

Social Anxiety Disorder and Perceived Criticism in Intimate Relationships: Comparisons With Normal and Clinical Control Groups

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Individuals with social anxiety disorder (SAD) have difficulties in their romantic relationships, including decreased satisfaction and intimacy, but the reasons for these difficulties are poorly understood. Because fear of negative evaluation is a cardinal feature of SAD, perceived criticism from a romantic partner may play a central role in socially anxious individuals' relationships. In the present study, we compared levels of perceived, expressed, and observed criticism and reactions to criticism among individuals with SAD and their partners ($n = 21$), individuals with other anxiety disorders and their partners ($n = 35$), and couples free of psychopathology ($n = 30$). Participants rated both global criticism and criticism during a 10-minute problem-solving task, which was also coded for criticism by observers. Individuals with anxiety disorders showed elevated levels of interaction-specific perceived criticism,

expressed criticism, and upset and stress due to criticism relative to normal controls; they also reported that the interaction was more stressful. However, there were no group differences on global measures of criticism, and the two anxious groups did not differ on any measures. Findings suggest that the high levels of criticism anxious individuals perceive and their corresponding negative reactions to criticism, though not specific to SAD, may account for some of the relationship difficulties that have been identified in SAD. Results also indicate that anxious individuals may contribute to their relationship difficulties by being highly critical themselves. Overall, our findings point to the need for a clinical focus on decreasing perceived criticism among individuals with anxiety disorders.

Keywords: social anxiety; intimate relationships; anxiety disorders; perceived criticism

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SOCIAL ANXIETY DISORDER (SAD), one of the most common mental disorders (Kessler et al., 2005), is associated with considerable disability (Stein & Kean, 2000). Though effective treatments for SAD have been developed, including cognitive-behavioral therapy (CBT) and pharmacotherapy (Mayo-Wilson et al., 2014), only about half of SAD patients respond to these treatments (Davidson et al., 2004). Moreover, individuals with SAD have difficulty forming close relationships, including romantic relationships (e.g., Davidson, Hughes, George, & Blazer, 1994). Even when formed, such

relationships are fraught with difficulty. In romantic relationships social anxiety is associated with decreased relationship satisfaction (Filsinger & Wilson, 1983; Porter & Chambless, 2014), decreased social support (Porter & Chambless, 2014, 2017; Rapee, Peters, Carpenter, & Gatson, 2015), greater conflict and communication difficulties (Cuming & Rapee, 2010; Wenzel, Graff-Dolezal, Macho, & Brendle, 2005), difficulties with emotional expression, self-disclosure, and intimacy (Porter & Chambless, 2014; Sparrevojn & Rapee, 2009), and higher rates of relationship dissolution (Porter & Chambless, 2017). Although CBT is associated with small improvements in satisfaction with interpersonal functioning, many treatment completers fail to achieve normative levels of satisfaction (Eng, Coles, Heimberg, & Safren, 2005).

Perceived criticism from a romantic partner is one aspect of relationship functioning that has received little attention where SAD is concerned. Criticism from a family member or romantic partner has long been recognized as an important predictor of individual well-being: A large body of literature has demonstrated that high levels of familial expressed emotion (EE), which includes criticism as well as hostility and emotional overinvolvement, predict higher rates of relapse in a number of different psychological disorders, including major depressive disorder (MDD), schizophrenia, eating disorders, and substance use disorders (see Hooley, 2007, for a review). Unlike EE criticism, which is coded by a rater from an interview with the relative, perceived criticism assesses the patient's subjective sense of being criticized by the relative by asking, "How critical is your relative of you?" Perceived criticism has been found to be a more robust predictor of clinical outcomes in patients with anxiety disorders and depression than EE criticism (Chambless & Steketee, 1999; Hooley & Teasdale, 1989). Indeed, perceived criticism from relatives with whom the patient lives has been identified as a predictor of poor treatment response in anxiety and fear-based disorders such as obsessive-compulsive disorder, panic disorder, and agoraphobia (Chambless et al., 2017; Chambless & Steketee, 1999), and in a variety of other disorders (for a review, see Masland & Hooley, 2015). Perceived criticism is also associated with poor relationship satisfaction (Renshaw, 2008). A related construct, also linked to treatment outcome, is how upset an individual becomes when criticized by the intimate other. Upset due to criticism has been found to predict poor clinical outcomes in bipolar disorder (Miklowitz, Wisniewski, Miyhara, Otto, & Sachs, 2005) and to mediate the relationship between perceived criticism and weekly ratings of

mood and anxiety symptoms (Steketee, Lam, Chambless, Rodebaugh, & McCulloch, 2007) among patients in treatment for anxiety disorders. Although no existing study has adequately tested the relationship of perceived criticism or upset due to criticism to outcome of SAD treatment, the literature on other anxiety disorders suggests that decreasing perceived criticism and upset due to criticism among patients with SAD has the potential to improve treatment response rates and increase relationship satisfaction (see Chambless, 2012).

Although perceived criticism has been generally found to have small, nonsignificant relationships with measures of psychopathology (Renshaw, 2008), there is theoretical reason to believe that patients with SAD may display elevated levels of perceived criticism. A central feature of SAD is an excessive fear of negative evaluation (Rapee & Heimberg, 1997). Empirical data indicates that individuals high in social anxiety are more attuned to signs of disapproval from others (Veljaca & Rapee, 1998) and perceive their interpersonal interactions in a more negative light than do their interaction partners (Stopa & Clark, 1993). Individuals high in social anxiety may therefore be more likely to notice criticism from a romantic partner and to interpret a partner's comments as critical. Criticism from a partner may also be especially upsetting for these individuals, as it may be interpreted as confirmation of their worst fears that they will be negatively evaluated and rejected by others.

To date, only one study has examined whether social anxiety is associated with perceived criticism from a romantic partner. Porter, Chambless, and Keefe (2017) found that among undergraduates, social anxiety was not associated with global perceived criticism from a romantic partner (that is, how critical the respondent perceived the partner to be of him or her in general) or with perceived criticism from a partner specifically during a problem-solving interaction task. However, Porter et al. found evidence that individuals higher in social anxiety, particularly women, are more globally upset by a partner's criticism. Moreover, women's upset due to criticism mediated the relationship between social anxiety and a composite measure of intimacy and relationship satisfaction. This study had several limitations. First, the severe end of the continuum of social anxiety was not well represented in Porter et al.'s study, and it is not clear whether the observed associations with criticism would hold in a more severe sample. Second, couples were young and in relatively short relationships, and chose to discuss fairly trivial problems, raising questions about whether results would generalize to couples in more long-standing

and committed relationships, who may be facing more significant relationship difficulties. Thus, a replication of this study using a clinical sample of older couples in more committed relationships is needed. Further study of the role of perceived criticism and upset about that criticism in SAD is important because, although individuals with SAD have problematic relationships, the reasons for these difficulties are not yet well understood. If socially anxious individuals perceive their romantic partners as especially critical or become especially upset in response to their partners' criticism, this might contribute to their being less satisfied in their relationships, self-disclosing less to their romantic partners, reporting less emotional intimacy with their partners, and perceiving intimacy as especially risky (Porter & Chambless, 2014). Furthermore, if individuals with SAD report high levels of perceived criticism or upset about criticism in their intimate relationships, this would underscore the importance of addressing perceived criticism clinically in this population and studying its impact on treatment outcome.

If individuals with SAD report elevated levels of perceived criticism, it will be important to determine whether this is a product of negative perceptual bias or whether these individuals are truly subject to more criticism from their partners than are individuals without this disorder. These alternative explanations have different implications for treatment. One way to differentiate between these alternatives is to examine whether partners of those with SAD show elevations on measures of criticism as rated by others. Previous studies have found that patients' ratings of perceived criticism are positively related to both relatives' reports of expressed criticism of the patient and observer ratings of relatives' criticism although substantial unexplained variance in perceived criticism remains (Chambless & Blake, 2009; Hooley & Teasdale, 1989). However, moving beyond self-report is crucial to determine whether individuals with SAD are truly subject to more criticism or whether this problem is mainly in the eye of the socially anxious beholder.

Another important question is whether individuals with SAD might elicit criticism from their partners by expressing more criticism themselves. Consistent with this notion, Porter et al. (2017) found that higher levels of social anxiety were associated with participants' self-reports of being more globally critical of their partners. Moreover, male partners of women higher in social anxiety reported higher levels of global perceived criticism. These findings are consistent with previous research indicating that parents with SAD were rated by observers as being more critical during a 5-minute

interaction with their nonanxious children than were parents with anxiety disorders apart from SAD (Budinger, Drazdowski, & Ginsburg, 2013). Porter et al.'s findings are also consistent with previous work documenting problematic communication behaviors among socially anxious individuals when interacting with their romantic partners: Although they did not examine criticism specifically, Wenzel et al. (2005) found that observers rated socially anxious undergraduates as displaying more very negative communication behaviors than non-anxious undergraduates during a 10-minute discussion of a relationship problem with a romantic partner. These findings highlight the need for further research examining criticism from individuals with SAD toward their romantic partners, particularly given prior research finding that criticism is predictive of relationship dissolution (see Gottman, Gottman, Greendorfer, & Wahbe, 2014).

In the present study, we seek to better understand whether SAD is associated with greater perceived criticism from a romantic partner, more upset in reaction to criticism from a partner, and greater expressed criticism to a partner among couples in committed relationships who are cohabitating. We examine both global criticism (i.e., how critical do individuals with SAD perceive their partners to be in general) and criticism during a 10-minute problem-solving interaction where observer ratings of criticism could simultaneously be collected and memory bias was less likely to be a factor. In addition to self-report, we utilize partner- and observer-report measures. We also build upon previous research examining relationship functioning among socially anxious individuals by comparing a clinical sample of individuals with SAD to individuals with other anxiety disorders, as well as normal controls. This design allows us to determine whether any observed differences in criticism are specific to SAD or a feature of anxiety disorders more broadly.

We hypothesized that individuals with SAD would be more upset by criticism and would experience a problem-solving discussion as more stressful than normal controls and individuals with other anxiety disorders, as measured by self- and partner-reports of upset, as well as self-reports of postdiscussion stress. We further hypothesized that individuals with SAD would be more critical of their partners, as measured by self-, partner-, and observer-reports, than would normal controls or individuals with other anxiety disorders. Finally, we tested whether individuals with SAD would perceive their partners to be more critical than anxious and normal control participants. In the one study of social anxiety and perceived criticism to date (Porter et al., 2017), socially anxious students

did not perceive their partners as more critical. However, because this was a nonclinical sample and because theory suggests that socially anxious individuals should perceive criticism more readily, the relationship of SAD to perceived criticism merits further examination.

Previous research suggests that interactions between depressed individuals and their spouses are characterized by high levels of negative communication behaviors (see Rehman, Gollan, & Mortimer, 2008 for a review). Thus, in a final set of analyses we examined whether any obtained differences among groups were still observed when we excluded individuals with comorbid major depression.

Method

Participants and measures for the present study are drawn from a larger ongoing study, the Family Relationships and Anxiety Disorders Study.

PARTICIPANTS

Participants were 86 heterosexual couples who had been cohabitating for at least 3 months prior to study participation. See Table 1 for information

about sample demographics. Couples who reported any severe domestic violence in the past year were excluded. All study procedures were approved by the University of Pennsylvania Institutional Review Board.

Clinical Sample

The clinical sample consisted of individuals with a primary diagnosis of a *DSM-IV* (American Psychiatric Association [APA], 2000) anxiety disorder (henceforth *targets*) and their romantic partners ($n = 60$). Targets with a primary diagnosis of specific phobia or performance-specific SAD and no other anxiety disorders were excluded from the study; however, those with anxiety disorder not otherwise specified were eligible for the study if this diagnosis was deemed clinically significant at intake. Targets were excluded if they were acutely suicidal, had organic brain pathology or significant cognitive impairment, had a lifetime history of bipolar disorder or psychosis, or if they met criteria for substance dependence during the 6 months prior to study participation. We also excluded couples in which the partner was cognitively

Table 1
Demographics and Study Measure Descriptive Statistics for Couples by Diagnostic Group

		Socially anxious ($n = 21$)				Other anxiety ($n = 35$)				Normal controls ($n = 30$)			
		Targets		Partners		Targets		Partners		Targets		Partners	
		<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Sex	Female	16	76.2%	5	23.8%	23	65.7%	12	34.2%	24	80.0%	6	20.0%
Race	White	17	81.0%	16	76.2%	25	71.4%	21	60.0%	22	73.3%	24	80.0%
	Black/African American	3	14.3%	3	14.3%	5	14.3%	7	20.0%	3	10.0%	4	13.3%
	Asian	0	0.0%	2	9.5%	1	2.9%	0	0.0%	2	6.7%	2	6.7%
	Other	1	4.8%	0	0.0%	4	10.0%	2	5.7%	3	10.0%	0	0.0%
	Unknown	0	0.0%	0	0.0%	0	0.0%	5	14.2%	0	0.0%	0	0.0%
Ethnicity	Hispanic	3	14.3%	1	4.8%	2	5.7%	1	2.9%	2	6.7%	0	0.0%
	Non-Hispanic	18	85.7%	20	95.2%	33	94.3%	27	77.1%	27	90.0%	30	100%
	Unknown	0	0.0%	0	0.0%	0	0.0%	7	17.5%	1	3.3%	0	0.0%
Education	High School Diploma or Less	1	4.8%	2	9.5%	4	11.4%	7	20.0%	1	3.3%	1	3.3%
	Some College or 2 Year College Degree	4	19.0%	5	23.8%	6	17.1%	4	11.4%	3	10.0%	5	16.7%
	4 Year College Degree	8	38.1%	5	23.8%	9	25.7%	10	28.6%	7	23.3%	8	26.7%
	Any Graduate School	8	38.1%	8	38.1%	16	45.7%	10	28.6%	18	60.0%	16	53.3%
	Unknown	0	0.0%	1	4.8%	0	0.0%	4	11.4%	1	3.3%	0	0.0%
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Age (years)		34.1	12.02	36.2	13.09	36.7	10.06	39.1	10.80	32.2	8.62	32.8	9.43
PCM: Perceived criticism		4.3	2.70	4.3	2.97	4.9	2.65	5.3	2.74	3.5	1.98	4.1	2.54
PCM: Upset		5.8	2.84	-	-	6.6	2.30	-	-	5.1	2.45	-	-
PCM-I: Perceived criticism		4.2	2.06	4.9	2.74	3.7	2.40	4.4	2.81	2.2	1.15	3.7	2.93
PCM-I: Upset		3.5	2.32	-	-	3.5	2.37	-	-	1.9	1.42	-	-
PCM-I: Expressed criticism		5.3	2.43	4.3	2.20	4.6	2.34	4.2	2.54	4.0	2.32	3.8	2.17
PCM-I: Partner's upset		-	-	3.7	2.63	-	-	3.3	2.71	-	-	2.4	1.96
Observed criticism		3.5	1.89	3.2	1.72	3.1	1.66	3.2	2.07	2.2	1.24	2.5	1.26
PDSS		11.0	4.43	-	-	10.6	4.33	-	-	7.6	4.52	-	-

Note. Means and standard deviations for measures not included in analyses are not listed. PCM = Perceived Criticism Measure; PCM-I = Interaction-Specific Perceived Criticism Measure; PDSS = Perceived Discussion Stress Scale; RAS = Relationship Assessment Scale.

impaired, had been diagnosed with a psychotic disorder, or had uncontrolled bipolar disorder at the time of study participation. We did not conduct diagnostic interviews with partners but did ask screening questions of the target about the partner's diagnostic history and current functioning to assess for the aforementioned conditions. Because our intent was to compare couples in which the target had SAD to those in which the target had a different anxiety disorder, targets with a subclinical diagnosis of SAD as evidenced by a severity rating of 3 on the SAD module of the Anxiety Disorders Interview Schedule for *DSM-IV* (ADIS-IV; Brown, DiNardo, and Barlow, 1994) ($n = 1$) were excluded from the present analyses. Several couples completed all study procedures but were excluded from the present analyses due to a failure of our video-recording equipment ($n = 2$) and previously undiagnosed cognitive impairment in the target which interfered with questionnaire completion ($n = 1$). Thus, the final clinical sample consisted of 56 couples. Couples that included a target with a diagnosis of SAD ($n = 21$) were designated as belonging to the SAD group, regardless of whether or not SAD was primary. Couples that included a target without a diagnosis of SAD ($n = 35$) were designated as belonging to the other anxiety group.

The average number of clinical diagnoses was 3.1 in the SAD group ($SD = 1.22$, range = 2-6) and 1.7 in the other anxiety group ($SD = 0.80$, range = 1-4). This difference was statistically significant, $t(30) = 4.72$, $p < .001$, $d = 1.37$. Accordingly, we reran our main analyses comparing the SAD and other anxiety groups, controlling for number of diagnoses. The pattern of results remained unchanged; thus, we present the original analyses below, in which we did not control for number of diagnoses. Four participants in the SAD group (19.0%) and six participants in the other anxiety group (17.6%) received a comorbid diagnosis of MDD. Within the SAD group, the mean ADIS clinical severity rating for SAD was 5.1 ($SD = 1.04$, range = 4-7). Six participants (28.6%) had a primary diagnosis of SAD. See Supplementary Table 1 for additional information about target diagnoses.

Normal Control Sample

The normal control sample consisted of couples in which neither partner met criteria for any *DSM-IV* disorders ($n = 34$). Couples in which a partner was currently taking psychotropic medication were also excluded. Additionally, to equate the normal control and clinical samples on age, we excluded the four youngest couples in the normal control sample from the present analyses. Thus, the final normal control sample consisted of 30 couples.

MEASURES

Interview Measures

Anxiety Disorders Interview Schedule for DSM-IV (ADIS-IV). The ADIS-IV (Brown, DiNardo, and Barlow, 1994) was used to screen for the presence of anxiety disorders, exclusionary conditions, and other comorbid disorders among targets in the clinical sample. The ADIS is a semistructured diagnostic interview. The interviewer assesses the presence or absence of each disorder and assigns each disorder a severity rating ranging from 0 (*absent*) to 8 (*very severe*). Ratings of 4 and above are considered clinically significant. In the present study, ADIS interviewers were doctoral students and postdoctoral fellows in clinical psychology who were trained to reliability with a master rater. Measures of interrater reliability were obtained based on ratings of audio-taped interviews. Interrater reliability was acceptable ($\kappa = .87$ for SAD; $\kappa = .74$ -1.00 for all diagnoses). Reliability on SAD severity was excellent, $\rho_1(2, 1) = .91$. A subset of targets ($n = 27$) were recruited from other clinics or research studies and had already completed the ADIS. We obtained consent to use their prior ADIS data rather than readministering the ADIS to these targets. Most of these targets ($n = 18$) were recruited from a panic disorder treatment study (Milrod et al., 2016), in which interrater reliability on the ADIS was acceptable ($\kappa = .64$ -1.00 for all diagnoses; for SAD, $\kappa = .70$ and $\rho_1[2, 1] = .70$). Participants recruited from other studies completed the present study within 3 months of administration of the ADIS. The vast majority of these participants completed the present study approximately 3 weeks after administration of the ADIS.

Mini International Neuropsychiatric Interview (MINI). The MINI (Sheehan et al., 1998) was used to screen for the presence of psychiatric disorders in the normal control sample. The MINI is a brief structured diagnostic interview with favorable psychometric properties, including high interrater reliability and convergent validity with other structured diagnostic interviews (Sheehan et al., 1998). Participants in the normal control sample completed a set of yes/no questions that screen for the presence or absence of each disorder in self-report form online prior to study participation. Participants who answered in the affirmative to any of the screening questions were contacted by phone by a clinical psychology doctoral student, who administered the corresponding MINI modules.

Self-Report Measures

In addition to the measures listed below, all participants also provided basic demographic

information and completed other measures not pertinent to the present study.

Perceived Criticism Measure (PCM). The PCM (Hooley & Teasdale, 1989) is a 2-item measure that asks individuals to rate on a 10-point Likert scale how critical their partners are of them and how upset this makes them. The PCM has demonstrated good convergent and discriminant validity, moderate agreement with relatives' ratings of expressed criticism, and good test-retest reliability (see Renshaw, 2008, for a review).

Interaction-Specific Perceived Criticism Measure (PCM-I). This modified version (Chambless & Blake, 2009) of the original PCM asks respondents to base their criticism ratings on a specific interaction. In addition to rating perceived criticism and upset due to criticism during the interaction, participants also rated on the same 10-point scale how critical they were of their partners and how upset their partners became when criticized. The PCM-I has demonstrated high levels of agreement with observers' ratings of criticism and spouses' ratings of expressed criticism during the same interaction, and higher scores predict lower marital satisfaction (Chambless & Blake, 2009).

Perceived Discussion Stress Scale (PDSS). The PDSS (Powers, Pietromonaco, Gunlicks, & Sayer, 2006) is a 3-item, self-report measure of stress in response to a couples' problem-solving interaction. Respondents rate how stressful, intense, and negative the discussion was on 7-point Likert scales. Internal consistency was good in the present ($\alpha = .84$) as in past (Powers et al., 2006) samples.

Observer-Rated Measures

Observed criticism. A team of four female undergraduates who were uninformed as to study hypotheses and couple psychopathology independently coded all interactions for criticism. Ratings were made for each partner's behavior across the entire problem-solving interaction using the same 10-point Likert scale employed by the PCM. Raters were not trained; instead, they used their personal judgment to determine the extent to which an individual was critical during the interaction. Raters' judgments were then averaged to yield the final score. Previous researchers have found that pooled naive ratings of criticism are highly reliable and show moderate to large, significant correlations with participants' ratings of perceived criticism ($\rho = .47$) and marital satisfaction ($\rho_s = -.45$ to $-.35$; Chambless & Blake, 2009). In the present study, interrater reliability was very good, $\rho_{I(3, 4)} = .88$.

PROCEDURE

Clinical Sample

Targets in the clinical sample were recruited via flyers, online advertisements, and referrals from other research studies and clinics. Targets completed a telephone screening interview with a research assistant to assess basic eligibility criteria and subsequently were scheduled for the ADIS. If eligible based on their ADIS, targets were invited to attend the main study visit with their romantic partner. During this visit, the couple provided informed consent before completing a series of self-report questionnaires including the PCM. Next, in randomized order couples (a) met separately with study staff for further interviewing about the target's symptoms, and (b) completed the problem-solving interaction tasks.

For the problem-solving tasks, couples were instructed to select the top problem area in their relationship that was related to the target's anxiety disorder and the top problem area in their relationship that was not related to the anxiety disorder. A research assistant helped to facilitate this process and ensure that the couple agreed on their problem topics. When couples had difficulty generating topics, the research assistant provided suggestions from items both had endorsed on the Areas of Change Questionnaire (Weiss, Hops, & Patterson, 1973). The couple was then instructed to discuss each topic for 10 minutes and to try to work towards a mutually satisfactory resolution of the problem. The research assistant was not present while the couple discussed the problem. The interaction was videotaped and later coded for criticism by observers. Following the discussion, participants completed the PCM-I, PDSS, and other measures not pertinent to the present study. The order in which couples completed the anxiety-related and non-anxiety-related interactions was randomly assigned. We verified with *t*-tests that there were no significant order effects. In the present study, to keep coders uninformed as to the clinical status of participants, we analyzed data from the non-anxiety-related discussions only.

Targets were paid \$10 per hour to complete the ADIS, and targets and relatives were each paid \$75-\$105 to complete the main study visit.

Normal Control Sample

Participants in the normal control sample were recruited via flyers and online advertisements, which included a link to the screening questionnaires for the study. The first individual from each couple to participate in the study provided informed consent and completed the screening questionnaires, which included the MINI screening

questions. Participants who appeared eligible or possibly eligible based on their responses to these questionnaires were then asked to provide their own and their partners' contact information. Participants who responded in the affirmative to any of the MINI screening questionnaires but who otherwise appeared eligible for the study were contacted by a graduate student who administered the relevant MINI modules to determine eligibility. Partners of participants who were deemed eligible were then contacted with the link to the screening questionnaires, and this process was repeated. Once both partners had completed the screening procedures, eligible couples were invited for the main study visit.

Procedures for the study visit were similar to those employed for the clinical sample, with the exception that the anxiety-related problem-solving interaction was omitted. Each partner was paid \$50 for participation in the study.

For data analysis purposes, we needed to determine which partner in each normal control couple would be compared to the targets from the clinical sample, and which partner would be compared to the partners in the clinical sample. To do this, we calculated the proportion of male targets in the clinical sample and randomly selected an equal proportion of normal control couples for which the male partner would serve as the target to whom we would compare targets in the clinical sample. In the remaining normal control couples, the female partner served as the target.

Data Analysis

All statistical analyses were conducted within the R statistical computing language. Several predicted variables violated the normality assumption due to outliers and skew. In lieu of transforming these variables to approximate normality, when analyzing nonnested data, we employed a robust regression framework using the package "robustbase" (Maechler et al., 2016). A robust regression iteratively assesses the influence of multivariate outliers, downweights the contribution of outliers using a prespecified function based on their severity, re-fits the model using the new weights, and repeats this process until reaching a convergence criterion. Settings for the robust regression were made as per Koller and Stahel (2017).

For nested data jointly analyzing assessments from multiple reporters (i.e., target, partner, and observer), we employed linear mixed models using the packages "lme4" and "lmerTest" (Kuznetsova, Brockhoff, & Christensen, 2017). Multiple observations were nested within a random effect of target. Fixed effects included clinical group (between-individuals), report-

er (within-individuals), and the interaction between these variables. Degrees of freedom were calculated using Satterthwaite's approximation.

Because we were interested in differences between the clinical and control groups and between the SAD and other anxiety disorders groups, each analysis was first run on the full sample with groups coded as clinical and control and was then repeated on the clinical subsample with groups coded as SAD and other anxiety. Below, we report the full results from analyses examining differences between the clinical and control groups. For analyses examining differences between the SAD and other anxiety groups, we report only the main effects of group; the main effects of reporter and its interaction with group are reported in the text only when the pattern of these results differed from the analyses comparing the clinical and control groups. The full details of these analyses are available in this article's supplementary materials. Below, positive *ds* indicate that the clinical or SAD group scored higher on a given measure than the control or other anxiety group, whereas negative *ds* indicate that the clinical or SAD group scored lower. We used post-hoc pairwise comparisons to better understand the nature of any significant effects of reporter and corrected for multiple comparisons using the Holm-Bonferroni correction (Holm, 1979). One target in the anxious control group failed to complete the standard PCM and was excluded from analyses examining global target perceived criticism and upset due to criticism; apart from that, there were no missing data.

Results

DESCRIPTIVE STATISTICS AND CORRELATIONS AMONG CRITICISM MEASURES

Sample demographics and mean scores on study measures are presented in Table 1. The three groups did not differ from one another on any demographic measures. There was generally substantial agreement between target, partner, and observer ratings of criticism during the interactions and high levels of agreement between target and partner ratings of how upset the target was by the partner's criticism; Spearman nonparametric correlations ranged from .30 to .57 (see Supplementary Table 2). The exception was the observers' agreement with the normal control partners on their expressed criticism, for which the correlation was small and not significant, $r_s = .09$. It is not clear why this is the case when a strong correlation ($r_s = .56$) was observed for the clinical sample. The data also suggest negative reciprocity in the problem-solving interactions in that, according to observers, there were moderate to large correlations between targets' and partners'

criticism of one another ($r_s = .27$ for clinical participants and $.65$ for normal controls).

GROUP DIFFERENCES IN PARTNER CRITICISM

We used robust regression to test for group differences between the clinical and control groups and between the SAD and other anxiety groups on global target perceived criticism. Results indicated that the clinical and control samples did not differ significantly from one another ($B = 1.04$, $CI_{95\%} [-0.10, 2.19]$, $t(84) = 1.81$, $p = 0.07$, $d = 0.40$), nor did the two clinical groups differ from one another ($B = -0.55$, $CI_{95\%} [-2.11, 1.02]$, $t(54) = -0.70$, $p = 0.49$, $d = -0.19$). Effect sizes were small.

Next, we used linear mixed models to test whether the groups differed on interaction-specific partner criticism of the target. In analyses comparing the clinical and control groups, there was a significant effect of group such that partners of targets in the clinical sample were significantly more critical than partners of targets in the control sample with a medium effect size ($B = 0.95$, $CI_{95\%} [0.24, 1.66]$, $t(84) = 2.62$, $p = 0.01$, $d = 0.59$). There was also a significant, small-medium effect of reporter ($F(2,170) = 12.9$, $p < .001$, $\eta_p^2 = .07$), such that partners themselves reported being more critical than either targets ($B = -0.81$, $CI_{95\%} [-1.27, -0.35]$, $t(170) = -3.50$, $p < .001$, $d = -0.54$) or observers rated them as being ($B = -1.15$, $CI_{95\%} [-1.61, -0.69]$, $t(170) = -4.93$, $p < .001$, $d = -0.76$). Effect sizes were medium to large. Additionally, there was a small but significant Group \times Reporter interaction, $F(2, 168) = 3.74$, $p = 0.03$, $\eta_p^2 = .04$, such that the clinical group demonstrated significantly higher target-reported perceived criticism as compared to the control group with a medium effect size ($d = 0.53$, $p < .001$), but the two groups did not differ on partner-reported expressed criticism ($d = 0.14$, $p = 0.35$), or on observer-rated partner criticism ($d = 0.24$, $p = 0.11$). Effect sizes for between-group differences on partner- and observer-rated measures were small. In analyses comparing the SAD and other anxiety groups, the groups did not differ significantly from one another, and the effect size was small ($B = 0.24$, $CI_{95\%} [-0.75, 1.22]$, $t(54) = 0.48$, $p = 0.64$, $d = 0.13$). The Group \times Reporter interaction was also small and not significant in this analysis, $F(2, 108) = 0.37$, $p = 0.69$, $\eta_p^2 < .01$.

GROUP DIFFERENCES IN TARGETS' CRITICISM OF THEIR PARTNERS

We next examined differences in partners' reports of global perceived criticism. Results indicated that partners of targets in the clinical and control groups did not differ significantly on global perceived

criticism ($B = 0.84$, $CI_{95\%} [-0.47, 2.14]$, $t(84) = 1.28$, $p = 0.21$, $d = 0.28$), nor did partners of targets in the SAD and other anxiety groups differ significantly from one another ($B = -1.14$, $CI_{95\%} [-2.81, 0.53]$, $t(54) = -1.37$, $p = 0.18$, $d = -0.37$). Effect sizes were small.

Next, we examined group differences on interaction-specific target criticism. In analyses comparing the clinical and control groups, there was a significant effect of group such that targets in the clinical group were more critical than targets in the control group with a medium effect size ($B = 0.94$, $CI_{95\%} [0.14, 1.74]$, $t(84) = 2.31$, $p = 0.02$, $d = 0.52$). There was also a significant, large effect of reporter, $F(2,170) = 21.8$, $p < .001$, $\eta_p^2 = .22$, such that observer ratings of target criticism were lower than either targets' reports of expressed criticism ($B = 1.67$, $CI_{95\%} [1.14, 2.19]$, $t(170) = 6.19$, $p < .001$, $d = 0.95$) or partners' reports of perceived criticism ($B = 1.36$, $CI_{95\%} [0.84, 1.89]$, $t(170) = 5.07$, $p < .001$, $d = 0.78$). Effect sizes were large. The interaction between group and reporter was small and not significant, $F(2, 168) = 0.07$, $p = 0.93$, $\eta_p^2 < .01$. In analyses comparing the SAD and other anxiety groups, the groups did not differ significantly from one another, and the effect size was small, $B = 0.56$, $CI_{95\%} [-0.43, 1.55]$, $t(54) = 1.10$, $p = 0.28$, $d = 0.30$.

Group Differences in Targets' Reactions to Criticism

We next examined whether the groups differed on targets' global reports of upset due to criticism. Targets in the clinical group and control group did not differ significantly from one another on global upset due to criticism ($B = 1.20$, $CI_{95\%} [-0.01, 2.42]$, $t(84) = 1.97$, $p = 0.053$, $d = 0.43$), nor were there significant differences between the SAD and other anxiety targets ($B = -0.82$, $CI_{95\%} [-2.32, 0.69]$, $t(54) = -1.09$, $p = 0.28$, $d = -0.30$). Effect sizes were small.

We then examined group differences in interaction-specific upset due to criticism. In analyses comparing the clinical and control groups, there was a significant group effect such that participants in the clinical group were significantly more upset by criticism than those in the control group with a medium-large effect size, $B = 1.33$, $CI_{95\%} [0.48, 2.19]$, $t(84) = 3.05$, $p = 0.003$, $d = 0.69$. Neither the main effect of reporter nor the Group \times Reporter interaction was significant, $F(1, 85) = 0.30$, $p = 0.58$, $d = 0.12$, $\eta_p^2 < .01$; $F(1, 84) = 0.89$, $p = 0.35$, $\eta_p^2 < .01$, respectively. The anxiety groups did not differ significantly from one another in upset, and the effect size was small, $B = 0.21$, $CI_{95\%} [-0.93, 1.35]$, $t(54) = 0.36$, $p = 0.72$, $d = 0.10$.

To examine whether targets in the clinical group were more upset by the same level of criticism than those in the control group, we reran this analysis controlling for observer ratings of the relative's criticism. Results showed that although the relative's observed criticism significantly predicted the target's level of upset with a very large effect size ($B = 0.54$, $CI_{95\%} [0.34, 0.75]$, $t(83) = 5.09$, $p < 0.001$, $d = 1.12$), the effect of group remained significant, with participants in the clinical group reporting significantly higher levels of upset than those in the control group with a medium effect size ($B = 0.93$, $CI_{95\%} [0.17, 1.69]$, $t(83) = 2.38$, $p = 0.02$, $d = 0.54$).

Finally, we tested whether there were group differences in self-reported stress following the problem-solving interaction. Results indicated that targets in the clinical group reported more stress than targets in the control group with a large effect size ($B = 3.50$, $CI_{95\%} [1.47, 5.54]$, $t(84) = 3.43$, $d = 0.75$), but the SAD and other anxiety groups did not differ from one another with a small effect size, $B = 0.36$, $CI_{95\%} [-2.24, 2.97]$, $t(54) = 0.28$, $p = 0.78$, $d = 0.08$.

Results Excluding Participants With MDD

To test whether the differences we found between the clinical and control groups could be explained by the presence of targets with comorbid depression in the clinical group, we reran all analyses on which we initially found a significant difference between the clinical and control groups, excluding the 10 participants with comorbid MDD diagnoses. Due to the loss of power for these analyses, we focus on changes in effect size. Excluding depressed participants resulted in very small decreases in between-groups effect sizes (change in $d = 0.01$ – 0.11), indicating that comorbid MDD explained little of the differences between the clinical and control groups.

Discussion

Overall, our results indicate that compared to individuals without psychopathology, individuals with anxiety disorders perceive their partners to be more critical of them. However, these heightened levels of criticism are not apparent to their partners or to observers. In contrast, individuals with anxiety disorders are more critical of their romantic partners when discussing a problem topic than are couples without psychopathology; these findings were robust and were not dependent on which source (target, partner, or observer) was reporting on criticism. Additionally, compared to normal controls, individuals with anxiety disorders experienced the problem-solving discussion as more

stressful and were more upset by their partners' criticism. Surprisingly, we did not find any differences between groups on global measures of criticism, nor did we find differences between the SAD and other anxiety groups on any of the measures.

Our finding that anxious individuals reported greater perceived criticism from their romantic partners than did normal controls is consistent with prior research on criticism in anxiety disorders: [Chambless et al. \(2002\)](#) found that during a laboratory-based problem-solving interaction with their husbands, agoraphobic women reported greater perceived criticism than did women without psychopathology. Our results suggest that this prior result was not specific to agoraphobia, but rather may represent a correlate of anxiety disorders more broadly. However, [Chambless et al. \(2002\)](#) also found that husbands of agoraphobic wives were observed to be more critical during the interaction as compared to the husbands of women without psychopathology. These discrepant results might be explained by differences in how observed criticism was measured in these two studies: [Chambless et al. \(2002\)](#) used a frequency count of observed criticism as their measure, whereas in the present study observers used their personal judgment to rate the degree to which each partner was critical.

Interestingly, we also found that individuals with anxiety disorders were more critical of their partners than were normal controls. Together, these results highlight some of the ways in which anxious individuals themselves may contribute to their relationship problems. First, anxious individuals are not wrong in perceiving their partners to be critical of them, in that observers' and partners' own ratings of partners' criticism are substantially correlated with perceived criticism. However, anxious individuals' perceptions of the intensity of that criticism seem inflated relative to the observations of coders and partners, in that only in the case of the anxious individuals' ratings was criticism higher in clinical vs. normal control couples. Thus, to the degree that anxious individuals see their partners as more highly critical than they are, and are distressed by that perception, the more they create their own misery. Second, previous investigations of perceived criticism among individuals with anxiety disorders have largely focused on anxious individuals as the recipients of criticism and have neglected to examine anxious individuals' criticism of their partners (e.g., [Chambless et al., 2017](#)). Anxious individuals' critical behavior may elicit or perpetuate their partners' criticism and thereby contribute to their relationship dissatisfaction. Indeed, observers' ratings suggested that the

more critical targets were, the more critical their partners were, and vice versa. This is reminiscent of the stress generation model of depression (Hammen, 1991), which posits that depression-prone individuals actively create stressors, particularly interpersonal stressors, which in turn contribute to the onset or recurrence of their depression. This model has received considerable empirical support (for a review, see Liu & Alloy, 2010). More recently, researchers have found support for the stress generation model among individuals with anxiety disorders and those with elevated neuroticism, in addition to those with depression (Uliaszek et al., 2012). Consistent with this, our findings suggest that anxious individuals may elicit interpersonal stress in the form of criticism, which in turn serves as an indicator of poor prognosis in treatment (Chambless et al., 2017; Chambless & Steketee, 1999). Critically, this pattern of results held even when individuals with comorbid MDD were excluded from our analyses: Excluding depressed individuals resulted in only very small decreases in effect sizes. Our results thus suggest that the high levels of negativity that characterize interactions between depressed individuals and their spouses (Rehman et al., 2008) may be the result of negative affect more broadly, rather than MDD specifically.

There are several reasons why high levels of negative affect might be associated with negative interactions with a romantic partner. First, individuals high in negative affect may frequently be irritable, and their relationships with their partners, like other interactions, may suffer from this irritability. Second, individuals high in negative affect may have more negative expectations for and interpretations of their partners' behavior and may respond in kind, leading to more negative interactions. Third, daily interactions with an individual who is experiencing a high level of negative affect can take an emotional toll on partners, who may themselves become more irritable, leading to a vicious cycle of criticism. Consistent with this notion, in a study of women with anxiety disorders and their husbands, Zaider, Heimberg, and Iida (2010) found that on days when wives reported higher anxiety, husbands reported decreased relationship quality and increased distress.

Anxious individuals were more upset by perceived criticism than were normal controls, even when we controlled for observer ratings of the partner's criticism, suggesting that the same level of criticism is more upsetting to individuals with anxiety disorders compared to those free of psychopathology. It would be interesting to see whether upset due to criticism might explain some of the difficulties with intimacy that have been

documented among individuals with SAD, the mechanisms of which are poorly understood (Porter & Chambless, 2014; Sparrevojn & Rapee, 2009). For example, do socially anxious people perceive intimacy as risky because they perceive their partners as highly critical and find this criticism upsetting? Further research is needed to elucidate such questions. Individuals with anxiety disorders also experienced the problem-solving discussion as more stressful than did controls, perhaps due to the heightened level of criticism they perceived during the interaction and their reactions to that perceived criticism. Finding problem-solving interactions stressful might promote the avoidant coping style that has been documented in some anxious individuals (e.g., Brodbeck & Michelson, 1987), leading to unresolved relationship difficulties to fester and thus decreasing relationship satisfaction.

Surprisingly, although our clinical and control groups differed on measures of interaction-specific criticism, the groups did not differ on global measures of criticism. We are unsure of why this was the case. One possibility is that we lacked sufficient power to detect differences between groups: Differences between the clinical and control groups on global perceived criticism and upset due to criticism were small to medium in magnitude, and it is possible significant effects would be found in a larger sample. However, global measures of criticism were also associated with smaller between-group differences than were interaction-specific measures of criticism. It may be that although anxious individuals and their partners are more critical of one another when they discuss problems in their relationships, such couples are less inclined to openly discuss areas where they disagree in the course of their day-to-day lives. Supporting this, Davila and Beck (2002) found that among undergraduates, social anxiety symptoms were associated with greater desire to avoid conflict and greater conflict avoidance when interacting with romantic partners, friends, and family members. Unfortunately, we did not ask participants in the present study to rate the extent to which they generally avoid discussing areas of conflict in their relationship with their partners.

Our results in the present study differ somewhat from the findings of the only other known study to examine associations between social anxiety and perceived and expressed criticism. Porter et al. (2017) found no significant differences in perceived criticism between undergraduate couples high and low in social anxiety during a laboratory task, though social anxiety was associated with greater global expressed criticism and among women,

greater global upset due to criticism. We suspect that our divergent findings may be explained by differences in the study populations which may have affected how couples approached the problem-solving task: In the present study, we compared cohabitating community couples in which one partner either was or was not diagnosed with an anxiety disorder of clinical severity, whereas Porter et al. (2017) compared undergraduate couples who likely did not share a residence and who were selected based on their scores on a self-report measure of social anxiety. A post hoc comparison using unpublished data indicated that high social anxiety couples in Porter et al.'s undergraduate sample reported greater relationship satisfaction than the clinical sample participants included in the present study, with a medium-large effect size. If, as we have suggested, anxious individuals typically rely on avoidant coping when confronted with interpersonal problems (e.g., Brodbeck & Michelson, 1987), our problem-solving task may have provided more troubled, clinically anxious couples with an atypical opportunity to address their difficulties rather than avoiding conflict as they might at home. In contrast, Porter et al.'s (2017) sample had less troubled relationships and may have failed to take the problem-solving task seriously or had little of substance to discuss. Indeed, post hoc analyses conducted by Porter et al. indicated that regardless of social anxiety status, undergraduate participants were significantly less upset by criticism during the laboratory interactions relative to global criticism from their partners.

Despite the centrality of fear of negative evaluation in SAD, we found no evidence that individuals with SAD perceive or express more criticism or are more upset by criticism than individuals with other anxiety disorders. Effect sizes in the analyses comparing these groups were small and nonsignificant, and the direction of the effects differed depending on whether global or interaction-specific measures were examined. Rather, heightened perceived criticism and distress about that criticism appear to be characteristics common to all anxiety disorders. These results highlight the need for inclusion of clinical comparison groups in other studies examining relationship difficulties in SAD to determine whether other difficulties associated with SAD (e.g., low social support; Porter & Chambless, 2014) are specific to this disorder or reflect problems associated with anxiety disorders more broadly.

To our knowledge, the present study is the first to compare levels of perceived and expressed criticism among a clinical sample of individuals with SAD, individuals with other anxiety disorders, and

normal controls. Nevertheless, this study has several limitations. First, this was a cross-sectional study. Although our findings are consistent with a stress generation model, longitudinal research would help to elucidate how anxious individuals' criticism of their partners might influence their partners' criticism of them and their relationship satisfaction over time. Second, we unfortunately did not collect data from participants in the present sample about other areas of relationship dysfunction that have been found to relate to social anxiety. Specifically, we would be interested to see whether the low levels of self-disclosure and intimacy and high levels of perceived risk in intimacy, which have been found to be associated with social anxiety in undergraduate samples, would replicate in a clinical sample, as well as whether perceived criticism and upset due to criticism might mediate this relationship. Third, we did not collect data on relationship length or diagnostic data on partners of targets in the clinical sample, so we could not test whether results varied as a function of relationship length, nor could we examine whether couples in which a single partner met criteria for an anxiety disorder differed from those in which both partners met criteria for an anxiety disorder. Fourth, the present sample was highly educated, with 44.2% of participants having attended graduate school; thus, further replication in less highly educated samples is needed. Fifth, although previous research has found that the relationships between social anxiety and some criticism variables are moderated by sex (Porter et al., 2017), in the present study we did not test for moderation due to a lack of statistical power. Finally, the present study was lacking in statistical power for small effects, and further replication with larger samples is needed.

Clinically, our findings suggest that during treatment for anxiety disorders, a focus on perceived criticism and emotional reactions to criticism may be important, both to improve treatment outcomes and to increase anxious individuals' relationship satisfaction. Intervention strategies to target perceived criticism could take multiple forms. In individual therapy for anxiety disorders, clinicians might focus on helping patients to recognize cognitive errors that may lead them to exaggerate the intensity of their partners' criticism, including the attributions they make for their partners' criticism. Previous research has found that patients' attributions for relatives' negative behavior explain variance in perceived criticism above and beyond the variance explained by observed criticism (Chambless, Blake, & Simmons, 2010), and individuals who make more positive and less negative attributions for a relative's criticism perceive the relative as less critical overall (Allred &

Chambless, 2014). Our results also suggest that it may be beneficial for clinicians to help anxious individuals to decrease their own criticism of their partners, which may have the indirect effect of decreasing their partners' criticism of them and decreasing the overall level of negativity in the relationship. To this end, some patients may benefit from adjunctive couples' therapy specifically aimed at decreasing perceived and actual criticism in the relationship (Chambless, 2012).

Conflict of Interest Statement

The authors declare that there are no conflicts of interest.

Appendix A. Supplementary Data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.beth.2018.05.005>.

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