuroticism. This instrument consists of 10 statements with which participants indicated 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).

Observed interaction behavior. The prevalence of negative behavior exhibited by each spouse was estimated by coding videotapes of couples' problem-solving discussions for negative behavior using a modified version of the Verbal Tactics Coding Scheme (Sillars, Coletti, Parry, & Rogers, 1982). Each speaking turn from each spouse was coded. A speaker received a negative code for speaking turns that either directly faulted, rejected, or criticized the partner, or indirectly criticized the partner through presumptive attributions, avoiding responsibility, or hostile questions. A total proportion of negative behavior exhibited by each husband and each wife was computed for each conversation by dividing the number of negative codes for each spouse by the total number of speaking turns for that spouse in that conversation. To determine the reliability of the coding, 25% of the conversations were randomly chosen to be coded by a second rater and agreement between coders was assessed by calculating an intraclass correlation coefficient (ICC) between the proportions of speaking turns coded as negative by each coder. Reliability was adequate (ICC = .88). Due to a random technical difficulty, both discussions from one couple were unable to be coded and one conversation from another couple was unable to be coded.

Expectancies for interactions. Immediately prior to each discussion, spouses reported their expectancies for how they expected that discussion to go. Specifically, spouses answered the following four questions regarding each of the two conversations: (a) How pleasant do you expect the upcoming conversation to be? (b) How much do you expect the conversation to bring you closer together? (c) How positively do you expect your partner to behave during the upcoming conversation? (d) How satisfied with the upcoming conversation do you expect to be? Spouses answered each question on a 7-point Likert-type scale, where 1 = *not at all* to 7 = *very much*. Higher scores indicate more positive expectancies. Reliability of these four questions was adequate for each spouse's expectancies of wives' topics (husbands' alpha = .73, wives' alpha = .78) but slightly lower than desired for each spouse's expectancies for husbands' topics (husbands' alpha = .67, wives alpha = .66). Accordingly, any null effects of either spouse's expectancies for conversation of husbands' topics may be due to measurement error.

Perceptions of interaction behavior. Immediately following each discussion, spouses reported their perceptions of their partners' behavior. Questions were designed to mirror the codes of the Verbal Tactics Coding Scheme described above. Specifically, spouses answered the following five questions regarding each of the two conversations: (a) How defensive was your partner? (b) How much did your partner blame or criticize you for the problem? (c) How much did your partner take responsibility for the problem? (reversed) (d) How much did your partner hurt your feelings? (e) How much did your partner ask you to change? Spouses answered each question on a 7-point Likert-type scale, where 1 = *not at all* to 7 = *very much*. Reliability of these five questions was adequate for each spouse's perceptions of wives' topics (husbands' alpha = .74, wives' alpha = .77) but slightly lower than desired for each spouse's perceptions of husbands' topics (husbands' alpha = .65, wives' alpha = .64). Accordingly, any null effects of either spouse's perceptions of conversation of husbands' topics may be due to measurement error.

Marital satisfaction. To ensure that any associations that emerged among neuroticism, perceptions, and behavior were not due to variance shared with marital satisfaction, global marital satisfaction was measured and controlled in all analyses using the Quality Marriage Index (Norton, 1983). The Quality Marriage Index is a 6-item scale asking spouses to report the extent to which they agree or disagree with general statements about their marriage (e.g., "We have a good marriage" and "My relationship with my partner makes me happy"). Five items ask spouses to respond according to a 7-item scale, whereas 1 item asks spouses to respond according to a 10-item scale, yielding scores from 6 to 45. High scores reflect more positive satisfaction with the relationship. Internal consistency of this measure was high (husbands' alpha = .93, wives' alpha = .94).

Analysis Strategy

Analyzing data from couples presents unique challenges. Because husbands and wives share similar experiences in their relationships, experiences not shared by other members of the sample, their data violate statistical assumptions of independence. Thus, Raudenbush and colleagues (Barnett, Marshall, Raudenbush, & Brennan, 1993; Raudenbush, Brennan, & Barnett, 1995) recommend estimating the effects of husbands and wives separately but simultaneously in the first level of a multilevel model with two intercepts, one intercept for husbands and one intercept for wives (also see Kenny, Kashy, & Cook, 2006, p. 97). We followed such recommendations here, testing all hypotheses through hierarchical linear modeling (Bryk & Raudenbush, 2002), using the HLM/2L computer program (Bryk, Raudenbush, & Congdon, 2004). These analyses were conducted separately for each of the two discussions.

RESULTS

Descriptive Statistics and Preliminary Analyses

Descriptive statistics are presented in Table 1. As the table reveals, husbands reported mean neuroticism scores below the midpoint and wives reported mean neuroticism scores close to the midpoint. Consistent with prior research (Caughlin et al., 2000), a paired-samples *t* test revealed that these levels of neuroticism reported by wives were significantly greater than the levels of neuroticism reported by husbands, $t = 5.05$, $p < .01$. As expected among newlyweds, both spouses appeared relatively satisfied with their relationships, on average, though standard deviations revealed that some spouses were more satisfied than others. Likewise, spouses expected their conversation to go rather positively on average, exhibited a relatively low proportion of negative behaviors during their conversations on average, and appeared to perceive few negative partner behaviors during the discussions on average. Despite these low means, however, standard deviations indicate substantial variability suggesting that some partners expected more negativity than others, that some spouses behaved more negatively than others, and that some spouses perceived more negativity in their partners than others. The primary aim of the current study was to examine whether variability in each spouse's neuroticism was associated with variability in their partners' behaviors and their own perceptions.

Correlations among the variables examined here are presented in Table 2, where husbands' correlations are presented below the diagonal, wives' correlations are presented above the diagonal, and correlations between husbands and wives are presented along the diagonal in bold. As that table reveals, each spouse's satisfaction was negatively associated with his or her behavior (marginally for husbands), revealing that even among these newlyweds, spouses who were less satisfied behaved more negatively. It is not surprising that satisfaction was also positively associated with each spouse's tendencies to hold more positive expectancies for their discussions, suggesting that more satisfied spouses expected more pleasant discussions. Furthermore, among husbands, satisfaction was negatively related to neuroticism and negatively associated perceptions of negativity, supporting the need to control satisfaction when examining the effects of neuroticism on perceptions. Among wives, these correlations did not reach significance. The correlation between neuroticism and own behavior did, however, reach significance among wives, but not husbands, suggesting that more neurotic wives behaved more negatively than less neurotic wives. Consistent with intrapersonal models, for both husbands and wives, neuroticism was significantly associated with perceptions. Like previous research, however, these correlations do not control for the association between spouses' perceptions and observations of their partners' behaviors. Such control was part of the goal of the primary analyses (described in the next section). Furthermore, consistent with the idea that expectancies may account for any perceptual biases observed in the current study, more positive expectancies were negatively associated with lower levels of neuroticism for both partners and with more negative perceptions for husbands. Again, however, these bivariate associations only provide initial support for the idea that expectancies mediate the effects of neuroticism on perceptions because they do not control for shared variance with other variables such as satisfaction and observations of behavior. Finally, cross-spouse correlations reveal that spouses reported similar levels of marital satisfaction, exchanged similar rates of negative behavior, reported

TABLE 1: Descriptive Statistics

	Husbands		*Wives*	
Variable	M	SD	M	SD
Neuroticism	23.71	8.28	30.24	7.65
Marital satisfaction	40.97	4.81	41.74	4.96
Expectancies for discussions	20.60	3.61	20.51	3.26
Own negative behavior	.11	.11	.11	.11
Perceptions of partner's negative behavior	15.74	6.62	13.28	5.58

NOTE: *M* and *SD* of the "own negative behavior" variable are proportions of speaking turns coded as negative.

TABLE 2: Correlations

	Satisfaction	*Neuroticism*	*Expectancies*	*Negative Behavior*	*Perceptions*
Satisfaction	**0.41*****	–0.17	0.43**	–0.22*	–0.12
Neuroticism	–0.37**	**0.05**	–0.36**	0.51***	0.41***
Expectancies	0.31**	–0.38**	**0.27***	–0.17	–0.07
Negative behavior	–0.21†	0.06	–0.11	**0.73*****	0.62***
Perceptions	–0.28*	0.43***	–0.43**	0.43***	**0.33****

NOTE: Husbands' correlations are presented below the diagonal, wives' correlations are presented above the diagonal, and correlations between husbands and wives are presented along the diagonal in bold.
†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

similar expectancies for their discussions, and reported similar perceptions of one another's behaviors during those discussions, supporting the need to control the similarities between husbands and wives through hierarchical linear modeling. Spouses did not report similar levels of neuroticism, however.

Did the Spouse's Own Neuroticism Predict Observations of Partner Behavior?

According to interpersonal explanations of the negative effects of neuroticism on relationship outcomes, the partners of more neurotic spouses should behave more negatively than the partners of less neurotic spouses, and partners' own behavior should mediate those effects. Analyses tested the first part of this hypothesis by regressing observations of partners' behavior onto spouses' own neuroticism score, separately for each of the two discussions. To ensure that any associations that emerged were not due to variance shared between partners' behaviors and their satisfaction with the relationship, these analyses controlled for partners' satisfaction. To also ensure that any effects observed for one spouse were not due to variance shared between the two spouses, effects for husbands and wives were estimated separately but simultaneously in the following first level of a multilevel model, according to procedures described by Barnett et al. (1993):

$$Y = \beta_1 (\text{dummy code for husbands}) + \beta_2(\text{dummy code for wives}) + \beta_3 (\text{wives' satisfaction}) + \beta_4 (\text{husbands' satisfaction}) + \beta_5 (\text{husbands' neuroticism}) + \beta_6 (\text{wives' neuroticism}) + e \quad (1)$$

where Y represents observations of the partner's negative behavior; β_1 estimates husbands' intercept; β_2 estimates wives' intercept; β_3 captures the association between wives' satisfaction and observations of wives' negative behavior; β_4 captures the association between husbands' satisfaction and observations of husbands' negative behavior; β_5 captures the association between husbands' neuroticism and observations of wives' negative behavior, controlling for wives' satisfaction; β_6 captures the association between wives' neuroticism and observations of husbands' negative behavior, controlling for husbands' satisfaction; and e is the residual variance in the couple, assumed to be independent and normally distributed. Because these level-1 effects were based on only two observations from each couple, husbands' reports and wives' reports, they were all treated as fixed and no random effects were estimated.

Results are presented in the first two columns of Table 3. As those columns reveal, consistent with predictions derived from interpersonal models, spouses' neuroticism predicted observations of their partners' negative behavior in every case. That is, controlling for the association between partner satisfaction and partner behavior, the partners of more neurotic spouses were observed to behave more negatively, whereas the partners of less neurotic spouses were observed to behave less negatively.

But according to interpersonal models, these effects of neuroticism on partner behavior should be mediated by the association between neuroticism and own behavior. To find out, additional analyses were conducted to compute Sobel (1982) tests using the z' statistic recommended by MacKinnon, Lockwood, Hoffman, West, and Sheets (2002), where the critical value for $z' = .97$. In the first set of these additional analyses, own neuroticism was regressed onto own behavior, where own satisfaction was controlled to ensure any association between neuroticism and behavior was not due to own satisfaction. Results of these analyses revealed that neuroticism significantly predicted own negative behavior for wives (for own topic, $\beta = 7.66^{-3}$, $t = 4.01$, $p < .001$, $r = .33$; for partner topic, $\beta = 7.32^{-3}$, $t = 3.84$, $p < .001$, $r = .31$), but not husbands (for own topic, $\beta = 0.07^{-3}$, $t = –0.04$, $p > .50$, $r = .00$; for partner topic, $\beta = –0.31^{-3}$, $t = –0.15$, $p > .50$, $r = .01$). Direct tests of this gender difference revealed that the effects of wives' neuroticism on their behavior were significantly

TABLE 3: Neuroticism, Negative Partner Behavior, and Own Perceptions

	Observations of Partner Behavior		*Perceptions of Partner Behavior*	
Topic	*β*	r	*β*	r
Husbands' neuroticism				
Discussion of own topic	3.00^{-3}	.16*	1.86^{-1}	.20*
Discussion of partner topic	4.13^{-3}	.24**	1.81^{-1}	.20*
Wives' neuroticism				
Discussion of own topic	8.23^{-3}	.33***	0.15^{-1}	.01
Discussion of partner topic	4.81^{-3}	.26**	1.55^{-1}	.19*

NOTE: *B*s are unstandardized; $r = \sqrt{\frac{t^2}{t^2 + df}}$.

*$p < .05$. **$p < .01$. ***$p < .001$. All p values are one-tailed.

stronger than the effects of husbands' neuroticism on their behavior (for own topic, $\chi^2 = 8.92$, $p < .01$; for partner topic, $\chi^2 = 10.68$, $p < .01$). Then in the second set of these additional analyses, the spouse's own behavior was regressed onto partner behavior, controlling the spouse's own satisfaction, own neuroticism, and partner satisfaction. The results of these analyses revealed that own behavior predicted partner behavior for both husbands (for spouse's own topic, $\beta = 5.94^{-1}$, $t = 4.57$, $p < .001$, $r = .37$; for partner topic, $\beta = 6.28^{-1}$, $t = 8.60$, $p < .001$, $r = .60$) and wives (for spouse's own topic, $\beta = 6.96^{-1}$, $t = 5.02$, $p < .001$, $r = .40$; for partner topic, $\beta = 4.76^{-1}$, $t = 4.61$, $p < .001$, $r = .37$). Finally, Sobel tests based on the results of these analyses revealed that wives' behavior significantly mediated the effects of their neuroticism on husbands' behavior (for spouse's own topic, $z' = 3.13$, $p < .01$, $r = .26$; for partner topic, $z' = 2.95$, $p < .01$, $r = .25$), indicating that more neurotic wives elicited more negative behavior from their husbands through their own negative behaviors. Notably, the mediation observed by wives' behavior appeared to be partial mediation, as wives' neuroticism remained somewhat associated with husbands' negative behavior even after wives' behavior was controlled (for spouse's own topic, $\beta = 3.45^{-3}$, $t = 2.36$, $p < .05$, $r = .20$; for their partner topic, $\beta = 1.68^{-3}$, $t = 1.10$, $p = .28$, $r = .10$). For husbands, because own neuroticism did not predict own behavior (as revealed by the first set of additional analyses described above), Sobel tests failed to reach significance in both discussions (for spouse's own topics, $z' = -0.04$, $p > .50$, $r = .00$; for partner topics, $z' = -0.14$, $p > .50$, $r = .01$), indicating that the wives of more neurotic husbands behaved negatively for reasons other than the negative behaviors coders observed among those husbands.

Did the Spouse's Own Neuroticism Predict Perceptions of Partner Behavior?

Intrapersonal models suggest that spouses' neuroticism should also influence their perceptions of their partners' behavior, even once these associations between spouses' neuroticism and observations of these partners' behavior have been controlled. To examine this possibility, spouses' perceptions of their partners' behaviors were regressed onto their own neuroticism scores, controlling for observations of their partners' behavior, separately for each of the two discussions. To ensure that any associations between neuroticism and perceptions did not simply reflect satisfaction, these analyses controlled for spouses' own marital satisfaction. To again ensure that any effects obtained for one spouse were independent of any effects demonstrated for the other spouse, effects for husbands and wives were estimated separately but simultaneously in the first level of the following multilevel model, according to procedures described by Barnett et al. (1993):

$$\begin{aligned} Y = {} & \beta_1 (\text{dummy code for husbands}) + \beta_2 (\text{dummy code for wives}) + \\ & \beta_3 (\text{husbands' satisfaction}) + \beta_4 (\text{wives' satisfaction}) + \\ & \beta_5 (\text{observations of wives' behavior}) + \\ & \beta_6 (\text{observations of husbands' behavior}) + \\ & \beta_7 (\text{husbands' neuroticism}) + \beta_8 (\text{wives' neuroticism}) + e \end{aligned} \quad (2)$$

where Y is the spouse's perceptions of the partner's behavior; β_1 estimates husbands' intercept; β_2 estimates wives' intercept; β_3 captures the association between husbands' satisfaction and husbands' perceptions of wives' behavior; β_4 captures the association between wives' satisfaction and wives' perceptions of husbands' behavior; β_5 captures the association between observations of wives' behavior and husbands' perceptions of wives' behavior; β_6 captures the association between observations of husbands' behavior and wives' perceptions of husbands' behavior; β_7 captures the association between husbands' neuroticism and husbands' perceptions of wives behavior, controlling for husbands' satisfaction and observations of wives' behavior; β_8 captures the association between wives' neuroticism and wives' perceptions of husbands' behavior, controlling for wives' satisfaction and observations of husbands' behavior, and e is the residual variance in the couple, assumed to be independent and normally distributed. Because these level-1 effects were based on only two observations from each couple, husbands' reports and wives' reports, they were all treated as fixed and no random effects were estimated.

Results are reported in last two columns of Table 3. As those columns reveal, consistent with intrapersonal

models of neuroticism, husbands' and wives' neuroticism predicted more negative perceptions of their partners' behaviors during discussions of those partners' topics, controlling for observations of those partners' behaviors and own satisfaction. Furthermore, husbands' neuroticism also predicted more negative perceptions of their wives' behavior during discussions of husbands' own topics, controlling observations of those wives' behaviors and husbands' satisfaction. Of note, these significant effects for both husbands and wives emerged despite the lower-than-ideal reliability of measures of each spouse's perceptions of the partner's behavior during the interactions regarding husbands' topics, suggesting that the low reliability did not play a significant role in the results obtained here. In contrast, the association between wives' neuroticism and their perceptions of their husbands' behavior during discussions of their own topics did not reach significance. Furthermore, a direct test of the difference between husbands and wives in the strength of the association between own neuroticism and perceptions of partners' behavior during discussions of their own topics trended toward statistical significance ($\chi^2 = 2.21$, $p = .13$), suggesting that husbands' neuroticism may more strongly influence their perceptions during discussions of their own topics than wives' neuroticism influences their perceptions during discussions of their own topics.

According to other research on how intimates construe the details of their discussions with one another (e.g., McNulty & Karney, 2002), these perceptual effects of neuroticism may be mediated by neurotic spouses' more negative expectancies for how their discussions would proceed. To find out, additional analyses were conducted to compute Sobel (1982) tests using the z' statistic recommended by MacKinnon et al. (2002), where the critical value for $z' = 0.97$. In the first of set of these additional analyses, own neuroticism was regressed onto own expectancies, controlling for own satisfaction. Results of these analyses revealed that neuroticism significantly or marginally significantly predicted more negative expectancies for both husbands (for his own topic, $\beta = -0.93^{-1}$, $t = -1.75$, $p < 0.10$, $r = 0.15$; for partner topic, $\beta = -1.74^{-1}$, $t = -2.81$, $p < 0.01$, $r = 0.23$) and wives (for her own topic, $\beta = -1.57^{-1}$, $t = -2.75$, $p < 0.01$, $r = 0.23$; for partner topic, $\beta = -1.34^{-1}$, $t = -2.51$, $p < 0.05$, $r = 0.21$). Then in the second set of additional analyses, own expectancies were regressed onto own perceptions, controlling own satisfaction, own neuroticism, and partner behavior. According to those analyses, expectancies predicted husbands' perceptions (for own topic, $\beta = -4.21^{-1}$, $t = -2.75$, $p < 0.01$, $r = 0.23$; for partner topic, $\beta = -3.75^{-1}$, $t = -1.93$, $p = 0.06$, $r = 0.16$) but not wives' perceptions (for own topic, $\beta = 0.38^{-1}$, $t = 0.19$, $p > 0.50$, $r = 0.01$; for their partner topic, $\beta = -0.31^{-1}$, $t = -0.14$, $p > 0.50$, $r = 0.01$). Of note, the significant effects regarding husbands' expectancies emerged despite the lower-than-ideal reliability of the measure of husbands' expectancies for the interactions regarding their own topics, suggesting that the low reliability did not play a significant role in the results obtained for husbands. In contrast, it remains possible that the lower-than-ideal reliability of the measure of wives' expectancies for their husbands' behavior during interactions regarding those husbands' topic may have limited our ability to find effects. Nevertheless, direct tests of these gender differences revealed that husbands' expectancies marginally predicted or trended toward predicting perceptions of their wives' behavior more strongly than wives' expectancies predicted perceptions of their husbands' behavior—for own topic, $\chi^2(1) = 2.81$, $p = .08$; for partner topic, $\chi^2(1) = 1.34$, $p = .24$—suggesting that these different effects obtained for husbands and wives were real. Finally, Sobel tests based on the results of these analyses revealed that husbands' expectancies significantly mediated the effects of own neuroticism on perceptions of partner behavior in discussions of each spouse's topics (for own topics, $z' = 1.47$, $p < .05$, $r = .12$; for partner topics, $z' = 1.91$, $p < .05$, $r = .16$), indicating that more neurotic husbands perceived their discussions more negatively because they held lower expectancies for how those discussions would proceed. Notably, the mediation observed by husbands' expectancies appeared to be partial mediation, as neuroticism remained somewhat associated with perceptions even after expectancies were controlled (for own topic, $\beta = 1.46^{-1}$, $t = 1.88$, $p = .06$, $r = .16$; for their partner topic, $\beta = 1.11^{-1}$, $t = 1.49$, $p = .14$, $r = .13$). For wives, because their expectancies were unrelated to their perceptions (as revealed by the second set of additional analyses described above), Sobel tests failed to reach significance in both discussions (for own topic, $z' = -0.19$, $p > .50$, $r = .02$; for partner topic, $z' = -0.17$, $p > .50$, $r = .01$), indicating that more neurotic wives perceived that their husbands behaved more negatively during discussions of those husbands' topics for reasons other than their expectancies for those discussions.

DISCUSSION

Study Rationale and Summary of Predictions

Why are neurotic intimates likely to have difficulties in their relationships? The current study drew on self-report and observational data to demonstrate that there are two independent sources of such difficulties. Consistent with interpersonal explanations, men and women with higher

levels of neuroticism had partners who were observed to behave more negatively during discussions of relationship problems. Subsequent tests of mediation demonstrated wives' own negative behaviors mediated the effects of their neuroticism on their husbands' behavior, suggesting that more neurotic wives elicited such negativity themselves. But consistent with intrapersonal models of neuroticism, more neurotic spouses also perceived greater levels of negativity in their partners, even after the observed negativity had been controlled. Subsequent tests of mediation demonstrated husbands' negative expectancies mediated the effects of their neuroticism on their perceptions of their wives' behavior. Taken together, the results of this study indicate that more neurotic intimates have more difficult relationships because they are more likely to create negative experiences for themselves and, on top of that, construe their experiences more negatively. That both behavior and perceptions uniquely contribute to neurotic intimates' relationship troubles helps explain why such troubles are so strong and robust (see Karney & Bradbury, 1995).

Nevertheless, several predicted results failed to reach significance. First, although wives' neuroticism predicted their perceptions of their husbands' behaviors during discussions of husbands' topics, wives' neuroticism failed to predict their perceptions of their husbands' behaviors during discussions of their own topics, whereas the corresponding effect for husbands was significant and stronger in magnitude. Furthermore, the link between wives' neuroticism and their perceptions of their husbands' behaviors that did emerge was not mediated by wives' expectancies for that conversation. In other research, women demonstrate a general tendency to process information more deeply than men do (e.g., Tanaka, Panter, & Winborne, 1988), particularly information about their intimate relationships (e.g., Acitelli, 1992). Perhaps such deep processing minimizes the biasing influence of neuroticism and expectancies. But given the relatively small size of the current sample, and given that only one of wives' null effects was marginally different from the corresponding significant effect observed for husbands, the null effects observed for wives' neuroticism and expectancies on perceptions may have been due to low statistical power. Future research with larger samples attempting to account for any gender differences with specific explanations (e.g., information processing) would contribute to a better understanding of the perceptual effects of wives' neuroticism.

Second, husbands' behavior failed to mediate the effects of their own neuroticism on their wives' negative behavior, whereas the corresponding effect for wives was significant and stronger in magnitude. This gender difference is consistent with results obtained in research on dyadic interactions reported by Furr and Funder (1998). Specifically, those authors reported that although males' and females' dispositional negativity predicted more negative behaviors in themselves and randomly assigned partners, those associations emerged less consistently among men. According to those results and the results reported here, the wives of neurotic husbands may behave more negatively for reasons other than those husbands' behavior. For instance, it may be that more neurotic men and more negative women are more likely to enter into and remain in relationships with one another. Alternatively, the wives of more neurotic men may possess their own stable qualities that lead to their negative behavior. But like the null effects observed for wives, it is also possible that the current methodology accounted for the null effect of neuroticism on husbands' behavior. For instance, perhaps the coding system used here was not sensitive to the types of behaviors that neurotic husbands exhibit that elicit more negative behaviors from their wives, as it overlooked ambiguous affective behaviors through which husbands' neuroticism may have led to more overt expressions of wives' negative behaviors. Future research may benefit by examining behaviors other than the ones examined here, or potential nonbehavioral variables, as explanations of the relationship between males' neuroticism and females' more negative behaviors.

Study Implications

The current findings have both theoretical and practical implications. With respect to theory, the current findings mirror findings from studies of other intrapersonal qualities (e.g., attachment anxiety; Collins & Feeney, 2004; Simpson, Rholes, & Nelligan, 1992) to reveal two independent mechanisms through which neuroticism affects relationships: behavior and perceptions. The idea that personality affects relationships through behavior is not particularly novel. In fact, numerous previous discussions and models of relationships highlight this link (e.g., Karney & Bradbury, 1995; Kelley et al., 1983). But the finding that personality also affects close relationships through processes of perceptual construal beyond such behavioral effects is rather novel and has implications for interpretations of previous research and directions for future research. With respect to previous research, the fact that personality uniquely contributes to behavior and perceptions suggests that important effects of personality may have been obscured by studies that have not simultaneously examined such effects. Specifically, whereas neuroticism appears to influence behavior and perceptions in the same direction, other personality traits may affect behavior and perceptions in competing directions, leading to average effects of those traits that appear nonexistent. Consistent with this possibility, reviews reveal few consistent effects of personality on relationships other than those demonstrated by neuroticism (e.g.,

Karney & Bradbury, 1995). With respect to future research, the current finding that personality uniquely predicts behavior and perceptions suggests that future studies that examine such effects independently and simultaneously may shed new light on the role of other personality traits in predicting interpersonal outcomes.

With respect to practice, the current study also shed light on the challenges of treating relationships in which at least one partner is neurotic. Not only must practitioners address the behavioral problems likely to be affecting such couples but they must address intimates' cognitive distortions as well. In light of both sources of dysfunction, marriages in which one or both partners demonstrate high levels of neuroticism may benefit most from cognitive–behavioral approaches (for review, see Epstein & Baucom, 2002). The behavioral components of these approaches can teach neurotic intimates the skills to solve problems effectively without eliciting negativity from the partner. Indeed, even spouses high in neuroticism who possess effective problem-solving skills have been shown to be at reduced risk for engaging in negative behaviors such as violence (Hellmuth & McNulty, 2008). But even in the absence of negative experiences, spouses with high levels of neuroticism appear to perceive greater negativity in their partners. Accordingly, in addition to such behavioral efforts, the cognitive components of treatment will benefit couples by helping to limit neurotic spouses' negatively distorted views of their partners' behaviors. One way to reduce cognitive biases may be to encourage the spouses of neurotic people to limit or at least clarify the meaning behind any ambiguous behaviors. An emerging body of evidence suggests that ambiguous information is more susceptible to processes of perceptual construal than more concrete information (e.g., Dunning, Meyerowitz, & Holzberg, 1989; McNulty & Fisher, 2008; McNulty & Karney, 2001). Accordingly, neurotic individuals should be less likely to negatively interpret definitively nonnegative information as compared to more ambiguous information. Further research may shed additional light on the best ways to address the behavioral and cognitive sources of negativity in the marriages of neurotic spouses.

Study Strengths and Limitations

Several strengths of this research enhance confidence in the findings reported here. First, the current research drew on both self-report and observational data to examine the behavioral and perceptual implications of neuroticism in relationships, controlling for the behavioral implications when examining the perceptual ones, thus increasing the likelihood that such perceptions reflect processes of construal rather than the reality of those experiences. Second, the behaviors and perceptions examined here were drawn from discussions about important marital topics, suggesting that the processes observed here may be likely to generalize to discussions of important topics that occur throughout marriage. Third, the couples examined here were relatively homogenous in age, relationship length, and other factors, helping reduce variance in factors unrelated to the current analyses that could have obstructed tests of the current hypotheses. Finally, the current analyses examined effects of husbands' and wives' neuroticism simultaneously using hierarchical linear modeling, thus controlling for the nonindependence of these married couples' data.

Despite these strengths, certain factors nevertheless qualify the current findings until they can be reproduced in subsequent research. First, the current sample was rather small, possibly leading to some of the study's null effects (e.g., lack of perceptual effects for wives during conversations of their own topics), as discussed earlier. Future research using larger samples that yield more power would complement the current research. Second, the behaviors examined here (i.e., negative verbal problem-solving behaviors) were only a subset out of many potential behaviors that can affect marriages and other relationships. Furr and Funder's (1998) research revealed that dispositional negativity predicted negativity in a wide variety of interpersonal behaviors, suggesting that the effects observed here may generalize to other interpersonal behaviors between intimates. Future research that examines the association between neuroticism and observations and perceptions of other behaviors (e.g., affect, support provisions) may therefore complement the current findings. Finally, although the homogeneity of the current sample helped provide the internal validity necessary to draw confident conclusions, future research replicating the current findings on other samples (e.g., established marriages) is needed before the current results can be generalized to populations not examined here.

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Received August 28, 2007
Revision accepted April 13, 2008