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# The Role Of Attributions In The Perception Of Criticism

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# The Role Of Attributions In The Perception Of Criticism

## **Abstract**

Perceived criticism from loved ones is a predictor of poor clinical outcomes for patients with a range of psychological disorders. Previous research indicates that attributions of criticism, the explanations individuals make about the intentions underlying relatives' criticism, may play a role in the perception of criticism. The goal of the present research was to explore the relationship between attributions of criticism and perceived criticism in undergraduate, community, and clinical samples. In Chapter 1, we examined the longitudinal relationship between attributions and perceived constructive and destructive criticism in a sample of undergraduates. Results showed that positive attributions predicted increases in perceived constructive criticism, whereas negative attributions predicted increases in perceived destructive criticism over time. Conversely, destructive criticism predicted increases in negative attributions and decreases in positive attributions over time. In Chapter 2, we examined the relationships among attributions, perceived constructive and destructive criticism, upset due to criticism, and warmth in a sample of Black and White community participants and tested for differences across race. Results proved consistent across race: Positive attributions were associated with greater perceived constructive criticism and less upset, whereas negative attributions were associated with greater perceived destructive criticism and upset. Warmth was related to greater perceived constructive criticism, less destructive criticism, and less upset. Blacks were less upset by relatives' criticism than Whites if they perceived their relative to be warm. In Chapter 3, we examined the relationships among attributions, perceived criticism, and upset due to criticism among individuals with anxiety disorders and those without psychopathology. Negative attributions were associated with greater global perceived criticism and upset due to criticism. Negative attributions also contributed to greater perceived criticism and upset over and above the effect of observer-rated criticism during a problem-solving interaction. Positive attributions were not significantly related to any perceived criticism or upset measure. These patterns were consistent across clinical and normal control groups. Taken together, results suggest that attributions of criticism play an important role in the perception of criticism and point to attributions as a potential target of interventions to reduce perceived criticism and upset and ultimately improve clinical outcomes for patients with psychological disorders.

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THE ROLE OF ATTRIBUTIONS IN THE PERCEPTION OF CRITICISM

Kelly M. Allred

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## ABSTRACT

### THE ROLE OF ATTRIBUTIONS IN THE PERCEPTION OF CRITICISM

Kelly M. Allred

Dianne L. Chambless

Perceived criticism from loved ones is a predictor of poor clinical outcomes for patients with a range of psychological disorders. Previous research indicates that attributions of criticism, the explanations individuals make about the intentions underlying relatives' criticism, may play a role in the perception of criticism. The goal of the present research was to explore the relationship between attributions of criticism and perceived criticism in undergraduate, community, and clinical samples. In Chapter 1, we examined the longitudinal relationship between attributions and perceived constructive and destructive criticism in a sample of undergraduates. Results showed that positive attributions predicted increases in perceived constructive criticism, whereas negative attributions predicted increases in perceived destructive criticism over time. Conversely, destructive criticism predicted increases in negative attributions and decreases in positive attributions over time. In Chapter 2, we examined the relationships among attributions, perceived constructive and destructive criticism, upset due to criticism, and warmth in a sample of Black and White community participants and tested for differences across race. Results proved consistent across race: Positive attributions were associated with greater perceived constructive criticism and less upset, whereas negative attributions were associated with greater perceived destructive criticism and upset. Warmth was related to greater perceived constructive criticism, less destructive criticism, and less upset. Blacks were less upset by relatives' criticism than Whites if they perceived their relative to be warm.

In Chapter 3, we examined the relationships among attributions, perceived criticism, and upset due to criticism among individuals with anxiety disorders and those without psychopathology. Negative attributions were associated with greater global perceived criticism and upset due to criticism. Negative attributions also contributed to greater perceived criticism and upset over and above the effect of observer-rated criticism during a problem-solving interaction. Positive attributions were not significantly related to any perceived criticism or upset measure. These patterns were consistent across clinical and normal control groups. Taken together, results suggest that attributions of criticism play an important role in the perception of criticism and point to attributions as a potential target of interventions to reduce perceived criticism and upset and ultimately improve clinical outcomes for patients with psychological disorders.



**TABLE OF CONTENTS**

<b>ACKNOWLEDGMENT .....</b>	<b>II</b>
<b>ABSTRACT.....</b>	<b>IV</b>
<b>LIST OF TABLES .....</b>	<b>VII</b>
<b>LIST OF APPENDICES .....</b>	<b>IX</b>
<b>CHAPTER 1 .....</b>	<b>1</b>
<b>Abstract.....</b>	<b>2</b>
<b>References .....</b>	<b>22</b>
<b>CHAPTER 2 .....</b>	<b>32</b>
<b>Abstract.....</b>	<b>33</b>
<b>References .....</b>	<b>61</b>
<b>CHAPTER 3 .....</b>	<b>72</b>
<b>Abstract.....</b>	<b>73</b>
<b>References .....</b>	<b>101</b>

## LIST OF TABLES

### CHAPTER 1

- Table 1: Summary Statistics and Zero-Order Correlations for Attributions, Perceived Constructive and Destructive Criticism, and DASS Depression at Time 1 and Time 2
- Table 2: Factor Loadings for Exploratory Structural Equation Model (ESEM) with Geomin Rotation of Attributions of Criticism Scale (ACS) Items
- Table 3: Multiple Regression of Attributions, Perceived Constructive Criticism, and DASS Depression at Time 1 Predicting Perceived Constructive Criticism at Time 2
- Table 4: Multiple Regression of Attributions, Perceived Destructive Criticism, and DASS Depression at Time 1 Predicting Perceived Destructive Criticism at Time 2
- Table 5: Multiple Regression of Perceived Constructive and Destructive Criticism, Positive Attributions, and DASS Depression at Time 1 Predicting Positive Attributions at Time 2
- Table 6: Multiple Regression of Perceived Constructive and Destructive Criticism, Negative Attributions, and DASS Depression at Time 1 Predicting Negative Attributions at Time 2

### CHAPTER 2

- Table 1: Factor Loadings for Exploratory Structural Equation Model (ESEM) with Geomin Rotation of Attributions of Criticism Scale (ACS) Items
- Table 2: Summary Statistics and Zero-Order Correlations for Attributions, Warmth, Perceived Criticism, Relationship Factors, and Demographic Variables for Blacks and Whites
- Table 3: Regressions Predicting Constructive Criticism and Upset due to Criticism from Positive Attributions
- Table 4: Regressions Predicting Destructive Criticism and Upset due to Criticism from Negative Attributions

**CHAPTER 3**

- Table 1: Zero-Order Correlations among Attributions, Perceived Criticism and Upset, and Relationship Satisfaction
- Table 2: Demographics and Descriptive Statistics for Study Measures by Diagnostic Group
- Table 3: Multiple Regression of Clinical Status, Attributions, and Relationship Satisfaction Predicting Global Perceived Criticism and Upset
- Table 4: Multiple Regression of Clinical Status, Attributions, Observed Criticism, and Relationship Satisfaction Predicting Perceived Criticism and Upset for Non-Anxiety-Related Interaction
- Table 5: Multiple Regression of Clinical Status, Attributions, Observed Criticism, and Relationship Satisfaction Predicting Perceived Criticism and Upset for Anxiety-Related Interaction

**LIST OF APPENDICES****CHAPTER 1**

Appendix A: Variables Included in Multiple Imputation Model

**CHAPTER 2**

Appendix A: Results with Extreme Responding Excluded as Covariate

**CHAPTER 1****Attributions Predict Changes in Perceived Constructive and Destructive Criticism  
over Time**

### Abstract

**Objective(s):** This investigation sought (a) to continue psychometric work on the Attributions of Criticism Scale (ACS), which measures attributions about the intentions underlying relatives' criticism, and (b) to examine the longitudinal relationship between attributions of criticism from one's relative and perceived constructive and destructive criticism from that relative.

**Method:** Undergraduates ( $N = 193$ ) completed measures of attributions of criticism and perceived criticism at two time points five weeks apart.

**Results:** Consistent with previous findings, the ACS displayed a two-factor solution of positive and negative attributions. These factors demonstrated good psychometric properties. Positive attributions predicted increases in perceived constructive criticism over time, whereas negative attributions predicted increases in destructive criticism. Conversely, destructive, but not constructive, criticism predicted increases in negative attributions as well as decreases in positive attributions over time.

**Conclusions:** These longitudinal findings, while correlational, build on previous cross-sectional work by providing evidence consistent with a causal relationship between attributions and perceived criticism.

## **Attributions Predict Changes in Perceived Constructive and Destructive Criticism over Time**

The criticism that patients receive from their loved ones is an important predictor of poor clinical outcomes for a range of mental disorders (Butzlaff & Hooley, 1998). Traditionally relatives' criticism has been assessed by interviewing the relative with the Camberwell Family Interview and subsequently submitting the recording of that interview to analysis by trained coders (Vaughn & Leff, 1976). However, an emerging body of literature indicates that much can be gained by simply asking the patient to rate the relative's criticism using a single item measure, the Perceived Criticism Measure (Hooley & Teasdale, 1979). This single item predicts poor outcomes for schizophrenia, major depression, bipolar disorder, obsessive-compulsive disorder, panic disorder, and substance use and may be a stronger predictor of outcome than criticism assessed by the traditional method (see review by Masland & Hooley, 2015).

Given the link between perceived criticism and negative patient outcomes, it is important to understand the antecedents of perceived criticism, which may prove to be fruitful targets of intervention to reduce perceived criticism and thereby improve clinical outcomes. Previous research has shown patients' perceived criticism to be moderately to strongly correlated with observer ratings of relatives' criticism as well as relatives' self-report of their criticism (Chambless & Blake, 2009; Chambless, Bryan, Aiken, Steketee, & Hooley, 1999). However, observed criticism only accounts for part of the variance in perceived criticism, with attributions explaining additional variance (Chambless, Blake, & Simmons, 2010). While perceived criticism represents judgments about the extent to which individuals feel criticized by their loved ones, attributions refer to the thoughts

individuals have about the intentions driving their relatives' behavior (Weiner, 1986). An example may better illustrate this distinction. Imagine a mother who tells her son that she dislikes his style of dress. When the son reports being criticized by his mother, he is reporting perceived criticism. He may also make various attributions about the intentions behind his mother's comments: He may view her intentions as positive (e.g., "My mother wants me to look neat and put my best foot forward") or negative (e.g., "My mother is trying to attack my style choices and undermine my autonomy"). The kinds of attributions the son makes about his mother's intentions are proposed to influence the extent to which he feels criticized by her. For example, if he makes mostly positive attributions about her comments, he may perceive her as less destructively critical. Thus, attributions are theorized to precede and influence the judgment of criticism.

Consistent with this model, cross-sectional research has established a link between attributions and perceived criticism. In a study of community couples, Chambless et al. (2010) found that individuals' negative attributions about their spouses' behavior during a problem-solving interaction were associated with their ratings of perceived criticism during the same interaction. Similarly, in a study of anxious patients and their spouses, Chambless et al. (2010) extracted negative attributions from patients' speech during a problem-solving interaction with their spouses and found that higher ratings of negative attributions during this interaction were related to greater patient perceived criticism. However, one limitation of these studies is that they have used attributions about relatives' negative behavior in general as a proxy for attributions made specifically about relatives' criticism instead of measuring these attributions directly. Moreover, these investigations have only assessed negative attributions, and as our



example illustrates, attributions may also be positive. Despite these limitations, the research suggests that changing attributions may be an effective way to decrease perceived criticism and mitigate its negative effects.

In light of recent advances in the measurement of perceived criticism, we sought to include a more refined measure of perceived criticism in the current investigation. Renshaw, Blais and Caska (2010) have shown that individuals are able to distinguish between constructive and destructive forms of perceived criticism. Additional research indicates that respondents are largely rating destructive criticism when completing the PCM with correlations between destructive and global perceived criticism ranging from .36 to .54, whereas there is little relationship between constructive and global perceived criticism ( $r$ s ranging from -.05 to -.18; Allred & Chambless, 2014; Renshaw et al., 2010). However, the correlations between destructive and global perceived criticism are not perfect, suggesting that the PCM is also assessing criticism that is not destructive. Consequently, measures of destructive criticism may more purely and reliably capture hostile criticism than the standard PCM. Moreover, evidence (Allred & Chambless, 2014) suggests that there are differences in the factors that predict perceived constructive and destructive criticism. Taken together, these findings suggest that it would be wise to break down global perceived criticism into its constructive and destructive elements. For these reasons, we explored the relationship between attributions and these types of perceived criticism instead of the standard PCM in the current study. Only one prior study has tested these associations. Using the Attributions of Criticism Scale (ACS), a measure developed to assess positive and negative attributions made specifically about relatives' criticism, Allred and Chambless (2014) found that positive attributions were

associated with greater constructive and less destructive criticism in a community sample, whereas the opposite associations were found for negative attributions. However, causal inferences are precluded by this study's cross-sectional design.

In the current investigation, we sought to build on previous research by exploring the longitudinal relationship between attributions and perceived criticism in an undergraduate sample. Although our model clearly proposes that attributions make a causal contribution to perceived criticism, all of the research on attributions and perceived criticism to date has been cross-sectional in nature, preventing causal inferences (Allred & Chambless, 2014; Chambless et al., 2010). Through our longitudinal design, we aimed to establish the temporal sequence of our variables of interest to permit stronger confirmation of our causal model. Informed by the findings of Allred and Chambless (2014), we hypothesized that positive and negative attributions would differentially predict change in the types of perceived criticism over time such that positive attributions would predict increases in perceived constructive criticism and negative attributions would predict increases in perceived destructive criticism. However, it is also plausible that perceived constructive and destructive criticism predict change in positive and negative attributions over time. Accordingly, we tested this alternative hypothesis as well. Given empirical work showing depression to be associated with negative cognitive biases (e.g., greater attention to negative versus positive stimuli; Gotlib, Krasnoperova, Yue, & Joormann, 2004) which may also influence individuals' ratings of attributions and perceived criticism, we controlled for depressive symptoms in our analyses.

A secondary goal of the current study was to continue psychometric work on the ACS. The psychometric properties of this scale have already been examined in undergraduate and community samples (Allred & Chambless, 2013, 2014). The ACS demonstrated a three-factor structure in the previous undergraduate sample (Allred & Chambless, 2013), but subsequent to scale refinement and the addition of more items, the ACS displayed a two-factor structure in an older community sample, with factors representing positive and negative attributions (Allred & Chambless, 2014). Thus, it is an open question whether the ACS demonstrates a different factor structure in younger age groups or whether the different factor structures obtained in the undergraduate and community samples were the result of changes to the composition of the scale. We sought to answer this question by examining the factor structure of the ACS in the current undergraduate sample. We also explored the internal consistency, convergent and discriminant validity, and test-retest reliability of the ACS factors. Finally, due to the cross-sectional design of their initial validation study, Renshaw and colleagues (2010) were unable to establish test-retest reliability of the PCM-Type, a measure of perceived constructive and destructive criticism. The current study contributes to the psychometric work on this measure by examining the test-retest reliability of these types of perceived criticism over the course of five weeks.

## **Method**

### **Participants**

Undergraduates at the University of Pennsylvania were recruited from the psychology department subject pool. To participate, individuals had to be 18 years of age or older. Of the initial 260 participants, 67 were excluded for various reasons (see

Excluded Cases and Missing Data). Thus, the final sample comprised 193 individuals (159 women, 34 men) ranging in age from 18 to 24 ( $M = 19.55$ ,  $SD = 1.19$ ). Due to a clerical error, data on participant race and ethnicity were not collected initially.

Participants were contacted and asked to provide these data. Of the 193 in the final sample, 68 (35.2%) identified as White, 39 (20.2%) as Asian, 8 (4.1%) as African American, and 11 (5.7%) as other, whereas 67 (34.7%) did not respond. Of the students, 11 (5.7%) identified as Hispanic, and 64 (33.1%) did not provide their ethnicity. The racial and ethnic breakdown of our sample was comparable to the racial and ethnic composition of the University of Pennsylvania undergraduate population at large (University of Pennsylvania, 2015).

### **Procedure**

The study was advertised on the psychology department's subject pool website as a survey of criticism in close relationships. At the beginning of the semester, participants enrolled in the study through a website where they provided consent and completed questionnaire measures. Eligible participants were asked to identify the most influential or impactful person in their lives and to indicate the person's relationship to them. The sample for the present study was limited to those whose most influential or impactful person was a parental figure (e.g., parent, grandparent, aunt/uncle, or guardian) because relatively few participants nominated other types of influential people. Once participants had identified their relationship to that person, the questionnaire populated subsequent measures with this relationship. For example, a participant who identified her father as the most important person in her life would then see question stems in which her father was referenced. Five weeks after the initial assessment, participants were contacted by e-

mail to complete the same questionnaire measures again. The questionnaire took approximately 20 minutes to complete at each time point, and students were compensated with 1 hour of research credit for completing both assessments. All study procedures and measures were approved by the University of Pennsylvania's Institutional Review Board.

## **Measures**

Participants provided basic demographic information and completed the following measures:

**Attributions of Criticism Scale (ACS; Allred & Chambless, 2014).** The ACS is a 22-item questionnaire that assesses the attributions that individuals make about the intentions underlying their relatives' criticism. Items include "When your relative criticizes you, to what extent do you believe he/she is trying to get you to do better, learn, or grow?" and "When your relative criticizes you, to what extent do you believe he/she is trying to attack you?" Participants rate their attributions on a Likert-type scale ranging from 1 (*not at all*) to 5 (*completely*). Psychometric work on the ACS in a community sample demonstrated a two-factor structure with factors corresponding to positive and negative attributions; research in an undergraduate sample with an earlier version of the ACS demonstrated good convergent and discriminant validity (Allred & Chambless, 2013, 2014). Additional psychometric properties of the ACS in the current sample are discussed below (see Results).

**Perceived Criticism Measure – Type (PCM-Type; Renshaw et al., 2010).** To assess hostile and non-hostile forms of perceived criticism, Renshaw et al. (2010) developed the PCM-Type, which measures perceived constructive and destructive criticism. A modified version of the PCM-Type was used in the current study.

Participants responded to the following questions: “When your relative is critical of you, how harsh or hurtful is he/she?” rated on a scale from 1 (*not at all harsh/hurtful*) to 10 (*very harsh/hurtful*) and “When your relative is critical of you, how helpful or constructive is he/she?” rated on a scale from 1 (*not at all constructive/helpful*) to 10 (*very constructive/helpful*). These items have shown good convergent and discriminant validity vis-à-vis measures of relationship satisfaction and psychopathology (Renshaw et al., 2010). Research has shown destructive criticism to be moderately to strongly correlated with the PCM in a sample of undergraduates with depressive symptoms ( $r = .36$ ; Renshaw et al., 2010), in a community sample of Blacks and Whites ( $r = .57$ ; Allred & Chambless, 2014), and in the current undergraduate sample ( $r = .54$ ), whereas constructive criticism has not been found to correlate strongly with the PCM ( $r_s = -.05$  to  $-.18$ ).

**Depression Anxiety Stress Scales-21 (DASS-21; Lovibond & Lovibond, 1995).** The DASS-21 is a 21-item, self-report measure of depression, anxiety, and stress symptoms experienced over the past week. Participants respond to each item using a 4-point Likert-type scale to rate the severity of their depression, anxiety, and stress with higher scores representing more severe or frequent symptoms. In both clinical and non-clinical samples, the DASS-21 has demonstrated good convergent and discriminant validity (Brown, Chorpita, Korotitsch, & Barlow, 1997; Lovibond & Lovibond, 1995). The measure has also been found to distinguish well between depressed and anxious populations (Lovibond & Lovibond, 1995). Only the depression scale of the DASS-21 was used in the present analyses. Internal consistency of the depression subscale at Time 1 was excellent ( $\alpha = .92$ ).

## Results

### Excluded Cases and Missing Data

Of the 260 participants who consented and accessed the survey, 55 were excluded for nominating individuals other than a parental figure as the most impactful/influential person in their lives. One was excluded for nominating a parental figure who was deceased, and 11 were excluded for not nominating the same individual at both assessment points. Thus, after exclusion, the final sample comprised 193 participants. Of those in the final sample, 33 (17.1%) did not complete the second assessment. There were no significant differences between these participants and those who completed both assessments on demographic variables or any of our variables of interest. For the participants who did not provide data at the second assessment, data for our outcome variables, perceived constructive and destructive criticism and positive and negative attributions at Time 2, were imputed with multiple imputation using 40 iterations. To prevent bias, missing values on the independent variables included in the linear regressions were also imputed (Acock, 2012). Consistent with the recommendations of Acock, predictors in the multiple imputation model included all predictors in the linear regressions (see Relationship between Attributions and Types of Perceived Criticism Over Time section below for description of regression analyses) as well as auxiliary variables in our dataset that were significantly correlated with Time 2 constructive and destructive criticism, positive and negative attributions, or missingness on any of these variables (See Appendix A for additional information on multiple imputation model). See Table 1 for zero-order correlations among study measures.

### Power Analysis

A power analysis conducted with G\*Power 3 (Faul, Erdfelder, Lang, & Buchner, 2007) indicated that in a sample of 193 participants, there was 84.2% power to detect a small effect size of  $f^2 = .07$  in a linear regression with four predictors (the most included in any model).

### **Description of the Sample**

On average, participants reported spending 0.76 hours ( $SD = 2.93$ ) each day in the previous week with the most influential person in their lives; however, the majority (83.9%) of participants reported spending no time with this person during this period. Participants also reported spending an average of 2.35 hours ( $SD = 2.58$ ) each day communicating with this person via phone, email, or any other form of electronic communication in the previous week.

### **Psychometrics Tests of the Attributions of Criticism Scale (ACS) and PCM-Type**

We sought to confirm the ACS two-factor structure demonstrated in the community sample of Allred and Chambless (2014) by determining the factor structure of the ACS at Time 1 in this sample. Research has shown that confirmatory factory analysis often results in poor model when item-level indicators are used because CFAs require each indicator to load onto only one factor, which is often too restrictive (Marsh, Morin, Parker, & Kaur, 2014). Consequently, Marsh et al. (2014) recommend the use of exploratory structural equation modeling (ESEM) which allows for all factor loadings and cross-loadings to be freely estimated within a specified factor structure.

In accordance with the recommendations of Marsh and colleagues (2014), we first conducted a two-factor CFA because a CFA reflects the simplest solution when it adequately fits the data. Fit was poor,  $\chi^2(208) = 585.16, p < .001$ ; CFI = .90; RMSEA =



.10. We then conducted an ESEM using WLSMV estimation and geomin rotation in Mplus (Muthén & Muthén, 2007) and found acceptable model fit,  $\chi^2(188) = 366.69, p < .001$ ; CFI = .96; RMSEA = .07. Consistent with the findings of Allred and Chambless (2014), results demonstrated a two-factor structure with factors corresponding to positive and negative attributions (see item factor loadings in Table 2). Two items (“When your [parental figure] criticizes you, to what extent do you think he/she is trying to show concern for you?” and “When your [parental figure] criticizes you, to what extent do you think he/she has your best interests at heart?”) had salient loadings ( $\geq .35$ ) on both the positive and negative attribution factors. One of these items (“When your [parental figure] criticizes you, to what extent do you think he/she is trying to show concern for you?”) was ultimately included in the positive attributions subscale because it loaded more strongly on this factor. The other item (“When your [parental figure] criticizes you, to what extent do you think he/she has your best interests at heart?”) loaded comparably on the positive and negative attribution factors. However, given that this item loaded on factors representing positive attributions in the undergraduate sample and two community samples of Allred and Chambless (2013, 2014, 2016)<sup>1</sup>, it was ultimately included in the positive attributions subscale in this sample. Another item (“When your [parental figure] criticizes you, to what extent do you think he/she is trying to explain why he/she is disappointed in you?”) loaded on the negative attributions factors in this sample; however, it loaded on the positive attributions factor in the previous community sample and on the negative attributions factor (referred to as the Inflicting Harm factor) in the

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<sup>1</sup> In the undergraduate sample of Allred and Chambless (2013), the Attributions scale demonstrated a three-factor solution with factors representing Displaying Care, Fostering Growth, and Inflicting Harm. This item loaded on the Displaying Care factor which coalesced with the Fostering Growth factor to form the positive attributions subscale in the community sample of Allred and Chambless (2014) as is the case in the present sample.

previous undergraduate sample (Allred & Chambless, 2013, 2014). Because of the ambiguity of this item, it was removed from the scale, and the 21-item version was used in subsequent analyses. The positive ( $\alpha = .84$ ) and negative ( $\alpha = .86$ ) attribution subscales showed good internal consistency and were moderately negatively correlated ( $r = -.39$ ).

**Test-retest reliability.** The ACS subscales demonstrated good test-retest reliability in the current sample. Test-retest reliability over a period of approximately five weeks was .74 for positive attributions and .78 for negative attributions. The PCM-Type also displayed good test-retest reliability over the course of five weeks ( $r = .74$  for constructive criticism,  $r = .63$  for destructive criticism).

**Convergent and discriminant validity.** To test the convergent and discriminant validity of the ACS, we examined the correlations of attributions with perceived constructive and destructive criticism and depression scores at Time 1. Positive and negative attributions displayed medium to large correlations with constructive ( $r = .36$ ) and destructive criticism ( $r = .47$ ), respectively, indicating good convergent validity. To test discriminant validity, Meng, Rosenthal, and Rubin's (1992) procedure for comparing correlated correlation coefficients was employed. Results showed that positive attributions were more strongly related to constructive criticism, and negative attributions were more strongly related to destructive criticism, than either attribution type was to depression ( $r = -.06$  with positive attributions,  $r = .14$  with negative attributions). These differences were statistically significant ( $Zs = 3.72$  to  $4.31$ ,  $ps < .001$ ), indicating good discriminant validity of the attribution subscales.

### **Relationship between Attributions and Types of Perceived Criticism over Time**

To model change in perceived constructive criticism over time, a regression analysis predicting Time 2 constructive criticism was conducted with Time 1 constructive criticism, positive and negative attributions, and depression scores as independent variables. Similarly, a regression predicting Time 2 destructive criticism was run with Time 1 destructive criticism, positive and negative attributions, and depression scores as predictors. Diagnostic indices including *dfbetas*, distributions of residuals, and condition indexes were examined in all regression analyses to confirm that data did not violate the assumptions of multiple regression. See Tables 3 and 4 for regression results. As predicted, results indicated that positive attributions predicted increases in constructive criticism, and negative attributions predicted increases in destructive criticism.

To test the alternative hypothesis that perceived criticism predicts change in attributions over time, a regression analysis predicting Time 2 positive attributions was conducted with Time 1 positive attributions, constructive and destructive criticism, and depression scores as predictors. A regression predicting Time 2 negative attributions was also conducted with Time 1 negative attributions, constructive and destructive criticism, and depression scores as independent variables. See Tables 5 and 6 for regression results. Results showed that destructive criticism predicted decreases in positive attributions and increases in negative attributions, but constructive criticism did not significantly predict change in positive or negative attributions. Notably, depression scores did not significantly predict change in either perceived constructive and destructive criticism or positive and negative attributions. Thus, attributions contributed to changes in perceived criticism and vice versa over and above the effect of depression symptoms.

## **Discussion**

Our findings provide additional evidence that the ACS is a reliable and valid measure of attributions of relatives' criticism. Consistent with previous psychometric work in a community sample (Allred & Chambless, 2014), the ACS demonstrated a two-factor structure with factors representing positive and negative attributions in the current undergraduate sample. The ACS factors demonstrated good internal consistency and test-retest reliability over a five-week period and displayed good convergent and discriminant validity vis-à-vis measures of perceived criticism and depression. Taken together, these findings provide further support for the construct validity of the ACS. It is important to note that the ACS displayed a three-factor structure in an undergraduate sample (Allred & Chambless, 2013) in which an earlier version of the scale was used and a two-factor structure in a community sample (Allred & Chambless, 2014) in which the same version of the scale employed in the present study was used. Replication of the ACS two-factor structure in the current undergraduate sample suggests that the scale does not exhibit different factor structures in various age groups but rather that we were successful in further developing the measure. Moreover, it is notable that the same factor structure was obtained despite the difference in the type of relative participants rated: In the present sample, students rated a parent, whereas in the community sample, participants most often rated a spouse or romantic partner. Nonetheless, more research is needed to determine if the ACS displays similar psychometric properties in other samples; in particular, it would be desirable to test its properties in a clinical sample. In addition, our investigation is the first to examine test-retest reliability of the PCM-Type developed by Renshaw and colleagues (2010). In the current sample, perceived constructive and destructive criticism displayed good test-retest reliability over the course of the five

weeks, providing further support for the favorable psychometric properties of this measure.

Consistent with hypotheses, positive and negative attributions differentially predicted changes in the types of perceived criticism over time. Positive attributions predicted increases in perceived constructive criticism, and negative attributions predicted increases in destructive criticism. However, the alternative hypothesis that perceived criticism would predict change in attributions over time was also partially supported: Destructive criticism predicted decreases in positive attributions and increases in negative attributions, but constructive criticism did not predict change in either type of attributions. Moreover, when it came to the temporal relationships between destructive criticism and negative attributions, Time 1 negative attributions were a stronger predictor of Time 2 destructive criticism than vice versa. Notably, attributions predicted changes in perceived criticism and vice versa over and above the effects of baseline depression symptoms, indicating that attributions (especially negative ones) as well as perceived criticism are not merely a reflection of negative biases associated with depression. Taken together, these findings also highlight the importance of separating global perceived criticism into its constructive and destructive components.

The current study represents an important step in understanding the relationship between attributions of criticism and perceived criticism. Although previous research has shown attributions to be associated with perceived criticism (Allred & Chambless, 2014; Chambless et al., 2010), these studies have been cross-sectional, precluding causal interpretations. However, our model posits that attributions affect perceived constructive and destructive criticism. This longitudinal investigation builds on previous work by

establishing the temporal order of our variables of interest, allowing a stronger test of our causal model. It is important to note that given the correlational nature of our design, we are unable to demonstrate causality. However, our results do support the predictive validity of the ACS and PCM-Type and provide greater, although not definitive support for a causal relationship between positive attributions and constructive criticism than previous cross-sectional research. Moreover, we find a reciprocal relationship between negative attributions and destructive criticism in which negative attributions exert a stronger effect on destructive criticism than vice versa. Our results also suggest that destructive criticism may play an important role in determining the extent to which individuals make positive attributions about their loved ones' intentions. However, more longitudinal research with a greater number of time points is needed to elucidate further the nature of the relationship between attributions and perceived criticism.

Important clinical implications arise from the current findings. In light of research linking perceived criticism to poor treatment outcome (see Masland & Hooley, 2015 for review), our results point to the advisability of targeting patients' attributions of relatives' criticism during couples or family therapy. For example, clinicians may prompt patients to describe their attributions about relatives' criticism and encourage relatives to discuss the motives behind their critical comments. Through such discussions patients may learn that there are often positive intentions behind relatives' criticism (e.g., relatives mean to motivate or express care or concern for the patient), which may lead patients to make more positive (and fewer negative) attributions and thus perceive more constructive and less destructive criticism over time. Of course, it is possible that patients are accurate in identifying negative motives behind their relatives' critical comments. However, our

clinical experience indicates that in many cases there is a more palatable motive than the patient has assumed - for example, that the relative is frustrated and feels helpless in the face of the patient's disorder rather than that the relative intends to wound the patient. See Chambless (2012) for a description of the process of working with attributions underlying perceived criticism. It will be important for future studies to determine if interventions that target patients' attributions decrease subsequent perceived criticism and result in better clinical outcomes for patients.

The current study is not without its limitations. One major limitation is that the sample comprised undergraduates who were not selected for clinical diagnosis. Thus, future research is needed to replicate the current findings in a clinical sample. Additionally, participants rated their parents, with whom they were unlikely to be living. Consequently, participants may have been exposed to less criticism from their parent than if they had been living at home. However, participants in our sample did report spending a significant amount of time ( $M = 2.35$  hours) communicating with their parent on a daily basis through electronic means. Although this estimate may be somewhat inflated, it does suggest participants were in substantial contact with their parent to be exposed to his/her criticism. It is important for future studies to determine if the same pattern of results obtain when individuals are living with the most influential/important person in their lives. Finally, undergraduates in the current sample attended a prestigious private university, and thus many were likely from a privileged socioeconomic background. Consequently, our results may not generalize to individuals of more diverse backgrounds, such as those of various ages or from different socioeconomic strata. Despite these

limitations, the current investigation is a meaningful advance in illuminating the longitudinal relationship between attributions and perceptions of criticism.



## Appendix A

### *Variables Included in Multiple Imputation Model*

#### Demographic Variables

Dummy-coded Race (1 = African American, 0 = Not African American)

#### Time 1 Variables

Positive Attributions

Negative Attributions

Constructive Criticism

Destructive Criticism

Global Perceived Criticism (as measured by the Perceived Criticism Measure (PCM; Hooley & Teasdale, 1989))

DASS Depression score

#### Time 2 Variables

Positive Attributions

Negative Attributions

Constructive Criticism

Destructive Criticism

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Table 1

*Summary Statistics and Zero-Order Correlations for Attributions, Perceived Constructive and Destructive Criticism, and DASS Depression at Time 1 and Time 2*

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
Time 1										
1. Pos. Attrib.	4.28	0.50	1.00							
2. Neg. Attrib.	1.49	0.51	-.39***	1.00						
3. Const. Criticism	8.03	1.86	.36***	-.36***	1.00					
4. Dest. Criticism	3.83	2.29	-.17*	.47***	-.31***	1.00				
5. DASS Depression	6.94	8.82	-.06	.14	.04	.10	1.00			
Time 2										
6. Pos. Attrib.	4.31	0.55	.74***	-.41***	.35***	-.22**	.08	1.00		
7. Neg. Attrib.	1.40	0.45	-.26**	.78***	-.32***	.46***	.08	-.40***	1.00	
8. Const. Criticism	7.79	2.00	.46***	-.38***	.74***	-.27**	.01	.43***	-.39***	1.00
9. Dest. Criticism	3.38	2.07	-.11	.50***	-.38***	.63***	.02	-.15	.59***	-.38***

*Note.* DASS Depression = Depression Anxiety Stress Scales-21: Depression subscale.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 2

*Factor Loadings for Exploratory Structural Equation Model (ESEM) with Geomin Rotation of Attributions of Criticism Scale (ACS) Items*

ACS Item	Positive Attributions	Negative Attributions
When your [ <i>relative type here</i> ] criticizes you, to what extent do you believe he/she...		
is trying to get you to do better, learn, or grow?	<b>.85</b>	.00
is trying to motivate you or get you to take action?	<b>.75</b>	.14
is trying to correct a problem?	<b>.75</b>	.19
is trying to prevent you from making a mistake?	<b>.73</b>	.11
is trying to stop a problem from getting worse?	<b>.72</b>	-.00
is trying to show that he/she cares?	<b>.63</b>	-.25
is trying to stop you from hurting yourself or someone else?	<b>.60</b>	-.04
is trying to show concern for you?	<b>.56</b>	-.37
is trying to protect you?	<b>.56</b>	-.33
is trying to encourage you to think about a new point of view or perspective?	<b>.55</b>	-.03
is trying to be honest and open with you?	<b>.48</b>	-.20
has your best interests at heart?	<b>.48</b>	-.55
is trying to put you down?	-.07	<b>.90</b>
is trying to hurt or have a negative impact on you?	-.15	<b>.87</b>
is trying to humiliate you?	.06	<b>.86</b>
is trying to attack you?	.01	<b>.84</b>
is trying to make you feel stupid?	.01	<b>.83</b>
is trying to blame you for something?	.02	<b>.79</b>
is trying to show his/her frustration or anger with you?	-.16	<b>.68</b>
is trying to stop you from doing your best?	-.28	<b>.65</b>
is trying to control you?	.02	<b>.59</b>
is trying to explain why he/she is disappointed in you?	.27	.37

*Note.*  $N = 193$ . Factor loadings for items included in each factor score are in boldface.

Table 3

*Multiple Regression of Attributions, Perceived Constructive Criticism, and DASS Depression at Time 1 Predicting Perceived Constructive Criticism at Time 2*

Variable	Constructive Criticism – Time 2			
	$\beta$	<i>SE</i>	<i>sr</i>	<i>p</i>
Time 1				
Positive Attributions	.14	.06	.13	.02
Negative Attributions	-.10	.06	-.08	.13
Constructive Criticism	.67	.06	.60	<.001
DASS Depression	.02	.05	.02	.76

*Note.*  $N = 193$ . DASS Depression = Depression Anxiety Stress Scales-21: Depression subscale.



Table 4

*Multiple Regression of Attributions, Perceived Destructive Criticism, and DASS Depression at Time 1 Predicting Perceived Destructive Criticism at Time 2*

Variable	Destructive Criticism – Time 2			
	$\beta$	<i>SE</i>	<i>sr</i>	<i>p</i>
Time 1				
Positive Attributions	.08	.06	.07	.23
Negative Attributions	.35	.08	.29	<.001
Destructive Criticism	.49	.07	.43	<.001
DASS Depression	-.09	.06	-.09	.12

*Note.*  $N = 193$ . DASS Depression = Depression Anxiety Stress Scales-21: Depression subscale.

Table 5

*Multiple Regression of Perceived Constructive and Destructive Criticism, Positive Attributions, and DASS Depression at Time 1 Predicting Positive Attributions at Time 2*

Variable	Positive Attributions – Time 2			
	$\beta$	<i>SE</i>	<i>sr</i>	<i>p</i>
Time 1				
Constructive Criticism	-.01	.06	-.00	.94
Destructive Criticism	-.15	.06	-.15	.005
Positive Attributions	.72	.05	.67	<.001
DASS Depression	.10	.05	.10	.05

*Note.*  $N = 193$ . DASS Depression = Depression Anxiety Stress Scales-21: Depression subscale.

Table 6

*Multiple Regression of Perceived Constructive and Destructive Criticism, Negative Attributions, and DASS Depression at Time 1 Predicting Negative Attributions at Time 2*

Variable	Negative Attributions – Time 2			
	$\beta$	<i>SE</i>	<i>sr</i>	<i>p</i>
Time 1				
Constructive Criticism	-.03	.06	-.03	.59
Destructive Criticism	.12	.05	.11	.02
Negative Attributions	.75	.05	.63	<.001
DASS Depression	-.05	.05	-.05	.26

*Note.* *N* = 193. DASS Depression = Depression Anxiety Stress Scales-21: Depression subscale.

**CHAPTER 2**

**Attributions and Criticism in Black and White: Perceived Criticism in a  
Community Sample of Black and White Participants**

### Abstract

The primary aims of the current investigation were (a) to examine the relationships among attributions, perceived constructive and destructive criticism, and upset due to criticism and (b) to explore racial differences in mean levels of attributions, perceived criticism, upset due to criticism, and warmth in a community sample of Blacks and Whites ( $N = 272$ ). The Attributions of Criticism Scale (ACS) was used to measure participants' attributions regarding criticism from their relatives. In accordance with previous research, this scale demonstrated a two-factor structure with factors representing positive and negative attributions. No racial differences were found in mean levels of attributions or type of perceived criticism. However, Blacks were significantly less upset by perceived criticism from their relatives than Whites. When the relationships between attributions, perceived criticism, and upset were explored, results showed that positive attributions were associated with greater perceived constructive criticism and less upset due to criticism, whereas negative attributions were associated with greater perceived destructive criticism and more upset. Perceptions of relatives' warmth were also associated with greater perceived constructive criticism and less perceived destructive criticism, but warmth was only related to less upset for Blacks and not Whites. Findings suggest that attributions and warmth play an important role in the perception of criticism and the extent to which individuals become upset in response to criticism from loved ones and point to potential racial differences in mean levels of these variables and the associations among them.

## **Attributions and Criticism in Black and White: Perceived Criticism in a Community Sample of Black and White Participants**

Criticism from close family members is a strong predictor of poor patient outcomes for an array of psychological disorders (Butzlaff & Hooley, 1998). The traditional measure of relatives' criticism is the Camberwell Family Interview (CFI), an hour-long semi-structured interview with the relative about his/her experiences with the patient in the previous three months (Vaughn & Leff, 1976). The CFI is audio-recorded and then coded for the extent to which the relative expresses critical comments about the patient. Seeking to devise a less time-intensive assessment of relatives' criticism, Hooley and Teasdale (1989) developed the Perceived Criticism Measure (PCM), a single item ("How critical do you think your relative is of you?") of which has become the gold standard measure of perceived criticism. The researchers posited that this single item may be a better predictor of patient outcome than CFI-rated criticism because it represents the totality of criticism that the patient is taking in. The PCM has been shown to predict poor outcome for patients with schizophrenia, anxiety, mood disorders, and substance use disorders (see review by Masland & Hooley, 2015). Moreover, consistent with Hooley and Teasdale's (1989) hypothesis, perceived criticism as measured by the PCM was found to be a stronger predictor of clinical outcomes than criticism extracted from the CFI (Chambless & Steketee, 1999; Hooley & Teasdale, 1989). Thus, the PCM may not only be a more practical tool for assessing criticism in the patient's family environment than traditional methods but also a more powerful one.

In light of the relationship between perceived criticism and negative outcome for various forms of psychopathology, perceived criticism and its predictors are factors that

warrant further investigation. Research demonstrates that patients' perceptions of criticism partially reflect the criticism that is actually displayed in the family environment. For example, previous studies have found that patients' reports of perceived criticism show medium to large correlations with relatives' self-reported criticism and observer ratings of relatives' criticism toward the patient (Chambless & Blake, 2009; Chambless, Bryan, Aiken, Steketee, & Hooley, 1999). Yet, even after observers' and relatives' reports are accounted for, considerable unexplained variance in perceived criticism remains with attributions of criticism explaining a portion of this variance. Attributions of criticism refer to the explanations individuals make about the intentions prompting their loved ones' criticism. Consider a father who tells his daughter that he does not like her friends. When the daughter states that her father's comments were critical, she is reporting perceived criticism from him. By contrast, when she makes judgments about the motives driving his criticism, she is making attributions. These attributions may be positive (e.g., "My father cares about me and doesn't want me to get caught up in the wrong crowd") or negative ("My father doesn't want me to have fun and is trying to attack my choice of friends"). The types of attributions that an individual makes are theorized to affect the level and type of criticism that this person perceives from his/her relative (Weiner, 1986). For instance, if the daughter in our example makes predominantly negative attributions about her father's criticism, it is hypothesized that she will be more likely to perceive his criticism as harsh and hurtful.

Consistent with theory, cross-sectional and longitudinal studies have shown attributions of criticism to be related to perceived criticism (Allred & Chambless, 2013, 2014, 2017). Employing the Attributions of Criticism Scale (ACS), a scale developed to

measure attributions made about criticism, Allred and Chambless (2013, 2014) found a positive relationship between positive attributions and perceived constructive criticism and between negative attributions and perceived destructive criticism in undergraduate and community samples. Seeking to provide greater evidence for a causal link between attributions and perceived criticism, Allred and Chambless (2017) conducted a longitudinal study in an undergraduate sample which showed that positive attributions predicted increases in perceived constructive criticism whereas negative attributions predicted increases in destructive criticism over time. Together these findings, though correlational, suggest that attributions are an important factor in the perception of criticism and provide greater support for a causal relationship between these constructs than can cross-sectional analyses alone.

### **Refinement of the Perceived Criticism Measure (PCM)**

Hooley and Teasdale's (1989) PCM remains the gold standard measure of perceived criticism, yet evidence is mounting that this measure is in need of refinement. For example, research has shown that individuals are able to differentiate between perceived constructive and destructive criticism, and the PCM largely reflects destructive criticism: Medium to large correlations have been found between the PCM and perceived destructive criticism ( $r$ s ranging from .36 to .54; Allred & Chambless, 2014; Renshaw, Blais, & Caska, 2010), whereas small correlations have been observed between PCM and perceived constructive criticism ( $r$ s ranging from -.05 to -.18). However, the PCM and perceived destructive criticism are not perfectly redundant indicating that the PCM is also tapping criticism that is not destructive. Therefore, perceived destructive criticism may be a more valid and reliable measure of hostile criticism in the family environment and thus



may be a more robust predictor of poor patient outcome than the PCM, although this remains to be tested. Additionally, the differences in attributions that predict the types of perceived criticism further support the utility of focusing on constructive and destructive criticism as distinct components of perceived criticism.

Another focus of refinement of the perceived criticism construct may be to devote greater attention to a related construct – how upset individuals become in response to criticism from their relatives. According to the stress-vulnerability hypothesis of expressed emotion and perceived criticism’s effects on treatment outcome (Hooley & Gotlib, 2000), criticism should affect a patient’s response to treatment only to the degree that he or she finds it distressing. Although the PCM includes an item assessing upset due to criticism, few studies have explored this facet of perceived criticism. However, research suggests that upset may be an important predictor of treatment outcome. For example, Steketee et al. (2007) found that upset mediated the relationship between perceived criticism and weekly ratings of anxious mood for patients in treatment for obsessive-compulsive disorder or panic disorder with agoraphobia. Miklowitz and colleagues (2005) demonstrated that upset due to criticism, not perceived criticism, predicted treatment outcome for patients with bipolar disorder. Given the link between upset and clinical outcome, delving into the factors that may predict individuals’ upset is a worthwhile pursuit. There is reason to speculate that attributions of criticism may also be related to the extent to which individuals become upset in response to criticism. To return to our previous example of the daughter who is criticized by her father for her choice of friends, it is plausible that if the daughter made more positive attributions about her father’s criticism, she would be less upset than if she made more negative attributions

about his comments. To explore this hypothesis, we examined the relationship between attributions and upset due to criticism in the current investigation.

### **Racial Differences in Attributions and Perceived Criticism**

Cross-cultural research indicates that perceptions of criticism may vary across racial/ethnic lines. In particular, differences in perceptions of criticism have emerged between Blacks and Whites, with prior research demonstrating that observer ratings of relatives' criticism and patient perceived criticism are significantly correlated among Whites but not Blacks (Weisman, Rosales, Kymalainen, & Armesto, 2006). Previous studies have also shown that observer ratings of relatives' criticism predict relapse and other poor clinical outcomes for Whites but not for Blacks; yet perceived criticism is associated with poor outcome in both racial groups (Guada, Brekke, Floyd, & Barbour, 2009; Guada, Hoe, Floyd, Barbour, & Brekke, 2011; Rosenfarb, Bellack, & Aziz, 2006; Rosenfarb, Bellack, Aziz, Kratz, & Sayers, 2004; Tompson et al., 1995). It may be that observer ratings of criticism, which in research studies are unlikely to have been made by Black coders, do not capture what Blacks perceive as critical, resulting in no association between observed criticism and poor outcome. However, when Blacks themselves rate their relatives as critical, these perceived criticism ratings do predict poor outcomes. The significant association between patient-perceived (but not observer-rated) criticism and clinical outcomes among Blacks highlights the importance of investigating perceived criticism and its antecedents more closely in this racial group.

Prior research also suggests that there may be racial differences in the attributions individuals make about their relatives' criticism. Drawing on findings showing no association between relatives' criticism and poor outcome in Black samples, Rosenfarb et

al. (2004) proposed that Blacks may perceive some criticism from their loved ones as an indication of care or concern. This hypothesis suggests that Blacks make different, potentially more positive attributions about their relatives' criticism than Whites, and that these attributions influence their perceptions of criticism. In line with this view, in their community sample Allred and Chambless (2014) found that Blacks reported more positive attributions than Whites. However, they also perceived greater destructive criticism than their White counterparts, and there was some evidence to suggest that they made more negative attributions as well. Allred and Chambless (2014) noted that these racial differences may have been due to an extreme response bias among Blacks, that is, a tendency to use the high end of rating scales regardless of content. Given that this investigation was the first to explore racial differences in attributions and perceived constructive and destructive criticism, efforts to replicate these findings employing methods to control for the effects of response bias are essential.

### **The Current Investigation**

In the current investigation, we sought to explore the relationship between attributions of criticism and perceived criticism in a community sample of Blacks and Whites as well as to continue psychometric work on the Attributions of Criticism Scale (ACS), a measure recently developed to assess individuals' attributions about relatives' criticism. In the prior undergraduate and community samples of Allred and Chambless (2013, 2014, 2017), the relationship between positive attributions and perceived constructive criticism and that between negative attributions and perceived destructive criticism have been consistent, whereas less consistent associations have emerged between positive attributions and destructive criticism and negative attributions and

constructive criticism. For these reasons, in this study we examined positive attributions as a predictor of greater perceived constructive criticism and negative attributions as a predictor of greater destructive criticism. We also examined the relationship between type of attribution and upset due to criticism. We expected positive attributions to be related to less upset and negative attributions to greater upset in our sample.

Another principal goal of the current investigation was to replicate the findings of Allred and Chambless (2014) by examining mean differences in attributions and perceived criticism across race. In light of findings showing the tendency for Blacks to engage in extreme responding on self-report questionnaire measures (Bachman & O'Malley, 1984; Clarke, 2000; Greenleaf, 1992; Johnson et al., 1997), it is crucial to determine whether the racial differences in attributions and perceived criticism reported by Allred and Chambless (2014) represent true racial differences or whether they are an artifact of extreme responding among Blacks. To this end, we examined racial differences between Blacks and Whites on a measure of extreme responding and controlled for extreme responding in subsequent analyses exploring racial differences in attributions, perceived criticism, and upset due to criticism as well as in those examining the relationships among attributions, perceived criticism, and upset. In addition, findings from the criticism literature have shown that family warmth is protective against relapse for Mexican Americans but not for Whites with schizophrenia, suggesting that relatives' warmth may be a more important factor in some racial/cultural groups than others (López et al., 2004). To explore this further, we tested whether there were racial differences in mean levels of warmth and whether warmth displayed by relatives was differentially related to perceived criticism for Blacks and Whites.

## Method

### Participants

Black and White community members were recruited through community flyering, internet forums, and social media sites. To participate, individuals had to be 18 years of age or older. Of the initial 343 participants who consented to participate in the study, 71 were excluded for various reasons: 25 participants for not completing the majority of study measures, 11 for not meeting inclusion criteria, 8 for not nominating a romantic partner or parental figure as the most important or influential person in their lives, and 3 for not nominating a relative who was of the same race. Following quality control checks, 18 participants were excluded for having duplicate IP addresses, 9 were deleted from the data set for failing questions (e.g., CAPTCHA questions) designed to detect spambots, and 7 were excluded for having foreign IP addresses or IP addresses known to produce spam. Finally, one participant was excluded for having less than seven years of education because we believed it unlikely that an individual with less than a seventh grade education would be able to validly complete study measures. Thus, the final sample comprised 272 individuals, of whom 160 (58.8%) were Black and 112 (41.2%) were White. Of the Blacks in the sample, 78 (48.8%) were women and 82 (51.2%) were men. Of the Whites, 76 (67.9%) were women and 36 (32.1%) were men. Participants ranged in age from 18 to 64 years ( $M = 32.23$ ,  $SD = 8.12$ ). Their years of education ranged from 7 to 27 years ( $M = 16.96$ ,  $SD = 3.69$ ) with the majority of participants (87.4%) reporting having completed at least some postsecondary education.

### Procedure

The study was advertised to potential participants as a survey on criticism in close relationships. Participants were provided with the link to the online survey through which they could initiate participation in the study. In compensation for their participation, participants each received a \$5 Amazon gift card.

Previous research has shown perceived criticism to have its greatest negative impact on clinical outcomes when individuals are living with the relative whom they perceive to be critical (Renshaw, 2007). However, cohabitation and relatives' influence may be conflated in these studies, since individuals tend to live with the most influential or impactful people in their lives. There is evidence to suggest that this might not be the case among Blacks and other racial/ethnic minority groups in which the extended family system assumes greater importance (Gerstel, 2011). For these reasons, participants in the current study were asked to indicate the most influential person in their lives (regardless of whether they were cohabitating with this person) who was restricted to be either a romantic partner or someone who has acted as a parent (e.g., parent, grandparent, aunt/uncle, guardian). Because research on criticism has shown that romantic partners and parents tend to be more critical than siblings, participants who nominated siblings as the most influential person in their lives were excluded from the current sample (Hooley & Richters, 1995). To increase the homogeneity of the sample, the most influential/impactful person in participants' lives was also required to be of the same race as the participant. Once participants had identified their relationship to that person, the questionnaire populated subsequent measures with this relationship. For example, a participant who identified her grandmother as the most important person in her life would then see question stems in which her grandmother was referenced. All participants

provided informed consent. Study measures and procedures were approved by the Institutional Review Board of the University of Pennsylvania.

## Measures

**Relationship variables.** Participants completed questions about the duration of their relationship with the most influential/impactful person in their lives as well as the average amount of time spent each day with this person during waking hours in the past week.

**Brief Warmth Scale.** The Parental Bonding Instrument (PBI; Parker, Tupling, & Brown, 1979) is a self-report measure of the amount of care and protection exhibited by parents toward their children. Previously collected PBI Care scale data provided by a sample of University of Pennsylvania undergraduates were used to create a brief six-item warmth scale for the present study (Allred & Chambless, 2013b). A reliable short form of the warmth scale was created with the first half of this data set, and the scale's reliability was confirmed in the second half ( $\alpha = .83$ ). Item stems from the PBI were amended to allow participants to respond regarding the most influential/impactful person in their lives. Internal consistency in the present sample was acceptable for both Blacks ( $\alpha = .77$ ) and Whites ( $\alpha = .72$ ).

**Attributions of Criticism Scale (ACS; Allred & Chambless, 2014).** The ACS is a 21-item questionnaire that measures the attributions that individuals make about the intentions underlying their relative's criticism. Items include those that assess positive attributions such as "When your romantic partner/relative criticizes you, to what extent do you believe he/she is trying to make you do better, learn, or grow?" as well as those that assess negative attributions such as "When your romantic partner/relative criticizes

you, to what extent do you believe he/she is trying to put you down?” Participants responded to these items on a Likert-type scale ranging from 1 (*not at all*) to 5 (*completely*). Previous psychometric works on the Attributions of Criticism Scale indicated that the scale demonstrated a two-factor structure with factors corresponding to positive and negative attributions (Allred & Chambless, 2014, 2017), good test-retest reliability, and convergent and discriminant validity with measures of perceived criticism and psychopathology, respectively (Allred & Chambless, 2017). The psychometric properties of the Attributions of Criticism Scale in the current sample are discussed below (see Results).

***Perceived Criticism Measure (PCM; Hooley & Teasdale, 1989)***. The PCM asks individuals to respond to the following question: “How critical do you think your relative/romantic partner is of you?” which is rated on a 10-point Likert-type scale ranging from 1 (*not at all critical*) to 10 (*very critical*). This criticism item is the gold standard measure of perceived criticism and has demonstrated good test-retest reliability (Hooley & Teasdale, 1989), discriminant validity with measures of psychopathology (Renshaw, 2008), and predictive validity in its prediction of poor treatment outcome for a number of mental disorders (Masland & Hooley, 2015).

To assess how upset individuals become in response to criticism, Hooley (1987) added the following question to the PCM: “When your relative/romantic partner criticizes you, how upset do you get?” Participants respond to this question on a 10-point Likert-type scale ranging from 1 (*not at all upset*) to 10 (*very upset*). This upset item has predicted poor clinical outcomes for individuals with panic with agoraphobia, obsessive-



compulsive disorder, and bipolar disorder (Miklowitz et al., 2005; Steketee et al., 2007). Only the PCM upset item was used as an outcome in our analyses.<sup>2</sup>

***Perceived Criticism Measure – Type (PCM-T; Renshaw et al., 2010).*** To assess different forms of perceived criticism, Renshaw et al. (2010) developed the PCM-T, which measures perceived constructive and destructive criticism separately. A modified version of the PCM-T was used in the current study. Participants responded to the following questions: “When your relative is critical of you, how harsh or hurtful is he/she?” rated on a scale from 1 (*not at all harsh/hurtful*) to 10 (*very harsh/hurtful*) and “When your relative is critical of you, how helpful or constructive is he/she?” rated on a scale from 1 (*not at all constructive/helpful*) to 10 (*very constructive/helpful*). Previous research has shown moderate to large correlations between perceived destructive criticism and the standard PCM criticism item, whereas little relationship has been found between perceived constructive criticism and PCM-criticism (Allred & Chambless, 2014, 2017; Renshaw et al., 2010). Perceived constructive and destructive criticism have also demonstrated good test-retest reliability in an undergraduate sample (Allred & Chambless, 2017).

***Extreme Response Style Measure (Greenleaf, 1992).*** Greenleaf developed a measure of extreme response style comprising 16 items that exhibit low intercorrelations and equal extreme response proportions (i.e., the proportion of respondents who answer extremely is approximately equal for all items). Items include “Everyone should use mouthwash to help control bad breath” and “I like to visit places that are totally different from my home” and are rated as true or false. In the current study, to mimic the format of

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<sup>2</sup> Because the reader may be interested in the correlations between the standard PCM criticism item and study variables, these are included in Table 2.

the PCM-T, a modified version of the scale was employed in which participants responded to each item on a 10-point Likert-type scale ranging from 1 (*definitely disagree*) to 10 (*definitely agree*) instead of the 5-point Likert-type scale employed in the original measure. For each participant, an extreme response style score was computed by calculating the proportion of items the participant answered at the extremes of the scale (i.e., scoring a 1 or 2 or a 9 or 10 on the 10-point scale).

**Demographics.** Demographic information including age, race, gender, and years of education was collected from each participant.

## Results

### Descriptive Statistics for Relationship Variables

The majority (64.7%) of participants nominated a romantic partner/spouse as the most important/influential person in their lives. The average length of relationship with the relative/partner was 10.89 years ( $SD = 7.10$ ) among those who nominated romantic partners/spouses and 27.63 years ( $SD = 9.38$ ) among those who nominated parents. On average participants who nominated a romantic partner/spouse reported spending 5.90 hours ( $SD = 4.78$ ) with their relative whereas those who nominated a parent reported spending 2.47 hours ( $SD = 3.63$ ) with their relative during waking hours on an average day during the previous week.

### Psychometric Tests of the Attributions of Criticism Scale

**Factor Analysis.** We aimed to confirm the ACS two-factor structure demonstrated in the previous undergraduate and community samples of Allred and Chambless (2014, 2017) in the current community sample. Research has indicated that confirmatory factor analysis frequently results in poor model fit when item-level

indicators are employed because CFAs require items to load on one factor only, an assumption that is often too restrictive in psychological research. As a result, Marsh et al. (2014) propose the use of exploratory structural equation modeling (ESEM) which permits all factor loadings and cross-loadings to be estimated within a specified factor structure.

Consistent with the recommendations of Marsh et al. (2014), we first conducted a CFA because CFA represents the simplest solution when the model fits the data adequately. Given the sensitivity of the chi-square statistic to sample size (Cheung & Rensvold, 2002), we used the CFI and RMSEA statistics to assess model fit. Results of the CFA indicated inadequate fit based on the RMSEA:  $\chi^2(188) = 718.82, p < .001$ ; CFI = .95; RMSEA = .10. We then conducted an ESEM in Mplus (Muthén & Muthén, 2007) using WLSMV estimation and geomin rotation which resulted in improved fit:  $\chi^2(169) = 443.43, p < .001$ ; CFI = .97; RMSEA = .08. Consistent with the findings of Allred and Chambless (2014, 2017), the ACS demonstrated a two-factor structure in the current sample with factors corresponding to positive and negative attributions (see Table 1 for factor loadings). The attributions subscales demonstrated excellent internal consistency for both Blacks ( $\alpha = .93$  for positive attributions,  $\alpha = .94$  for negative attribution) and Whites ( $\alpha = .91$  for positive attributions,  $\alpha = .96$  for negative attributions) and were minimally correlated in the whole sample ( $r = -.19$ ).

**Measurement Invariance across Race.** Measurement invariance of the ACS two-factor structure across race was tested using multigroup CFAs with WLSMV estimation. Muthén & Muthén (2007) state that both factor loadings and intercepts must be freed and constrained simultaneously in Mplus when testing for strong measurement

invariance with categorical responses because both parameters affect the item probability curve. Therefore, in the first model, factor loadings and intercepts were allowed to vary freely between Blacks and Whites (Model 1:  $\chi^2(366) = 985.83, p < .001$ ; CFI = .947; RMSEA = .112). In the second model, factor loadings and intercepts were constrained to be equal across race (Model 2:  $\chi^2(446) = 1136.16, p < .001$ ; CFI = .941; RMSEA = .107). Given that the CFI and RMSEA are relatively robust to model complexity, sample size, and violations of the normality assumption compared to the chi-square statistic, Chen (2007) recommends using the differences in CFI and RMSEA values across nested models when testing for measurement invariance. According to Chen's recommendations, the null hypothesis of measurement invariance should not be rejected if (a) the difference in CFI is less than -.005 and (b) the difference in RMSEA is less than .01. Because the change in CFI across nested models exceeded the criterion for invariance proposed by Chen (2007) but the change in RMSEA did not (both criteria must be met in order to establish measurement invariance), our results provide inconclusive evidence for strong measurement invariance of the ACS two-factor structure across race ( $\Delta$  CFI between Model 2 and Model 1 = -.006;  $\Delta$  RMSEA between Model 2 and Model 1 = -.005). Given that the difference in CFI just exceeded the criterion for measurement invariance proposed by Chen and the ACS demonstrated measurement invariance in a previous community sample of Blacks and Whites (Allred & Chambless, 2014), we proceeded with comparisons across race in the current sample as part of hypothesis testing. However, these cross-race comparisons should be interpreted with caution, since additional research is needed to determine if the ACS demonstrates measurement invariance across Blacks and Whites.

### **Racial Differences in Extreme Responding**

Extreme response scores in the full sample ranged from 0 to .88 ( $M = .27$ ,  $SD = .21$ ) and were slightly positively skewed in their distribution (skewness = 0.56,  $SE = 0.15$ ). Internal consistency was quite high among Blacks and Whites ( $\alpha = .71$  in both groups) indicating that participants were answering consistently within a particular area of the 10-point scale. This pattern is to be expected among items that are reliably capturing extreme response bias when it is present (Greenleaf, 1992). We then tested for racial differences in extreme responding scores, and results showed that there was no difference in extreme responding between Blacks and Whites in our sample,  $t(267.04) = 0.60$ ,  $p = .55$ ,  $d = 0.07$ , 95% CI [-0.17, 0.32]. However, because participants' extreme responding scores were correlated with both predictors (attributions) and outcomes of interest (type of perceived criticism or upset due to criticism), they were included as a covariate in regression analyses (see Table 2) to reduce the effects of response bias.

### **Data Analytic Strategy**

Regression analyses predicting perceived constructive criticism and upset due to criticism were conducted with positive attributions, race, warmth, relative type, years of education, and their interactions as predictors and potential confounding variables as covariates. The same analyses were conducted with negative attributions predicting perceived destructive criticism and upset due to criticism. See Table 2 for zero-order correlations among study variables and Tables 3 and 4 for the results of regression analyses with all interaction terms and covariates included. Racial differences in mean levels of attributions, type of perceived criticism, upset due to criticism, and warmth were also tested using regression analyses with race as a predictor (see following section).

Zero-order correlations were examined to identify potential confounding variables to include as covariates in regression analyses. Participant gender, age, years of education, extreme responding score, relationship length, and number of waking hours spent with the relative were included as covariates in analyses because they were significantly correlated with one or more of our outcomes of interest (attributions, type of perceived criticism, upset due to criticism, or warmth). For consistency, the same covariates were included in each regression analysis. To reduce multicollinearity, variables included in interaction terms were mean-centered. Non-significant interactions were trimmed from analyses, and those that emerged as significant were probed according to the recommendations of Aiken and West (1991). To determine that data did not violate the assumptions of multiple regression, diagnostic indices including condition indexes, dfbetas, sdbetas, and residual distributions were examined for all regression analyses.

A power analysis conducted with G\*Power 3 (Faul, Erdfelder, Lang, & Buchner, 2007) indicated that in a sample of 272 participants, there was 84.7% power to detect a small-medium effect size of  $f^2 = .09$  in a linear regression with 20 predictors (the most included in any model).

### **Racial Differences in Mean Levels of Attributions, Perceived Criticism, Upset Due to Criticism, and Warmth**

We hypothesized that there would be racial differences in mean levels of attributions, perceived constructive and destructive criticism, upset due to criticism, and warmth. To test for mean level differences across race in our variables of interest, regression analyses predicting positive and negative attributions, perceived constructive

and destructive criticism, upset due to criticism, and warmth were conducted with dummy-coded race as the predictor and gender, age, years of education, extreme responding score, relationship length, and number of waking hours spent together as covariates<sup>3</sup>. The semi-partial correlation (*sr*) for the dummy-coded race variable was examined in each regression because it represents the unique effect of race when controlling for the other variables in the model.

Contrary to prediction, Blacks and Whites did not significantly differ on mean levels of positive attributions ( $\beta = .04, sr = .04, p = .58$ ), negative attributions ( $\beta = .00, sr = .00, p = .10$ ), perceived constructive criticism ( $\beta = .07, sr = .06, p = .40$ ), destructive criticism ( $\beta = -.03, sr = -.03, p = .69$ ), or warmth,  $\beta = .10, sr = .09, p = .15$ . However, Whites did report being more upset by perceived criticism from their relatives than Blacks,  $\beta = .16, sr = .14, p = .03$ .

### **Attributions, Perceived Criticism, and Upset Due to Criticism**

We predicted that positive attributions would be associated with greater perceived constructive criticism and less upset due to criticism, whereas negative attributions would be related to greater perceived destructive criticism and more upset. Multiple regression analyses were used to test these hypotheses, and in all regressions gender, age, years of education, extreme responding score, relationship length, and number of waking hours were included as covariates. As predicted, positive attributions were associated with more perceived constructive ( $\beta = .69, sr = .67, p < .001$ ) criticism and less upset ( $\beta = -.20, sr = -.20, p = .002$ ). Conversely, negative attributions were associated with more destructive

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<sup>3</sup> Substantive results were not affected by controlling for extreme responding. See Appendix A for results with extreme responding excluded from regression analyses.

criticism ( $\beta = .71, sr = .60, p < .001$ ) and greater upset ( $\beta = .53, sr = .45, p < .001$ ). There were no significant interactions of attributions with race, all  $ps > .06$ .

### **Contributions of Relatives' Warmth**

Findings from the criticism literature suggest that relatives' warmth might be a significant predictor of perceived criticism as well as a moderator of the effect of attributions on perceived criticism. In our analyses, warmth significantly predicted more perceived constructive criticism ( $\beta = .61, sr = .54, p < .001$ ), less destructive criticism ( $\beta = -.53, sr = -.47, p < .001$ ), and less upset ( $\beta = -.43, sr = -.38, p < .001$ ) when race, gender, age, years of education, extreme responding score, relationship length, and number of waking hours spent together were controlled.

We then examined whether there were racial differences in the effect of warmth on perceived criticism and upset due to criticism. In a regression predicting upset from negative attributions, a significant interaction of race and warmth emerged. See Table 4. When the interaction was probed, results showed that Whites reported greater upset than Blacks at average ( $\beta = .15, sr = .13, p = .02$ ) and high levels of warmth ( $\beta = .37, sr = .25, p < .001$ ) but not at low levels of warmth,  $\beta = -.07, sr = -.04, p = .43$ . However, warmth did not significantly moderate the effects of attributions, all  $ps > .07$ .

### **Relative Type and Perceived Criticism**

No hypotheses were made regarding the effect of relative type on perceived criticism. However, given that relative type proved to be a moderator of the relationship between attributions and perceived criticism in the community sample of Allred and Chambless (2014), we explored its potential moderating effect in the current sample. In a regression predicting constructive criticism from positive attributions, a significant



interaction of positive attributions and relative type emerged. See Table 3. Simple slope analyses showed that positive attributions were more strongly associated with constructive criticism when relatives were romantic partners ( $\beta = .64, sr = .42, p < .001$ ) rather than parents,  $\beta = .42, sr = .25, p < .001$ . However, in both cases, positive attributions were related to greater constructive criticism.

### **Discussion**

The primary aims of the current investigation were (a) to examine the relationship between attributions of criticism and perceptions of constructive and destructive criticism and (b) to extend research on racial differences (Allred & Chambless, 2014) by examining mean level differences in attributions, perceived criticism, upset due to criticism, and warmth between Blacks and Whites while controlling for response bias. A secondary aim of this study was to continue psychometric testing of the Attributions of Criticism Scale (ACS) in a community sample.

Consistent with the findings of Allred and Chambless (2014, 2017), psychometric tests indicated that the ACS demonstrated a two-factor structure with factors representing positive and negative attributions in the current sample. However, in contrast to the results of Allred and Chambless (2014) wherein the ACS two-factor structure demonstrated measurement invariance across Blacks and Whites, measurement invariance of this structure across race was not conclusively established in the current sample. Because the evidence for measurement invariance was inconclusive, we proceeded with multigroup comparisons across race. Consequently, our findings regarding racial differences in attributions and their relationship to perceived criticism and upset due to criticism must be interpreted with caution. Future studies are needed to

provide further evidence for measurement variance of the ACS two-factor structure across racial groups and to explore its factor structure in clinical samples.

Based on the previous work of Allred and Chambless (2014, 2017), we predicted that positive and negative attributions would be differentially related to the types of perceived criticism and upset due to criticism. In line with this prediction, positive attributions were related to greater perceived constructive criticism and less upset whereas negative attributions were associated with greater perceived destructive criticism and upset. The difference in the attributions that predict the types of perceived criticism underscores the importance of treating perceived constructive and destructive criticism as separate dimensions of perceived criticism (Renshaw et al., 2010). Furthermore, our findings suggest that attributions may also play an important role in determining how upset individuals become in response to criticism from their loved ones. Relative type was found to be a moderator of the relationship between positive attributions and perceived constructive criticism such that there was a stronger association between positive attributions and perceived constructive criticism when relatives were romantic partners than parents. However, in both cases the relationship was in the predicted direction.

Racial differences in mean levels of attributions, perceived criticism, upset due to criticism, and warmth were also tested. In contrast to the findings of Allred and Chambless (2014) which showed mean level differences in positive attributions, negative attributions, and perceived destructive criticism across race, no differences in positive and negative attributions, perceived constructive and destructive criticism, or warmth were observed between Blacks and Whites in the current sample. Unlike the study of

Allred and Chambless (2014) in which indicators of extreme responding were observed among Blacks, racial differences in extreme responding did not emerge in this study which may account for some of the differences in findings across these investigations. Given research showing Blacks to engage in extreme responding when answering questionnaire items (Bachman & O'Malley, 1984; Clarke, 2000; Greenleaf, 1992; Johnson et al., 1997), a tendency which may inflate racial differences in the observed literature, it is important that researchers check for this response style before making cross-racial comparisons involving this racial group. The current investigation, which included a measure of extreme responding to control for the effect of extreme response bias, outlines one method researchers may use to account for extreme responding in future studies examining differences between Blacks and other racial groups on questionnaire measures.

Finally, relative's warmth emerged as both a predictor and moderator of effects in our analyses. Greater warmth was associated with more perceived constructive criticism, less perceived destructive criticism, and less upset due to criticism. Additionally, there were racial differences in the effect of warmth on upset due to criticism. Blacks reported less upset than Whites when they perceived their relative to express average and high but not low levels of warmth. This racial difference in the effect of warmth on upset may be one reason for our findings showing Blacks to be less upset on average by criticism from their relatives. Together, these results along with those of López and colleagues (2004) showing warmth to protect against relapse among Mexican American but not White patients with schizophrenia suggest that warmth may indeed be more important in some racial/ethnic groups than others and should be the focus of further investigation. One

explanation for these results could be that for individuals from racial/ethnic groups in which close family ties are highly valued, lack of warmth from relatives is particularly stressful (López et al., 2004). Given that the current study is the first to explore the relationship between warmth and upset due to criticism across race, additional research is required to replicate our findings in racially/ethnically diverse samples.

### **Limitations and Future Directions**

The primary limitation of the current investigation is its cross-sectional design. Although our model proposes that attributions are causally related to perceived criticism and upset due to criticism, the current study's cross-sectional design prevents causal interpretation. Thus, future studies employing longitudinal designs or providing experimental evidence from evaluations of interventions targeting individuals' attributions would provide greater evidence for a causal link between attributions of criticism and perceived criticism. Another limitation of the current study was its recruitment method, which did not involve random sampling of the population. Participants in the current study were recruited through community flyering, social media sites, and internet forums. It may be that individuals who visit social media sites and internet forums and those who participate in internet research are not representative of the general population. Certainly impoverished groups with little access to computers are likely to have been excluded.

Despite these limitations, findings from this study provide a potential avenue for influencing treatment outcome for patients with psychological disorders. For example, in family/couples therapy, the clinician may prompt relatives to discuss the intentions driving their criticism (Chambless, 2012). Though it may be true that relatives intend to

hurt the patient with their criticism, in our clinical experience it has more often been the case that relatives feel overwhelmed by the patient's disorder and are unaware of the negative impact their critical behavior is having on the patient's progress. Being made aware of the link between their criticism and patient outcomes and having a better understanding of the patient's disorder and how to assist in overcoming it may help relatives reduce their critical responses. Through discussions with their relatives in therapy, patients could also be encouraged, when warranted, to make more positive attributions and fewer negative attributions about relatives' criticism instead of reflexively assuming the worst about their intentions. Furthermore, given the findings showing that warmth is an important factor in the perception of criticism, relatives' warmth may also be targeted in treatment. Research has found that the effects of family-focused therapy on treatment outcomes for bipolar disorder are mediated by improved positive communication patterns among family members (Miklowitz, George, Richards, Simoneau, & Suddath, 2003). Perhaps, interventions to make communication between patients and their relatives more positive in tone may be effective in increasing patients' appraisals of relatives' warmth. Further research is needed to determine if interventions targeting attributions and warmth reduce perceived destructive criticism and upset, increase perceived constructive criticism, and result in improved patient outcomes.

The current investigation also highlights the importance of focusing greater attention on upset due to criticism in future research. Results showing racial differences in mean levels of upset but not perceived constructive or destructive criticism underscore the utility of exploring the relative predictive validity of these constructs among Blacks and Whites. It may be that the extent to which patients become upset in response to

criticism is more predictive of clinical outcome than the sheer amount of criticism they perceive from their relatives. For example, see Miklowitz et al. (2005) wherein upset but not perceived criticism predicted treatment outcome for bipolar patients. There may well be other cases where if researchers had tested upset when perceived criticism failed to predict outcome, a similar pattern would have emerged. Such findings would be in keeping with the stress-vulnerability hypothesis of perceived criticism's effects (Hooley & Gotlib, 2000); that is, criticism is only important to the degree that the patient finds it stressful. Additionally, given the relationship between upset due to criticism and poor patient outcomes, our results showing that, so long as relatives were warm, Blacks were less upset by criticism than Whites may have important implications for the development of culturally sensitive family/couples treatments for Black patients. If upset due to criticism is found to be a predictor of poor outcomes among Blacks, it would be crucial for research to investigate whether interventions designed to foster warmth between patients and their relatives protect against negative clinical outcomes in this racial group.

## Appendix A

### *Results with Extreme Responding Excluded as Covariate*

#### **Racial Differences in Mean Levels of Attributions, Perceived Criticism, Upset Due to Criticism, and Warmth**

Blacks and Whites did not significantly differ on mean levels of positive attributions ( $\beta = .02$ ,  $sr = .02$ ,  $p = .78$ ), negative attributions ( $\beta = .05$ ,  $sr = .05$ ,  $p = .49$ ), perceived constructive criticism ( $\beta = .06$ ,  $sr = .05$ ,  $p = .48$ ), destructive criticism ( $\beta = .02$ ,  $sr = .01$ ,  $p = .83$ ), or warmth,  $\beta = .08$ ,  $sr = .07$ ,  $p = .27$ . However, Whites were more upset by perceived criticism from their relatives than Blacks,  $\beta = .17$ ,  $sr = .16$ ,  $p = .02$ .

#### **Attributions, Perceived Criticism, and Upset Due to Criticism**

Positive attributions were associated with more perceived constructive ( $\beta = .69$ ,  $sr = .67$ ,  $p < .001$ ) criticism and less upset ( $\beta = -.22$ ,  $sr = -.21$ ,  $p = .001$ ). Conversely, negative attributions were associated with more destructive criticism ( $\beta = .74$ ,  $sr = .69$ ,  $p < .001$ ) and greater upset ( $\beta = .51$ ,  $sr = .47$ ,  $p < .001$ ).

#### **Contributions of Relatives' Warmth**

Warmth significantly predicted more perceived constructive criticism ( $\beta = .60$ ,  $sr = .55$ ,  $p < .001$ ), less destructive criticism ( $\beta = -.59$ ,  $sr = -.53$ ,  $p < .001$ ), and less upset ( $\beta = -.44$ ,  $sr = -.40$ ,  $p < .001$ ) when race, gender, age, years of education, relationship length, and number of waking hours spent together were controlled.

In a regression predicting upset from negative attributions, a significant interaction of race and warmth emerged,  $\beta = .29$ ,  $sr = .21$ ,  $p < .001$ . Probes showed that Whites reported greater upset than Blacks at average ( $\beta = .15$ ,  $sr = .13$ ,  $p = .02$ ) and high

levels of warmth ( $\beta = .37, sr = .25, p < .001$ ) but not at low levels of warmth,  $\beta = -.07, sr = -.05, p = .40$ .

### **Relative Type and Perceived Criticism**

In a regression predicting constructive criticism from positive attributions, a significant interaction of positive attributions and relative type emerged,  $\beta = -.14, sr = -.10, p = .04$ . Probes showed that positive attributions were more strongly associated with constructive criticism when relatives were romantic partners ( $\beta = .63, sr = .41, p < .001$ ) rather than parents,  $\beta = .42, sr = .25, p < .001$ . However, in both cases, positive attributions were related to greater constructive criticism.



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Table 1

*Factor Loadings for Exploratory Structural Equation Model (ESEM) with Geomin Rotation of Attributions of Criticism Scale (ACS) Items*

ACS Item	Positive Attributions	Negative Attributions
When your [ <i>relative type here</i> ] criticizes you, to what extent do you believe he/she...		
is trying to show concern for you?	<b>.81</b>	-.05
is trying to motivate you or get you to take action?	<b>.79</b>	.00
is trying to prevent you from making a mistake?	<b>.79</b>	.04
is trying to stop a problem from getting worse?	<b>.79</b>	.05
is trying to protect you?	<b>.77</b>	.10
is trying to show that he/she cares?	<b>.76</b>	-.11
has your best interests at heart?	<b>.75</b>	-.31
is trying to be honest and open with you?	<b>.71</b>	-.15
is trying to correct a problem?	<b>.71</b>	.14
is trying to stop you from hurting yourself or someone else?	<b>.70</b>	.21
is trying to get you to do better, learn, or grow?	<b>.69</b>	-.18
is trying to encourage you to think about a new point of view or perspective?	<b>.62</b>	-.11
is trying to humiliate you?	.06	<b>.94</b>
is trying to put you down?	.01	<b>.93</b>
is trying to make you feel stupid?	.05	<b>.91</b>
is trying to stop you from doing your best?	.20	<b>.90</b>
is trying to attack you?	-.07	<b>.89</b>
is trying to hurt or have a negative impact on you?	-.08	<b>.88</b>
is trying to blame you for something?	-.11	<b>.78</b>
is trying to control you?	-.08	<b>.77</b>
is trying to show his/her frustration or anger with you?	-.15	<b>.64</b>

*Note.*  $N = 272$ . Factor loadings for items included in each factor score are in boldface.

Table 2

*Summary Statistics and Zero-Order Correlations for Attributions, Warmth, Perceived Criticism, Relationship Factors, and Demographic Variables for Blacks and Whites*

Measure	<i>M</i> (W)	<i>SD</i> (W)	<i>M</i> (B)	<i>SD</i> (B)	1	2	3	4	5	6	7	8	9
1. Pos. Attrib.	3.79	0.77	3.66	0.78	-	-.43**	.61**	.69**	-.29**	-.35**	-.32**	.14	-.06
2. Neg. Attrib.	2.50	1.23	2.52	1.04	.11	-	-.61**	-.36**	.72**	.57**	.60**	-.16*	.37**
3. Warmth	3.35	0.53	3.15	0.60	.14	-.65**	-	.66**	-.45**	-.44**	-.55**	-.03	.02
4. Constructive Criticism	6.96	2.09	6.89	2.21	.60**	.04	.17	-	-.31**	-.30**	-.39**	-.06	.11
5. Destructive Criticism	4.96	2.70	4.93	2.71	-.09	.75**	-.65**	-.12	-	.51**	.64**	.00	.35**
6. PCM-Criticism	5.39	2.62	6.38	2.21	.17	.73**	-.67**	-.02	.61**	-	.51**	-.09	.20*
7. Upset due to Criticism	7.02	2.09	6.03	2.41	.16	.44**	-.30**	.03	.40**	.45**	-	.08	.17
8. Relationship Length (yrs)	16.86	11.69	16.38	10.92	.12	.23*	-.32**	-.05	.14	.26**	.35**	-	-.35**
9. Waking Hours Spent Together Daily (hrs)	4.99	4.21	4.48	5.05	.13	.20*	-.04	-.04	.07	.16	.13	-.10	-
10. Years of Education	18.10	3.47	15.93	3.60	-.12	-.17	.11	-.11	-.04	-.13	-.15	.02	-.16
11. Extreme Responding	0.26	0.18	0.27	0.23	.13	-.36**	.40**	.13	-.29**	-.24*	.04	-.11	.04
12. Age (yrs)	33.04	7.89	31.65	8.26	.00	-.10	.00	-.05	-.23*	-.15	-.11	.34**	.16
13. Gender					.14	.32**	-.22*	.18	.17	.17	-.15	-.06	.21*
14. Relative Type					.22*	.32**	-.32**	.06	.29**	.41**	.43**	.76**	.17

*Note.* Correlations for Blacks are presented above the diagonal. Those for Whites are presented below the diagonal. W= White. B = Black. PCM = Perceived Criticism Measure. Gender was coded as Female = 0, Male = 1; Relative Type as Romantic Partner = 0, Parent = 1. \* $p < .05$ , \*\* $p < .01$ .



Table 2 (continued)

*Summary Statistics and Zero-Order Correlations for Attributions, Warmth, Perceived Criticism, Relationship Factors, and Demographic Variables for Blacks and Whites*

Measure	10	11	12	13	14
1. Pos. Attrib.	.32**	.17*	-.20*	-.13	.25**
2. Neg. Attrib.	-.17	-.51**	.14	.13	-.24**
3. Warmth	.35**	.07	-.05	-.15	.03
4. Constructive Criticism	.17	-.05	-.22**	.05	.11
5. Destructive Criticism	.11	-.40**	.06	.12	-.03
6. PCM-Criticism	-.08	-.32**	.06	.25**	-.08
7. Upset due to Criticism	.01	-.18*	.07	-.03	.04
8. Relationship Length (yrs)	.25**	.15	.23**	-.16	.67**
9. Waking Hours Spent Together Daily (hrs)	.08	-.40**	.15	-.06	-.45**
10. Years of Education	-	-.10	.11	-.08	.12
11. Extreme Responding	.21*	-	-.18	-.15	.26**
12. Age (yrs)	.22*	-.12	-	-.09	-.44**
13. Gender	.01	-.26**	.13	-	-.01
14. Relative Type	-.06	-.01	-.25**	-.05	-

*Note.* Correlations for Blacks are presented above the diagonal. Those for Whites are presented below the diagonal. W= White. B = Black. PCM = Perceived Criticism Measure. Gender was coded as Female = 0, Male = 1; Relative Type as Romantic Partner = 0, Parent = 1. \* $p < .05$ , \*\* $p < .01$ .

Table 3

*Regressions Predicting Constructive Criticism and Upset due to Criticism from Positive Attributions*

Predictors	Constructive Criticism		Upset due to Criticism	
	$\beta$	<i>sr</i>	$\beta$	<i>sr</i>
Pos. Attrib.	.64***	.42	-.03	-.03
Warmth	.32***	.24	-.41***	-.32
Education	-.06	-.05	.06	.05
Race	.00	.00	.21	.19
Gender	.10	.09	-.17*	-.15
Relative Type	.07	.03	.18	.07
Age	-.07	-.04	-.01	-.01
Relationship Length	-.06	-.02	.07	.03
Waking Time Spent Together Daily	-.02	-.02	.22**	.21
Extreme Responding Score	-.06	-.06	-.08	-.07
Race x Pos. Attrib.	-	-	-	-
Race x Warmth	-	-	-	-
Race x Education	-	-	-	-
Race x Relative Type	-	-	-	-
Pos. Attrib. x Warmth	-	-	-	-
Pos. Attrib. x Education	-	-	-	-
Pos. Attrib. x Relative Type	-.15*	-.10	-	-
Race x Pos. Attrib. x Warmth	-	-	-	-
Race x Pos. Attrib. x Education	-	-	-	-
Race x Pos. Attrib. x Relative Type	-	-	-	-

*Note.* \* $p < .05$ , \*\* $p < .01$ , \*\*\*  $p < .001$ . Dashes represent higher-order terms that were dropped from analyses when they did not emerge as statistically significant,  $ps > .05$ .

Table 4

*Regressions Predicting Destructive Criticism and Upset due to Criticism from Negative Attributions*

Predictors	Destructive Criticism		Upset due to Criticism	
	$\beta$	<i>sr</i>	$\beta$	<i>sr</i>
Neg. Attrib.	.59***	.39	.44***	.29
Warmth	-.19**	-.13	-.34***	-.21
Education	.22***	.19	.08	.07
Race	-.01	-.01	.15*	.13
Gender	-.03	-.03	-.21***	-.19
Relative Type	-.08	-.03	.23	.09
Age	-.25**	-.14	.02	.01
Relationship Length	.15	.06	.05	.02
Waking Time Spent Together Daily	.08	.08	.16**	.14
Extreme Responding Score	-.08	-.07	.03	.02
Race x Neg. Attrib.	-	-	-	-
Race x Warmth	-	-	.28***	.21
Race x Education	-	-	-	-
Race x Relative Type	-	-	-	-
Neg. Attrib. x Warmth	-	-	-	-
Neg. Attrib. x Education	-	-	-	-
Pos. Attrib. x Relative Type	-	-	-	-
Race x Neg. Attrib. x Warmth	-	-	-	-
Race x Neg. Attrib. x Education	-	-	-	-
Race x Neg. Attrib. x Relative Type	-	-	-	-

*Note.* \* $p < .05$ , \*\* $p < .01$ , \*\*\*  $p < .001$ . Dashes represent higher-order terms that were dropped from analyses when they did not emerge as statistically significant,  $ps > .05$ .

**CHAPTER 3**

**Attributions and Perceptions of Criticism: An Examination of Patients with Anxiety  
and Normal Control Participants**

### **Abstract**

Perceived criticism from relatives is a robust predictor of poor clinical outcomes for patients with a variety of psychological disorders. Previous research points to a link between the attributions that individuals make specifically about the motives for relatives' criticism and perceived criticism from this relative. In the current study, we examined the relationships among attributions of criticism, perceived criticism, and upset due to criticism among individuals with anxiety disorders and those with no psychopathology. Participants completed measures of global attributions, perceived criticism, and upset due to criticism regarding criticism from a romantic partner/spouse or parent. They also engaged in 10-minute problem-solving interactions with their relative and completed measures of attributions, perceived criticism, and upset with regard to this relative's critical behavior during the interactions. These interactions were then coded by observers for the amount of criticism exhibited by relatives. Results showed that negative attributions were related to greater perceived criticism and upset for both global and interaction-specific measures. Moreover, in analyses of interaction-specific measures, negative attributions added to prediction of perceived criticism and upset over and above the contribution of observed criticism. Positive attributions were not significantly related to global or interaction-specific upset in any analyses. Relationships were consistent across patients and normal controls. Our findings suggest that negative attributions of relatives' motives for their criticism are important predictors of perceived criticism and upset and that interventions targeting these attributions may be helpful in mitigating the negative effect of perceived criticism for individuals with psychopathology.

## **Attributions and Perceptions of Criticism: An Examination of Patients with Anxiety and Normal Control Participants**

The amount of criticism that a patient perceives from a parent or spouse/romantic partner has been linked to poor clinical outcomes for patients with major depression, obsessive-compulsive disorder, panic disorder with agoraphobia, substance use disorders, and schizophrenia (see review by Masland & Hooley, 2015). Relatives' criticism has traditionally been measured by the Camberwell Family Interview (CFI), an interview with the relative about his/her attitudes toward the patient that is conducted in the patient's absence and is later coded for the criticism the relative expresses about the patient (Vaughn & Leff, 1976). However, the CFI is both time-consuming to administer and laborious to code. For these reasons, Hooley and Teasdale (1989) developed the Perceived Criticism Measure (PCM), which yields a rating of the extent to which patients perceive themselves to be criticized by a loved one. Because the PCM captures the criticism that is getting through to the patient, Hooley and Teasdale (1989) proposed that it may be a more practical and powerful measure of criticism in the family environment than CFI-extracted criticism. Indeed, in two studies to date, self-reported perceived criticism as measured by the PCM was a more robust predictor of poor outcomes for patients with anxiety and depression than CFI-extracted criticism (Chambless & Steketee, 1999; Hooley & Teasdale, 1989). Given the association between perceived criticism and poor clinical outcomes, further investigation of the factors that predict perceived criticism is needed.

Research indicates that patient perceived criticism is capturing useful information about criticism in the family environment. Observer ratings of relatives' criticism as well

as relatives' own self-reported criticism show moderate to large associations with patients' reports of perceived criticism, indicating that patients' ratings of perceived criticism, in part, represent criticism present in the household (Chambless & Blake, 2009; Chambless, Bryan, Aiken, Steketee, & Hooley, 1999). However, patients may also perceive relatives to be more critical than they actually are. Smith and Peterson (2008) refer to the tendency for some individuals to perceive a greater amount of criticism from relatives than is apparent to objective observers or is intended by relatives as *criticality bias*. In support of this phenomenon, research shows that even when observer ratings of criticism and relatives' self-reports are taken into account, there is still a significant amount of variance in perceived criticism left unexplained. Thus, researchers have turned their attention to identifying factors that account for this deviation between patients' perceived criticism and observer ratings of relatives' criticism or relatives' intended criticism.

Attribution theory, as well as the literature on attributional processes in marriage, provides a guide for understanding how patient attributions for relatives' behavior may contribute to criticality bias (Bradbury & Fincham, 1990; Weiner, 1986). Attributions refer to individuals' explanations about the causes of an event. According to attribution theory, an individual's emotional and behavioral reactions to an event will be influenced by the attributions or causal explanations this person draws for the event in question (Weiner, 1986). A growing body of research suggests that patients' perceptions of relatives' criticism are shaped by the attributions they make about relatives' critical comments. Efforts to refine the measurement of perceived criticism have shown that criticism assessed by the PCM mainly assesses perceived destructive criticism rather than

constructive criticism (Renshaw, Blais, & Caska, 2010). Attribution theory suggests that patients who make positive attributions about their relatives' behavior (e.g., believe that relatives are genuinely concerned about patients' well-being) may perceive relatives as being less harshly or destructively critical and more constructively critical. In contrast, patients who believe that relatives' actions are meant to wound them may perceive greater destructive criticism and less constructive criticism in their relationships.

Consistent with prediction, Chambless and colleagues (2010) found that among patients with anxiety disorders and their relatives, patients' negative attributions for relatives' behavior as expressed during a problem-solving interaction were related to greater perceived criticism during this interaction over and above the effect of observers' ratings of relatives' criticism. Moreover, among community-recruited couples, Peterson and colleagues (2009) showed that participants' self-reported negative attributions about spouses' behavior were related to criticality bias during a social support interaction. Similarly, Chambless et al. (2010) found that in a sample of community couples, negative attributions about one's spouse rated during a review of a problem-solving interaction were associated with greater perceived criticism during that interaction. Although these investigations provide evidence for an association between attributions and perceived criticism, a limitation is that they have focused on attributions about relatives' negative behavior in general rather than on attributions made about relatives' criticism in particular. Additionally, these studies have not measured positive attributions about relatives' behavior and how they may relate to perceptions of constructive criticism.

More recent work suggests that the attributions patients make specifically about relatives' criticism are important predictors of perceived criticism. Attributions of



criticism refer to the explanations that individuals make about the intentions underlying their relatives' criticism (Allred & Chambless, 2014). For example, when a husband tells his wife with agoraphobia that he is fed up with her inability to leave the house without him, the wife is reporting perceived criticism when she admits that she found his comments to be critical. However, she is making attributions about his criticism when she makes judgments about the intentions behind his comments. She may believe his intentions are positive (e.g., "My husband is trying to motivate me to leave the house alone and expand my life") or negative (e.g., "My husband is trying to control and attack me"). In two cross-sectional investigations, Allred and Chambless (2014, 2018) found that positive attributions were related to greater perceived constructive criticism, whereas negative attributions were associated with greater perceived destructive criticism. Additionally, in a longitudinal study, these researchers showed that when attributions of criticism at baseline were controlled, positive attributions predicted increases in perceived constructive criticism, and negative attributions predicted increases in perceived destructive criticism over time (Allred & Chambless, 2017). Although correlational, these findings suggest not only that attributions are related to perceptions of criticism but also that this relationship may be causal in nature.

One facet of perceived criticism that has received less empirical attention is the extent to which patients become upset in response to criticism from their loved ones. In two studies to date, patients' upset due to criticism predicted poor outcomes when the amount of criticism they perceived did not. Miklowitz and colleagues (2005) showed that upset predicted poor clinical outcomes for patients with bipolar disorder, and Steketee et al. (2007) found that among patients receiving treatment for obsessive-compulsive

disorder or panic with agoraphobia, upset mediated the relationship between patients' perceived criticism and their weekly reports of anxiety and mood symptoms. Consistent with a diathesis-stress model of expressed emotion and perceived criticism's effects (Hooley & Gotlib, 2000), these findings suggest it may be that how stressful or upsetting a patient finds his/her relatives' criticism to be is more predictive of clinical outcomes than the amount of criticism the patient perceives. In light of the relationship between upset due to criticism and clinical outcomes, the factors predicting upset warrant further exploration. Recent evidence suggests that attributions of criticism also play a role in how upset an individual becomes in response to criticism. In a community sample, Allred and Chambless (2018) found that individuals who made negative attributions about relatives' critical comments were more upset by this criticism, whereas those who made positive attributions about relatives' criticism were less upset by it. We sought to replicate these findings and extend them to a clinical sample in the current investigation.

In the present study, we examined the relationships among attributions of criticism, perceived criticism, and upset due to criticism in a clinical sample of patients with anxiety disorders. We explored the associations among global attributions, perceived criticism, and upset (i.e., attributions, perceived criticism, and upset regarding relatives' criticism in general) as well as the associations among these variables during two 10-minute problem-solving interactions. Given that perceived criticism assessed by the PCM largely captures destructive criticism, and negative attributions have been found to be consistently related to perceived destructive criticism (Renshaw et al., 2010), we examined negative attributions as a predictor of both perceived criticism and upset due to criticism. In contrast, inconsistent associations have been observed between positive

attributions and perceived destructive criticism. Thus, we examined positive attributions as a predictor of upset only. For both global and interaction-specific measures, we hypothesized that participants who reported greater negative attributions would perceive their relatives to be more critical and would be more upset by their criticism, whereas those who made more positive attributions would be less upset by their relatives' criticism. Based on previous findings showing a relationship between attributions about relatives' negative behavior and criticality bias (Chambless et al., 2010; Peterson et al., 2009), we also hypothesized that attributions specifically about the relatives' criticism would add to prediction of perceived criticism and upset over and above the contribution of observer ratings of relatives' criticism during the problem-solving interactions. In light of findings from the marital literature indicating that negative attributions are concurrently and longitudinally related to less marital satisfaction and that marital satisfaction is negatively associated with perceived criticism (Chambless & Blake, 2009; Smith & Peterson, 2008), we controlled for relationship satisfaction, a potential confound, in our analyses. Additionally, given that negative attributions and perceived criticism have proved to be related in community as well as clinical samples (Chambless et al. 2010; Peterson et al., 2009) we examined whether the relationships among our variables of interest were of comparable strength and direction for patients and normal control participants.

Finally, we explored mean-level differences between patients and normal controls in global attributions of criticism. We hypothesized that patients with anxiety disorders would make more negative attributions and fewer positive attributions about their relatives' criticism in general than individuals with no psychopathology. Given research

showing that individuals with depression are more likely to make negative attributions about their loved ones' behavior which may inflate observed mean-level differences (Robins, 1988), we then tested whether mean-level differences between patients and normal controls obtained when patients with comorbid depression were excluded from analyses.

### **Method**

Participants, procedures, and measures for the current investigation were taken from the Family Relationships and Anxiety Disorders Study, a larger ongoing research project. All participants provided written informed consent, and this research was conducted with the approval of the Institutional Review Board of the University of Pennsylvania.

#### **Participants**

Participants were parent-adult child dyads or romantic couples who had been living together for at least three months before participation in the study. Participants were excluded if they reported severe domestic violence or fear of potential violence from their relative in the past year. Participants were permitted to be within the ages of 18 and 70.

**Clinical sample.** Participants were individuals with a primary diagnosis of an anxiety disorder (hereafter *patients*) according to the *DSM-IV* (American Psychiatric Association [APA], 2000) and their close relatives (either a spouse/romantic partner or parent). Patients with a primary diagnosis of specific phobia or public-speaking anxiety who did not meet diagnostic criteria for another anxiety disorder were excluded. Patients were excluded if they had a history of psychosis or bipolar disorder, were acutely

suicidal, met criteria for alcohol or substance dependence in the six months prior to participation, or if the patient's anxiety appeared to be the result of a medical condition. Patient-relative dyads were also excluded if the relative had been diagnosed with psychosis, was cognitively impaired, or had unmanaged bipolar disorder at the time of study participation. To ensure patients spent enough time with their relatives to be exposed to their criticism and therefore to be able to provide ratings concerning that criticism, patient-relative dyads were excluded if they did not spend an average of at least seven hours per week with each other, defined as being awake and in the same room together. Only the subset of patients who completed the Attributions of Criticism Scale (ACS) were included in the present sample ( $n = 54$ ).<sup>4</sup> One patient who completed this measure was subsequently excluded due to previously undiagnosed cognitive impairment, which interfered with his ability to validly complete study measures. Thus, the final clinical sample comprised 53 patients.

Participants in this sample completed two problem-solving interactions with their relative – one concerning a problem relating to the patient's anxiety and the other pertaining to a topic unrelated to the patient's anxiety (see Procedure section below).

**Normal control sample.** Participants were parent-adult child dyads or romantic couples in which neither individual met criteria for a *DSM-IV* disorder. They met the same criteria for age and time spent together as the clinical sample. To select comparable clinical and normal control groups, each patient was matched with one member of each normal control dyad on the basis of gender and age. The final normal control sample comprised 52 participants. Because these participants did not have an anxiety disorder, they completed a single problem-solving interaction (see Procedure section below).

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<sup>4</sup> The ACS was introduced after the study had been underway for some time.

## Measures

### **Interview measures.**

*Anxiety Disorder Interview Schedule for DSM-IV (ADIS-IV; Brown, DiNardo, & Barlow, 1994)*. The ADIS-IV was used to assess anxiety disorder and comorbid diagnoses, as well as the presence of exclusionary conditions in the clinical sample. The ADIS is a semi-structured diagnostic interview that assesses the presence and severity of *DSM-IV* anxiety disorders. In the present study, the ADIS was administered by doctoral students and post-doctoral fellows who were trained to reliability with a master diagnostician before conducting interviews for the study. Interrater reliability for ADIS diagnoses among interviewers ranged from acceptable to excellent ( $\kappa = .72-1.00$ ).

### *Mini International Neuropsychiatric Interview (MINI; Sheehan et al., 1998)*.

The MINI is a short structured diagnostic interview that was used to screen for the presence of *DSM-IV* psychiatric disorders in the normal control sample. The MINI has demonstrated good interrater and test-retest reliability and convergent validity with other diagnostic interviews (Sheehan et al., 1998). Participants in the normal control sample completed an online screening in which they were asked yes/no questions about symptoms of *DSM-IV* psychiatric disorders. Those who endorsed experiencing any symptoms were then contacted by telephone by a doctoral student who completed the MINI modules for the psychiatric disorders that corresponded to their endorsed symptoms.

**Self-report measures.** Participants provided basic demographic information and completed the following measures as well as measures that are not the subject of the current investigation.

*Attributions of Criticism Scale (ACS; Allred & Chambless, 2014).* The ACS is a 21-item scale assessing the positive and negative attributions that individuals make about the intentions driving their relatives' criticism. Items include "When your relative criticizes you, to what extent do you think he/she is trying to be honest and open with you?" and "When your relative criticizes you, to what extent do you think he/she is trying to make you feel stupid?" Participants rate their attributions on a five-point Likert-type scale ranging from 1 (*not at all*) to 5 (*completely*). The ACS has demonstrated good internal consistency, good test-retest reliability, and good convergent and discriminant validity with measures of perceived criticism and psychopathology, respectively (Allred & Chambless, 2014, 2017). Participants completed a global version of the ACS in which they rated the attributions they make about their relatives' criticism in general. The positive and negative attribution subscales for the global ACS demonstrated good to excellent internal consistency among patients and normal controls,  $\alpha = .89 - .92$  for positive attributions,  $\alpha = .84 - .90$  for negative attributions. Participants also completed an interaction-specific version of the ACS in which they were asked to rate their attributions about relatives' criticism during 10-minute problem-solving interactions, if indeed they perceived their relatives to have been at all critical. Internal consistencies ranged from good to excellent among patients and normal controls for these interaction-specific measures,  $\alpha = .88 - .93$  for positive attributions;  $\alpha = .86 - .93$  for negative attributions.

*Perceived Criticism Measure (PCM; Hooley & Teasdale, 1989).* Perceived criticism is assessed by the PCM criticism item: "How critical do you think your relative is of you?" Participants respond to this question on a 10-point Likert-type scale ranging from 1 (*not at all critical*) to 10 (*very critical*). This item has demonstrated good

convergent validity and discriminant validity with measures of relatives' criticism and psychopathology, respectively (Chambless et al., 1999; Chambless & Blake, 2009; Renshaw, 2008; Smith & Peterson, 2008). In the current investigation, participants completed the standard PCM criticism item regarding their relative (hereafter *Global Perceived Criticism*) as well as an interaction-specific version (Chambless & Blake, 2009) to assess how critical participants perceived their relative to be during a 10-minute problem-solving interaction (hereafter *Interaction-Specific Perceived Criticism*). Participants were asked "How critical was your relative of you during the discussion that you just completed?" and responded to this question on the same 10-point Likert-type scale as the standard PCM.

Hooley (1987) added an item assessing the participants' rating of how upset they are due to criticism. *Upset* is assessed by the following question: "When your relative/romantic partner criticizes you, how upset do you get?" Participants responded to this question on a 10-point Likert-type scale ranging from 1 (*not at all upset*) to 10 (*very upset*). This upset item has demonstrated predictive validity in its prediction of poor clinical outcomes for patients with bipolar disorder, obsessive-compulsive disorder, and panic disorder with agoraphobia (Miklowitz et al., 2005; Steketee et al., 2007). Like the PCM criticism item, in the current study participants rated their level of upset in response to relatives' criticism in general (hereafter *Global Upset*) as well as in response to their criticism during a 10-minute problem-solving interaction (hereafter *Interaction-Specific Upset*). To assess interaction-specific upset, participants responded to the question "When your relative criticized you during the discussion, how upset did you get?" on the same 10-point Likert-type scale as the global upset item.



*Relationship Assessment Scale (RAS; Hendrick, 1988)*. The RAS is a 7-item scale of relationship satisfaction. The scale has shown high internal reliability and validity for couples of different ages and ethnicities (Hendrick, 1988; Hendrick, Dicke, & Hendrick, 1998). The RAS has also demonstrated good internal consistency, test-retest reliability, and factorial validity for both romantic and non-romantic relationships and has been used to assess relationship satisfaction in multiple types of close relationships (Renshaw, McKnight, Caska, & Blais, 2011). Internal consistency in the present sample ranged from good to excellent for patients ( $\alpha = .86$ ) and normal controls ( $\alpha = .91$ ).

#### **Observer-rated measures.**

*Observed criticism.* Undergraduate raters who were naïve to study hypotheses and to other data on participants coded patient-relative problem-solving interactions for criticism. To keep raters unaware of the presence of clinical and normal control groups in our study, we first had them code the interactions not pertaining to anxiety. Four coders accomplished this task. Subsequently, in light of the high reliability of ratings, only two coders were retained to complete coding of the anxiety-related interactions. Raters coded independently and used the same 10-point Likert-type scale as the PCM to rate criticism for the entirety of the 10-minute interaction, and their scores were averaged for analysis. Raters were untrained and coded criticism based on the extent to which they believed an individual to be critical of the other during each interaction. Naïve ratings of criticism have been found to be more strongly related to individuals' self-reports of perceived criticism than are observers' criticism ratings obtained from a reliable observational coding system (Chambless & Blake, 2009). Interrater reliability was excellent for

observed criticism during both the anxiety-related ( $r_1(3,2) = .90$ ) and non-anxiety-related interactions ( $r_1(3,4) = .90$ ).

### **Procedure.**

**Clinical sample.** Participants in the clinical sample were recruited through community flyers, online and newspaper advertisements, and referrals from clinics and research studies. To assess basic eligibility, a research assistant completed a telephone screening with participants. Those who met eligibility criteria based on this screen were invited for the ADIS and were paid \$10 per hour for completing this interview. Those who met study criteria were invited back to the lab along with their relative for the main study visit. After giving their informed consent, patients and their relatives completed a battery of self-report questionnaires, which included the global ACS and PCM measures. In randomized order, they then completed the problem-solving interactions or further interviews about the patient's symptoms and the emotional climate of his/her family environment.

During the problem-solving interactions, patients and relatives were asked to identify the top two problems in their relationship that caused disagreement between the two of them: one that was related to the patient's anxiety and one that was not. A research assistant sat in the room as participants decided on these topics and helped them to identify topics when they were having difficulty with this process. If participants were unable to identify topics for discussion, the research assistant referred to participants' responses on the Areas-of-Change Questionnaire (Weiss, Hops, & Patterson, 1973) and selected domains both dyad members agreed were problem areas in their relationship. The anxiety- and non-anxiety-related topics were discussed in randomized order.

Participants were instructed to discuss each topic for 10 minutes with the goal of coming to a mutually satisfactory resolution of the problem. The research assistant then left the room and instructed participants when to start and end their discussion. Interactions were video-recorded for future coding. After each interaction, patients and relatives completed the interaction-specific ACS and PCM. Patients and relatives were paid \$75-100 for participating in the main study visit.

**Normal control sample.** Participants in the normal control sample were recruited through community flyers and online advertisements, which included a link to the online screening questionnaire where they could initiate participation in the study. The first individual in the dyad to access the online screening questionnaire provided informed consent and completed the questionnaire that included the MINI screen. Those who appeared eligible based on their responses to the screening questionnaire were prompted to provide their contact information as well as the contact information for the relative with whom they would be participating. Individuals who endorsed psychiatric symptoms on the MINI were contacted by telephone by doctoral students who administered the corresponding MINI modules. If based on their responses to the MINI modules, a participant did not meet criteria for any *DSM-IV* psychiatric disorders, a research assistant then contacted his/her relative via e-mail with a link to the screening questionnaire, and the screening process was conducted with this relative. If both members of the dyad were deemed eligible, they were invited to the lab for the main study visit.

During the main study visit, participant dyads provided informed consent and completed a battery of self-report questionnaires, which included the global ACS and

PCM. Participants then engaged in one discussion about the top problem area in their relationship. The procedures and measures for participants in the normal control sample were the same as those described above for the clinical sample with the exception that normal control participants did not complete an anxiety-related interaction. Each participant was paid \$50 for their participation.

### **Data Analysis Strategy**

**Analyses of the global measures.** Bivariate correlations were examined to identify potential confounding variables to include as covariates (see Table 1 for correlations among study measures). Relationship satisfaction was included as a covariate in all regression analyses because it was significantly correlated with both predictors and outcomes of interest. Three outlying relationship satisfaction scores were winsorized by changing them to the next highest value. Because the distribution for negative attributions was highly positively skewed, this variable was log-transformed before being included in analyses. For all regression analyses in the current study, variable distributions, condition indexes, dfbetas, sdbetas, and the distributions of residuals were checked to ensure that the assumptions of multiple regression were met.

To explore the relationship between global attributions and perceived criticism, a regression predicting global perceived criticism was conducted with clinical status (patient = 1, normal control = 0), negative attributions, and the interaction of clinical status and negative attributions as predictors and relationship satisfaction as a covariate. We then conducted a regression predicting global upset with clinical status, negative attributions, positive attributions, the interaction of clinical status with negative attributions, and the interaction of clinical status and positive attributions as predictors

and relationship satisfaction as a covariate. Interactions that did not emerge as significant ( $p > .05$ ) were trimmed from analyses, and significant interactions were probed according to the recommendations of Aiken and West (1991). A power analysis showed that there was 80% power to detect a medium effect size of  $f^2 = .14$  in a linear regression with six predictors (the most included in a model) in a sample of 103 participants<sup>5</sup>.

To examine mean-level differences in attributions between patients and normal controls, point biserial correlations between clinical status and negative and positive attributions were used. We then conducted sensitivity analyses to determine whether mean-level differences in attributions were due to the presence of patients with comorbid depression in this sample by re-running the correlations with these patients excluded. To be consistent with our strategy of controlling for potential confounding variables, we used multiple regression to test for differences in mean levels of attributions across patients and normal controls while relationship satisfaction was controlled. Separate regressions predicting positive and negative attributions, respectively, were run with clinical status as the predictor and relationship satisfaction as the covariate. We also conducted these analyses with depressed patients excluded. The semi-partial correlation for clinical status was used to test mean-level differences across groups because it represents the unique effect of clinical status when relationship satisfaction is controlled. A power analysis indicated that there was 80% power to detect a medium effect size of  $f^2 = .10$  in a linear regression with two predictors in a sample of 104 participants.

**Analysis of interaction measures.** Because participants were instructed not to complete the interaction-specific ACS if they had not perceived any criticism in the

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<sup>5</sup> Because of technical difficulties, one patient-relative dyad did not complete the online questionnaire battery that included the global measures.

preceding discussion with their relative, 22% ( $n = 11$ ) and 18% ( $n = 10$ ) of the clinical sample did not complete the interaction-specific ACS for the anxiety- and non-anxiety-related discussions, respectively, whereas almost half ( $n = 22$ ; 42.3%) of the normal control participants did not complete this measure for their single discussion. Normal control participants did not engage in a discussion comparable to the anxiety-related interaction completed by the clinical sample. As a result, analyses comparing the relationships among interaction-specific attributions, perceived criticism, and upset across clinical status were conducted for the non-anxiety-related interaction only. As with the global measures, distributions for the interaction-specific variables were examined prior to analysis. For both the anxiety- and non-anxiety-related interactions, the distributions for negative attributions, upset, and observer-rated criticism were highly positively skewed. This was also the case for perceived criticism during the non-anxiety-related interaction. Consequently, these variables were log-transformed before inclusion in analyses.

*Non-anxiety-related interaction analyses.* To examine the relationship between attributions and perceived criticism during the non-anxiety-related problem-solving interaction, we conducted a regression predicting non-anxiety interaction-specific perceived criticism with clinical status, log-transformed negative attributions, and the interaction of clinical status and negative attributions as predictors and observed criticism and relationship satisfaction as covariates. Another regression predicting non-anxiety interaction-specific upset was run with clinical status, negative attributions, positive attributions, the interaction of clinical status with negative attributions, and the interaction of clinical status with positive attributions as predictors controlling for

observed criticism and relationship satisfaction. Observed criticism data were missing for seven patient-relative and 12 normal control dyads that were recruited after the coding team was no longer available. A power analysis conducted with G\*Power 3 (Faul, Erdfelder, Lang, & Buchner, 2007) indicated that in a sample of 57 participants<sup>6</sup>, there was 80% power to detect a large effect size of  $f^2 = .29$  in a linear regression with seven predictors (the most included in a model).

*Anxiety-related interaction analyses.* To explore the relationship between attributions and perceived criticism for patients during the anxiety-related problem-solving interaction, a regression predicting anxiety interaction-specific perceived criticism was conducted with negative attributions and observed criticism as predictors and relationship satisfaction as a covariate. To explore the relationship between attributions and upset due to criticism, we conducted a regression predicting anxiety interaction-specific upset with negative attributions, positive attributions, and observer-rated criticism as predictors controlling for relationship satisfaction. Again, observed criticism data were not available for seven patient-relative dyads that were recruited after the coding team was no longer available. A power analysis conducted with G\*Power 3 (Faul et al., 2007) indicated that in a sample of 37 participants<sup>7</sup>, there was 80% power to detect a large effect size of  $f^2 = .38$  in a linear regression with four predictors (the most included in a model).

## Results

### Descriptive Statistics

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<sup>6</sup> Because of technical difficulties, the non-anxiety-related interaction was not recorded for one patient-relative dyad. Additionally, two patient-relative dyads did not complete this interaction.

<sup>7</sup> Two patient-relative dyads did not complete the anxiety-related interaction.

Sample demographics as well as mean scores and standard deviations of study measures and diagnoses are included in Table 2. As previously shown by Porter and colleagues (2016) in a subset of this sample, patients reported being less satisfied in their relationships than normal controls ( $t(91.75) = -4.46, p < .001, d = -0.87, 95\% \text{ CI} [-1.28, -.47]$ ). Patients and normal controls did not significantly differ on gender, race, ethnicity, level of education, age, or relative type (parent-adult child dyad vs. romantic couple;  $ps > .05$ ).

### **Global Attributions, Perceived Criticism, and Upset Due to Criticism**

We first examined the relationships between attributions and global perceived criticism and upset. As expected, there were medium to large correlations between negative attributions and both of these variables, as well as between positive attributions and upset (Table 1). We then conducted multiple regression analyses controlling for relationship satisfaction and including clinical status, attributions, and their interaction as predictors. No interactions emerged as significant in these regression analyses, indicating that the relationships were comparable regardless of whether participants were in the normal control or clinical samples. In the regression predicting global perceived criticism, negative attributions were associated with greater perceived criticism ( $\beta = .48, sr = .38, p < .001$ ) with clinical status and relationship satisfaction controlled. Similarly, in a regression predicting global upset, negative attributions ( $\beta = .54, sr = .39, p < .001$ ) were related to greater upset when clinical status and relationship satisfaction were controlled. Positive attributions were not significantly associated with upset,  $\beta = .10, sr = .08, p = .34$ . See Table 3 for full regression results.

### **Mean Differences in Global Attributions across Patients and Normal Controls**



As expected, patients reported greater negative attributions than normal control participants ( $r_{pb} = .31, p = .001, 95\% \text{ CI } [0.13, 0.50]$ ). However, there was no difference between groups on positive attributions ( $r_{pb} = -.10, p = .32, 95\% \text{ CI } [-0.29, 0.10]$ ). To test whether the difference in negative attributions could be accounted for by patients with comorbid depression, correlations were run with these patients excluded ( $n = 11$ )<sup>8</sup>. We focus on changes in effect size due to the loss of power for these analyses. When depressed patients were excluded, the effect size for negative attributions was undiminished ( $r_{pb} = .35, p = .001, 95\% \text{ CI } [0.16, 0.55]$ ) indicating that comorbid depression did not account for mean differences in negative attributions.

When mean-level differences were tested with multiple regression with relationship satisfaction controlled, findings changed. In regressions predicting positive and negative attributions separately, results showed that there were no differences between patients and normal controls in either positive ( $\beta = .08, sr = .07, p = .42$ ) or negative attributions ( $\beta = .08, sr = .07, p = .37$ ). The same pattern emerged when depressed patients were excluded from analyses ( $srs = .02 - .13$ ).

### **Non-Anxiety-Related Interaction-Specific Attributions, Perceived Criticism, and Upset Due to Criticism**

We next examined the relationships among attributions, perceived criticism, and upset for patients and normal controls during the non-anxiety-related interaction. Correlations between negative attributions and perceived criticism and upset were medium to large (Table 1). We then ran multiple regression analyses controlling for observer-rated criticism and relationship satisfaction with clinical status, attributions, and

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<sup>8</sup> Twelve patients in our sample were diagnosed with comorbid depression. One of these patients was a member of the patient-relative dyad that did not complete the online questionnaire battery that included the global measures. As a result, 11 patients with comorbid depression were excluded in these analyses.

their interaction as predictors. As in the global analyses, no significant interactions emerged in these models, again indicating that these relationships were the same for both patients and normal controls. Regression analyses showed that negative attributions were related to greater interaction-specific perceived criticism ( $\beta = .37$ ,  $sr = .29$ ,  $p = .01$ ) when controlling for clinical status, observer-rated criticism, and relationship satisfaction. In the regression predicting upset, negative attributions were also related to greater upset,  $\beta = .45$ ,  $sr = .37$ ,  $p = .001$ . Positive attributions did not emerge as a significant predictor of upset,  $\beta = -.11$ ,  $sr = -.10$ ,  $p = .34$ . (For full regression results, see Table 4.) These findings were consistent with those for the general measures in showing that negative attributions add to prediction of perceived criticism and upset over and above the effects of relationship satisfaction but go beyond those findings by demonstrating that attributions add to the variance accounted for not only by relationship satisfaction but also by observed criticism.

### **Anxiety-Related Interaction-Specific Attributions, Perceived Criticism, and Upset Due to Criticism**

We examined whether attributions were associated with perceived criticism and upset due to criticism during the problem-solving interaction. As shown in Table 1, negative attributions had a medium-large relationship with interaction-specific perceived criticism. However, when observed criticism and relationship satisfaction were controlled, this relationship was no longer statistically significant,  $\beta = .37$ ,  $sr = .26$ ,  $p = .09$ , although the semi-partial correlation was large (Harlow, 2005) and comparable in size to the significant effect observed with the larger combined clinical and normal control samples for the interaction unrelated to anxiety.

Positive and negative attributions had a medium or large correlation with interaction-specific upset, respectively. In this case, when relationship satisfaction and observed criticism were controlled, negative ( $\beta = .62, sr = .39, p = .005$ ) but not positive attributions ( $\beta = .05, sr = .04, p = .75$ ) were related to greater upset. Thus, negative attributions added to prediction of upset over and above the effects of relatives' observable criticism and relationship satisfaction. (See Table 5 for full regression results.)

### **Discussion**

The primary aims of the current investigation were (a) to explore the relationships among attributions of criticism, perceived criticism, and upset due to criticism in a clinical sample of individuals with anxiety disorders, (b) to examine whether these relationships were comparable among individuals without psychopathology, and (c) to explore whether attributions contribute to perceived criticism and upset above and beyond the effect of observed criticism. Overall, our findings show that attributions are significantly related to perceived criticism and upset. Consistent with prediction, global perceived criticism and upset due to criticism were higher when individuals made negative attributions about their relatives' criticism. However, contrary to hypothesis, positive attributions did not significantly predict less upset. The same patterns emerged during a laboratory problem-solving interaction when patients and controls engaged in a discussion with their relative about a topic not related to their anxiety. The laboratory study permitted us to gather data on the relatives' observable criticism and thereby to test whether negative attributions explained variance in perceived criticism and upset above and beyond the effects of the relatives' actual criticism. Indeed this was the case, indicating that these attributions contributed substantially to criticality bias and upset in

our sample. Moreover, the contribution of negative attributions to prediction of perceived criticism and upset was as great or greater than that of observable criticism. Further, although negative attributions did not emerge as a significant predictor of perceived criticism and upset for the anxiety-related interaction measures, the effect size for negative attributions was similar in magnitude to the effect sizes for negative attributions in the analyses for the non-anxiety-related interaction measures. Because data for the anxiety-related interaction were only available for patients, the sample size is smaller, and it is likely that the effect of negative attributions did not reach significance due to the substantial reduction in statistical power. No significant interactions of clinical status and attributions emerged in any analyses, indicating that the relationships among negative attributions, perceived criticism, and upset held for patients and normal controls alike. Finally, because we controlled for relationship satisfaction in all analyses, our findings indicate that negative attributions contribute to perceived criticism and upset even when this potentially confounding variable is taken into account.

When mean differences in global attributions among patients and normal controls were examined, results showed that patients made more negative attributions about relatives' criticism than normal controls, but no difference between groups emerged for positive attributions. However, the difference in negative attributions across groups disappeared when the effect of relationship satisfaction was controlled in analyses. This might indicate that differences between the groups are due to the patients' greater dissatisfaction with their relationships. However, longitudinal research from the literature on marital interaction (Bradbury & Fincham, 1990) suggests that attributions exert a causal influence on relationship satisfaction. Thus, patients' greater marital

dissatisfaction, perceived criticism, and upset may all result from negative attributions. Our cross-sectional design does not permit us to disambiguate these competing explanations.

Some patients in the sample had comorbid depression, raising the question as to whether depression accounts for mean-level differences in attributions between the clinical and control samples. This does not appear to be the case. Excluding patients with comorbid depression did not change the pattern of results: Only small changes in effect size were observed when individuals with depression were excluded from analyses. Thus, our findings suggest that mean levels of attributions are not accounted for by negative biases associated with depression.

The results of the current study are consistent with the findings of previous investigations showing a relationship between individuals' attributions about relatives' negative behaviors and perceived criticism (Chambless et al., 2010; Peterson et al., 2009). However, one limitation of the prior studies is that they used attributions about any negative behavior on the relatives' part as a proxy for attributions made specifically about relatives' criticism. Thus, our findings contribute to the perceived criticism literature by more precisely demonstrating the relationship between individuals' attributions of criticism and their perceptions of criticism in general and during interactions with their relative. The results of the current study also replicate the findings of Allred and Chambless (2018) and extend them to a clinical sample by showing that negative attributions were related to greater upset among individuals with anxiety disorders. However, contrary to the findings of Allred and Chambless (2018) wherein positive attributions were associated with less upset due to criticism, we found that

positive attributions were not related to upset in the current sample. In light of these discrepant findings, further research should be conducted to examine if positive attributions emerge as a significant predictor of upset in other clinical samples.

The current investigation is the first to explore the relationships among attributions of criticism, perceived criticism, and upset due to criticism in a clinical sample. Nonetheless, it is not without its limitations. Our theoretical model posits that attributions of criticism play a causal role in the perception of relatives' criticism and in how upset individuals become in response to this criticism. However, the cross-sectional design of the current investigation prevents causal interpretations from being made. Although previous research has demonstrated a longitudinal relationship between attributions and perceived criticism (Allred & Chambless, 2017), additional studies employing longitudinal designs or the experimental manipulation of attributions through interventions designed to target attributions are needed to provide greater support for the causal contribution of attributions to perceived criticism and upset. Another limitation of the current study is that it did not include measures of perceived constructive and destructive criticism. In light of research showing that individuals are able to discriminate between constructive and destructive forms of perceived criticism and that the PCM criticism item mainly captures destructive criticism (Renshaw et al., 2010), evidence suggests that measures of perceived constructive and destructive criticism may more accurately and reliably assess hostile and non-hostile types of family criticism and thus may be more useful than perceived criticism assessed by the PCM. Previous research has shown that in undergraduate and community samples positive and negative attributions were associated with perceived constructive and destructive criticism, respectively

(Allred & Chambless, 2014, 2017, 2018). It is an open question whether the same patterns would emerge in clinical samples, although it seems likely given the continuity of the present findings with our previous research with nonclinical samples. Additional research should be conducted to determine if this is indeed the case.

Despite these limitations, important implications for treatment follow from our findings. Family therapy for patients with psychiatric disorders that is influenced by expressed emotion research (e.g., Barrowclough & Tarrier, 1992) has long been shaped by a focus on attributions. Given the considerable research showing that relatives' negative attributions about patients' behavior are associated with higher criticism and hostility toward patients, in such treatment the initial focus of treatment is typically psychoeducation to help relatives realize that patients' symptoms are neither voluntary and nor the result of personality flaws. Our findings indicate that clinicians also need to address patients' attributions concerning relatives' behavior. In couples or family therapy, clinicians may aim to modify attributions through discussions of patients' attributions regarding relatives' critical behavior and of the intentions behind relative's criticism (Epstein & Baucom, 2002). Similarly, such interventions specifically focused on perceived criticism may prompt patients with anxiety disorders to examine alternative explanations for relatives' critical comments instead of automatically assuming that their loved ones' intentions are negative. While it may be the case that some relatives do intend to harm the patient with their critical comments and that patients are accurately detecting these motives, our clinical experience suggests that many times relatives' motives are less negative than the patient first thought and that patients may learn to view relatives' critical behavior in a more positive light (see Chambless, 2012). Our findings

indicate that negative attributions concerning criticism are equally important for community couples. Although cognitive-behavioral therapists have long been addressing individuals' negative attributions about their partners' behavior in couples therapy (Baucom & Epstein, 2002), our findings suggest that negative attributions regarding relatives' criticism may also be fruitful targets of intervention. Whether interventions designed to address negative attributions of criticism are effective in reducing perceived criticism and upset and in improving treatment outcomes is a question that warrants further investigation.



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Table 1

*Zero-Order Correlations among Attributions, Perceived Criticism and Upset, and Relationship Satisfaction*

Measure	1	2	3	4	5	6	7	8	9	10
Global Measures										
1. Positive Attributions	-	-.48**	.09	-.22	.28*	.34	-.50**	-.01	-.24	-.13
2. Negative Attributions (log-transformed)	-.52**	-	.39**	.54**	-.42**	-.03	.56**	.24	.40**	.34*
3. Perceived Criticism	-.29*	.73**	-	.44**	-.38**	.02	.17	.39**	.10	.30
4. Upset Due to Criticism	-.07	.36**	.48**	-	-.06	.29	.18	.23	.17	.07
5. Relationship Satisfaction (winsorized)	.52**	-.65**	-.53**	-.31*	-	.52**	-.76**	-.40**	-.41**	-.50**
Interaction-Specific Measures										
Non-Anxiety-Related										
Interaction										
6. Positive Attributions	.66**	-.50**	-.23	-.01	.45**	-	-.34	-.10	-.29	-.08
7. Negative Attributions (log-transformed)	-.25	.36*	.36*	.26	-.40*	-.32*	-	.29	.59**	.45*
8. Perceived Criticism (log-transformed)	.11	.28*	.35*	.24	-.22	.15	.36*	-	.49**	.47**
9. Upset Due to Criticism (log-transformed)	-.12	.42**	.41**	.47**	-.33*	-.18	.49**	.68**	-	.40*
10. Observed Criticism (log-transformed)	-.17	.10	.17	.07	-.30	-.18	.35*	.43**	.35*	-

*Note.* Correlations for patients are presented below the diagonal. Those for normal controls are presented above the diagonal. \* $p < .05$ , \*\* $p < .01$ .

Table 1 (continued)

*Zero-Order Correlations among Attributions, Perceived Criticism and Upset, and Relationship Satisfaction*

Measure	1	2	3	4	5	6	7	8	9	10
Anxiety-Related Interaction										
11. Positive Attributions	.63**	-.49**	-.25	-.25	.49**	.64**	-.43**	.12	-.30	-.20
12. Negative Attributions (log-transformed)	-.44**	.60**	.58**	.48**	-.56**	-.43**	.65**	.37*	.51**	.48**
13. Perceived Criticism	-.06	.31*	.47**	.51**	-.24	.15	.14	.55**	.45**	.52**
14. Upset Due to Criticism (log-transformed)	-.18	.26	.29*	.42**	-.27	-.19	.30	.22	.38**	.48**
15. Observed Criticism (log-transformed)	-.23	.12	.09	.16	-.20	-.15	.34*	.22	.30*	.59**

*Note.* Correlations for patients are presented below the diagonal. Those for normal controls are presented above the diagonal. \* $p < .05$ , \*\* $p < .01$ .

Table 1 (continued)

*Zero-Order Correlations among Attributions, Perceived Criticism and Upset, and Relationship Satisfaction*

Measure	11	12	13	14
Anxiety-Related Interaction				
11. Positive Attributions	-			
12. Negative Attributions (log-transformed)	-.62**	-		
13. Perceived Criticism	-.10	.46**	-	
14. Upset Due to Criticism (log-transformed)	-.32*	.63**	.57**	-
15. Observed Criticism (log-transformed)	-.27	.54**	.44**	.49**

*Note.* Correlations for patients are presented below the diagonal. Those for normal controls are presented above the diagonal. \* $p < .05$ , \*\* $p < .01$ .



Table 2

*Demographics and Descriptive Statistics for Study Measures by Diagnostic Group*

		Patients (n = 53)		Normal controls (n = 52)	
		n	%	n	%
Sex	<i>Female</i>	39	73.6%	41	78.8%
Race	<i>White</i>	29	54.7%	34	65.4%
	<i>Black/African American</i>	17	32.1%	9	17.3%
	<i>Other</i>	7	13.2%	9	17.3%
Ethnicity	<i>Hispanic</i>	4	7.5%	1	1.9%
	<i>Non-Hispanic</i>	49	92.5%	50	96.2%
	<i>Unknown</i>	0	0.0%	1	1.9%
Relative Type	<i>Romantic Partner</i>	40	75.5%	46	88.5%
Education	<i>Less than 4 Year College Degree</i>	28	52.8%	18	34.6%
	<i>4 Year College Degree</i>	10	18.9%	9	17.3%
	<i>Any Graduate School</i>	15	28.3%	24	46.2%
	<i>Unknown</i>	0	0.0%	1	1.9%
Diagnosis <sup>a</sup>	<i>Panic Disorder</i>	23	43.4%	-	-
	<i>Agoraphobia</i>	20	37.7%	-	-
	<i>Social Anxiety Disorder</i>	28	52.8%	-	-
	<i>Generalized Anxiety Disorder</i>	21	39.6%	-	-
	<i>Obsessive-Compulsive Disorder</i>	13	24.5%	-	-
	<i>Specific Phobia</i>	13	24.5%	-	-
	<i>Posttraumatic Stress Disorder</i>	7	13.2%	-	-
	<i>Anxiety NOS</i>	4	7.5%	-	-
	<i>Major Depressive Disorder</i>	12	22.6%	-	-

<sup>a</sup> Percentages add to more than 100% due to comorbidity.

Table 2 (continued)

*Demographics and Descriptive Statistics for Study Measures by Diagnostic Group*

		<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Global Measures	<i>Age (years)</i>	53	29.49	8.93	50	28.42	7.0
	<i>Pos. Attributions</i>	52	3.88	0.76	52	4.03	0.83
	<i>Neg. Attributions</i>	52	2.01	0.86	52	1.54	0.61
	<i>Perceived Criticism</i>	52	5.33	3.03	51	4.12	2.62
	<i>Upset Due to Criticism</i>	52	6.60	2.44	50	5.34	2.67
	<i>Rel. Satisfaction</i>	52	4.14	0.73	52	4.66	0.55
Interaction-Specific Measures							
Non-Anxiety-Related	<i>Pos. Attributions</i>	40	3.45	1.03	30	3.77	0.81
	<i>Neg. Attributions</i>	40	1.60	0.75	30	1.27	0.42
	<i>Perceived Criticism</i>	51	4.47	2.59	52	3.00	2.02
	<i>Upset Due to Criticism</i>	51	3.51	2.56	52	2.15	1.50
	<i>Observed Criticism</i>	43	3.21	1.95	40	2.10	1.08
Anxiety-Related	<i>Pos. Attributions</i>	40	3.73	0.91	-	-	-
	<i>Neg. Attributions</i>	40	1.64	0.86	-	-	-
	<i>Perceived Criticism</i>	51	4.96	2.98	-	-	-
	<i>Upset Due to Criticism</i>	51	3.80	2.82	-	-	-
	<i>Observed Criticism</i>	44	2.50	1.88	-	-	-

<sup>a</sup> Percentages add to more than 100% due to comorbidity.

Table 3

*Multiple Regression of Clinical Status, Attributions, and Relationship Satisfaction Predicting Global Perceived Criticism and Upset*

Variable	Global Perceived Criticism <i>N</i> = 103			Global Upset <i>N</i> = 102		
	$\beta$	<i>sr</i>	<i>p</i>	$\beta$	<i>sr</i>	<i>p</i>
Clinical Status	-.03	-.02	.77	.12	.11	.23
Positive Attributions	-	-	-	.10	.08	.34
Negative Attributions (log-transformed)	.48	.38	<.001	.54	.39	<.001
Relationship Satisfaction (winsorized)	-.22	-.17	.03	.06	.05	.61

*Note.* Clinical Status (1 = Patient, 0 = Normal Control). *sr* = semipartial correlation.

Table 4

*Multiple Regression of Clinical Status, Attributions, Observed Criticism, and Relationship Satisfaction Predicting Perceived Criticism and Upset for Non-Anxiety-Related Interaction*

Variable	Interaction-Specific Perceived Criticism (log-transformed) <i>N</i> = 57			Interaction-Specific Upset (log-transformed) <i>N</i> = 57		
	$\beta$	<i>sr</i>	<i>p</i>	$\beta$	<i>sr</i>	<i>p</i>
Clinical Status	.17	.15	.18	.04	.04	.72
Positive Attributions	-	-	-	-.11	-.10	.34
Negative Attributions (log-transformed)	.37	.29	.01	.45	.37	.001
Observed Criticism (log-transformed)	.32	.28	.01	.22	.19	.08
Relationship Satisfaction (winsorized)	.11	.09	.43	-.01	-.01	.94

*Note.* Clinical Status (1 = Patient, 0 = Normal Control). *sr* = semipartial correlation.

Table 5

*Multiple Regression of Clinical Status, Attributions, Observed Criticism, and Relationship Satisfaction Predicting Perceived Criticism and Upset for Anxiety-Related Interaction*

Variable	Interaction-Specific Perceived Criticism			Interaction-Specific Upset (log-transformed)		
	<i>N</i> = 37			<i>N</i> = 37		
	$\beta$	<i>sr</i>	<i>p</i>	$\beta$	<i>sr</i>	<i>p</i>
Positive Attributions	-	-	-	.05	.04	.75
Negative Attributions (log-transformed)	.37	.26	.09	.62	.39	.005
Observed Criticism (log-transformed)	.29	.23	.12	.25	.20	.12
Relationship Satisfaction (winsorized)	.13	.10	.49	.23	.18	.17

*Note.* *sr* = semipartial correlation.