Published in final edited form as:

J Nerv Ment Dis. 2017 April ; 205(4): 294–299. doi:10.1097/NMD.0000000000000636.

Expressed Emotion and Attributions in Relatives of Patients with Obsessive-Compulsive Disorder and Panic Disorder

Keith D. Renshaw, Ph.D.¹, Dianne L. Chambless, Ph.D.², and Sommer Thorgusen, Ph.D.¹

¹Department of Psychology, University of Utah, 380 S. 1530 E., Salt Lake City, UT 84102 USA

²Department of Psychology, University of Pennsylvania, 3720 Walnut St., Philadelphia, PA 19104 USA

Abstract

Relatives' criticism of, hostility toward, and emotional overinvolvement (EOI) with patients are predictive of treatment response and relapse. Although these constructs have been linked to relatives' attributions for patient problems, little research has yet evaluated attributions for specific types of problems. This study examined event-specific attributions (i.e., attributions specifically for either disorder-related [DR] or non-DR problems) in relatives of patients with anxiety disorders. Relatives made more illness attributions (attributing problems to a patient's disorder) than controllable attributions (attributing problems to factors controllable by patients) for DR events, with the reverse pattern for non-DR events. Criticism and hostility were associated primarily with controllability attributions for non-DR events. In contrast, presence of EOI was associated with illness attributions for non-DR events. Family-based interventions for anxiety disorders might need to focus on relatives' controllability attributions for a broad range of patient behaviors, and on reducing tendencies to attribute non-DR problems to patients' disorders.

Keywords

panic disorder; obsessive compulsive disorder; family; expressed emotion; attributions

Attention to the family environment of individuals with psychiatric disorders has increased over the years. Early research efforts in this area focused primarily on children, elderly individuals, or individuals with serious mental illness (e.g., Glick et al., 1985). More recent efforts have brought attention to the importance of the interpersonal context in understanding and treating a wide range of adult disorders, including depression (e.g., Barbato & D'Avanzo, 2008), substance abuse (e.g., O'Farrell & Fals-Stewart, 2006), trauma-related disorders (e.g., Monson et al., 2012), and anxiety disorders (e.g., Beck, 2010). Despite these advances, more work is needed to better understand the experiences of family members and potential mechanisms of their distress in the context of individual psychopathology (Jansen, Gleeson, & Cotton, 2015).

Corresponding author: Keith D. Renshaw, Department of Psychology, George Mason University, 4400 University Dr., MSN 3F5, Fairfax, VA 22030 USA. Phone : 703-993-5128, krenshaw@gmu.edu.

Conflicts of Interest: No conflicts of interest were declared for any of the authors.

One family-based construct that has received extensive attention in the literature is expressed emotion (EE). EE is an index of a relative's attitude toward a patient with a psychiatric disorder, typically measured during a 1½-hour semi-structured interview known as the Camberwell Family Interview (CFI; Vaughn & Leff, 1976). The three primary components of EE are criticism, hostility, and emotional overinvolvement (EOI). Criticism is derived from a simple frequency count of critical comments made during the interview, whereas hostility and EOI are global ratings made on the basis of the entire interview. Hostility refers to global rejection of the patient by the relative, and EOI refers to excessive sacrifice, intrusiveness, or emotional overreaction by the relative in response to the patient's illness.

Traditionally, relatives who are high on one or more of these dimensions were designated as high-EE, which has been associated with higher rates of relapse and poorer treatment outcome for a number of disorders (see meta-analysis by Butzlaff & Hooley, 1998). Increasingly, however, researchers have questioned the notion of combining these three constructs into a unitary, categorical variable (e.g., Alvarez-Jiménez et al., 2010; Chambless, Steketee, Bryan, Aiken, & Hooley, 1999), as well as the idea that all three constructs are uniformly negative (e.g., van Os, Marcelis, Germeys, Graven, & Delespaul, 2001). With regard to anxiety disorders in particular, these questions are supported by empirical findings of three separate evaluations of individuals with obsessive compulsive disorder and/or panic disorder indicating that relatives' criticism in the absence of hostility predicts *better* treatment outcome, whereas relatives' hostility predicted worse outcome (Chambless & Steketee, 1999; Peter & Hand, 1988; Zinbarg, Lee, & Yoon, 2007). In spite of the difficulties with the overall construct of EE, the predictive validity of the individual components of EE is clear.

To better enable us to use information about these constructs to improve outcomes for individuals and families, researchers must examine the underlying causes and potential mechanisms of action of these family-level constructs. One of the leading models of EE was initially advanced separately by Greenley (1986) and Hooley (1987). Both of these researchers posited that relatives who saw psychiatric symptoms as controllable (e.g., “John wouldn't be so bad off if he put more effort into taking care of himself”) would be more critical and hostile toward patients than those who saw such symptoms as uncontrollable. Hooley (1987, p. 185) further speculated that relatives with an “overly strong conviction that a patient is medically ill” might be more likely to be high in EOI. This perspective suggests that relatives who are too quick to attribute events to patients' disorders (e.g., “John's disorder really keeps him from doing anything to take care of himself”) could be overly accommodating of them, thus inhibiting their capacity to improve in treatment.

In support of these ideas, several studies have found that relatives of individuals with a variety of disorders are higher in levels of criticism and hostility when they make attributions of controllability for patients' negative behaviors and events (see review by Barrowclough & Hooley, 2003). Furthermore, two groups of investigators have found that relatives who attribute patients' problems directly to patients' disorders (*illness attributions*) are significantly higher in EOI than relatives who do not make such attributions (Barrowclough, Johnston, & Tarrier, 1994; Renshaw, Chambless, & Steketee, 2006). To date, however, these studies of attributions and EE have focused on attributions for any

negative event or behavior, without attention to the *types* of behaviors. For instance, although illness attributions have been found to be associated with higher rates of EOI (Barrowclough et al., 1994; Renshaw et al., 2006), it is unknown whether this association is driven by illness attributions for particular events, or whether the type of event for which a relative makes an illness attribution is irrelevant. Similarly, no study has yet examined controllability attributions specifically about disorder-related (DR) behaviors in comparison to controllability attributions for non-DR behaviors. Given that a small amount of research does suggest that relatives' attributions differ for different types of events (Barrowclough, Gregg, & Tarrier, 2008; Hinton, Chambers, & Velásquez, 2009; Tarrier et al., 2002), the association of event-specific attributions with components of EE represents an important gap in the literature.

Accordingly, the primary purpose of the current study was to examine relatives' attributions for disorder-related (DR) vs. non-DR events of patients with obsessive compulsive disorder (OCD) and panic disorder with agoraphobia (PDA) in relation to components of EE. We first analyzed attributions for all negative events together (hereafter referred to as *combined events*), to determine whether findings from our sample were similar to those from prior research in this area. We then analyzed attributions for symptoms of the patient's anxiety disorder (e.g., cleaning compulsions) vs. other behaviors/events that were not clearly disorder-related (e.g., interpersonal aggression toward family members). Our primary hypotheses were: (1) relatives would make more illness attributions than controllable attributions for DR events, but more controllable attributions than illness attributions for non-DR events; (2) controllability attributions (particularly for DR events) would be associated with greater criticism and hostility; and (3) illness attributions for non-DR events (i.e., overattributing negative events to a patient's disorder) would demonstrate stronger associations with EOI than illness attributions for DR events (which would reflect appropriate recognition of DR symptoms).

Method

Participants

The study sample is a subset of BLINDED'S sample of individuals with OCD and PDA. The original sample was 104 outpatients seeking treatment for OCD ($n = 62$) or PDA ($n = 42$) in the Boston, MA or Washington, DC areas, and their relatives/partners. Dyads were recruited in the early 1990s. Diagnoses of OCD and PDA were confirmed using the Structured Clinical Interview for the DSM-III-R, Patient Version (SCID-P; Spitzer, Williams, Gibbon, & First, 1989). Patients also had to engage in at least 1 hour worth of rituals per day (for OCD) or report at least moderate avoidance of activities (for PDA), as assessed during the SCID-P. All patients were between 18 and 65, had experienced symptoms for at least 1 year, and had been living with their relative or partner for at least 3 months before enrolling in the study. Most patients (70%) participated with a spouse or partner, with the remainder participating with a parent or another relative (e.g., sibling). When patients lived with more than one relative, the target relative for this study was selected according to decision rules reported in the parent study (BLINDED).

Eighty-seven relatives (51 relatives of patients with OCD and 36 relatives of patients with PDA) from the original sample had interviews that were able to be transcribed as needed for the current study (others had recordings that were either inaudible or damaged). To detect medium effect sizes with paired *t*-tests, correlations, and individual coefficients in regressions, a sample size of approximately 48 was needed for power of .80 (Faul, Erdfelder, Lang, & Bucker, 2007). Thus, because of the time intensive nature of the coding for this study, a subset of 48 interviews (31 from relatives of patients with OCD; 17 from relatives of patients with PDA) was selected for coding, by randomly choosing IDs from among the 87 relatives with audible interviews. The participants included in this subsample did not significantly differ from those who were not included on any of the following variables: patient age, relative age, patient sex, type of relative, baseline symptom severity, or relatives' EE variables (all *ps* > .10).

This subset of 48 relatives was predominantly male (70.8%) and included 38 spouses/partners, 8 parents, 1 sibling, and 1 adult child. Relatives had a mean age of 40.09 (*SD* = 12.26) years. The mean household score for relatives and patients on the Hollingshead Four-Factor Index of Social Position (Hollingshead, 1975) was 46.77 (*SD* = 11.72), reflective of a minor professional or medium-sized business owner.

The patients were predominantly female (81.3%), with a mean age of 33.98 (*SD* = 8.84) years. The patient group was 89.6% White, 6.3% African-American, and 4.2% other. All patients met criteria for a primary diagnosis of either OCD (*n* = 31) or PDA (*n* = 17). Patients with OCD reported having had symptoms for an average of 14.48 (*SD* = 12.09) years, and patients with PDA reported symptoms for an average of 10.12 (*SD* = 5.37) years. Common comorbidities included subclinical or clinical major depression (10 of those with OCD; 9 of those with PDA), dysthymia (4 of those with OCD; 2 of those with PDA), social phobia (2 of those with OCD; 5 of those with PDA), and general anxiety disorder (2 of those with OCD; 6 of those with PDA). Finally, 7 patients in the OCD group had secondary subclinical or clinical panic disorder, and 3 patients in the PDA group had secondary OCD.

Measures

Structured Clinical Interview for the DSM-III-R, Patient Version—(SCID-P; Spitzer et al. 1989). OCD and PDA were diagnosed using the SCID-P. Interviews were conducted by trained mental health graduate students. In the parent study, approximately 25% of the interviews were rated by multiple interviewers. Interrater reliability for diagnosis of OCD and PDA was excellent (κ = 1.00 for OCD, κ = 0.94 for PDA; see BLINDED).

Camberwell Family Interview—(CFI; Vaughn & Leff, 1976). The CFI is a semistructured interview for use with relatives of patients with psychiatric disorders. Trained interviewers administered the CFI to relatives before patients began treatment. Consultants reviewed audiotapes of the CFI to obtain measures of relatives' expressed emotion. Coding of relatives' responses yields three primary indices: criticism (a frequency count of the number of critical comments the relative makes about the patient), hostility (a global rating of how rejecting the relative is of the patient, from 0 to 3), and emotional overinvolvement (EOI; a global rating of how overly intrusive, self-sacrificing, and/or emotionally

overreactive the relative is toward the patient, scored from 0 to 5). Approximately 12% of CFIs in the parent study were rated by a second coder. Interrater reliability, as assessed by intraclass correlations, was good to excellent for each index ($\rho_I = .74 - .91$; see BLINDED).

Relatives in this sample made an average of 5.33 ($SD = 4.87$) critical comments, ranging from 0 to 18. Due to skew in this variable, we utilized a logarithmic transformation in correlation and regression analyses. The hostility variable was even more severely skewed, with only 37.5% of relatives expressing any level of hostility. Thus, hostility was dichotomized as either absent or present. Skewness was also a problem for EOI, in that more than half the sample (52.1%) had a score of 0. Thus, EOI was also dichotomized as either present or absent.

Leeds Attribution Coding System—(LACS; Stratton, Munton, Hanks, Heard, & Davidson, 1988). The most common method of assessing attributions in prior studies of EE and attributions has been using the LACS to code transcripts from CFI interviews with relatives (see review by Barrowclough & Hooley, 2003). The LACS prescribes a method of extracting and coding spontaneous attributional statements made during interviews. Attributional statements are statements that include an implicit or explicit belief about the cause of a negative behavior or event in a patient's life. Extracted statements are then broken into two components: the event and the attribution(s). The *event* is the singular behavior or event recounted by the relative. The *attribution(s)* is (are) the presumed reason(s) for the event. For example, in the statement, “John and I argue constantly, because he refuses to compromise,” the event would be “John and I argue,” and the attribution would be “he refuses to compromise.”

Independent raters who were untrained in EE coding and blind to the EE status of relatives extracted attributional statements from transcripts of the relatives' CFIs. A total of 2,224 extractions were made by one or more of the five raters. At least four out of five raters agreed on the presence or absence of a defined event with at least one attribution in 65% of the cases. Because the percentage agreement was not higher, raters held regular discussions to arrive at a consensus on attributional statements that were not clear.

After determining final attributional statements and clearly labeling the events/behaviors and attributional elements, raters then coded attributions on the controllable/uncontrollable dimension, as prescribed in the LACS. For this dimension, statements can be coded as controllable (e.g., “John and I argue constantly, because he refuses to compromise on anything”), uncontrollable (e.g., “John and I argue constantly, because his OCD makes it impossible for him to control his need for reassurance”), or mixed (e.g., “John and I argue constantly, because his OCD makes him need continual reassurance, but he is too stubborn to listen to anyone”). Statements that have no clear relation to controllability are marked uncodable.

In our study, all five raters coded all statements. Interrater reliabilities across all statements were adequate for controllability ($\rho_I = .77$). Any statement that had at least 3 out of 5 raters agree on a code on one end of the dimension (e.g., controllable), with no more than 1 rater coding on the opposite end (e.g., uncontrollable), was assigned a controllability attribution

score. Scores for each statement were calculated by dividing the number of raters who coded the statement as controllable by the number of raters who coded the statement as either controllable or uncontrollable (all mixed or uncodable ratings were excluded, as in prior research; e.g., Barrowclough et al., 1994, 2008; Brewin et al., 1991; Renshaw et al., 2006). We utilized this approach (rather than assigning dichotomous scores based on what the majority of raters coded each statement) to preserve a maximum amount of information in our data. This approach yielded scores for each statement that ranged from 0 to .25 on the low end of the dimension and from .75 to 1 on the high end of the dimension (no scores between .25 and .75 were possible, because at least 3 raters had to agree on one end of the dimension, with a maximum of 1 rater disagreeing and coding the other end). Higher scores indicated that most or all raters coded the statement as a controllable attribution.

Illness attribution coding—Raters also coded attributional elements of each statement on an illness/non-illness dimension (cf. Barrowclough et al., 1994; Renshaw et al., 2006), based on whether they included an explicit attribution to a patient's disorder or symptoms (e.g., “John and I argue constantly, because his OCD makes it impossible for him to control his need for reassurance”). Specific phrases that were automatically labeled illness attributions included, but were not limited to: OCD, panic, phobia, disorder, mental disorder/illness, illness, disease, and symptoms (or names of specific symptoms, such as obsessions or panic attack). Thus, *illness* refers specifically to patients' anxiety disorders. Raters were trained in symptoms of both OCD and PDA. All five raters coded all statements. Interrater reliability for illness/non-illness coding across all statements was strong ($\rho_1 = .89$). An illness attribution score was calculated for each statement in the same manner as for controllability attributions, described above.

Event coding—Raters coded the type of event in each attributional statement, based on adaptations of the categories proposed by Brewin, MacCarthy, Duda, and Vaughn (1991). In our study, the initial categories included: (1) anxiety-related symptoms (i.e., symptoms of either OCD or PDA, based on DSM-III-R criteria), (2) negative symptoms (e.g., comorbid depressive symptoms), (3) anger and irritability, (4) interpersonal problems, and (5) other. Again, all five raters coded all events. Because of the categorical nature of this coding system, a specific category had to be assigned for each statement. Categories were assigned when the majority of raters agreed on a single category, unless three raters agreed on one category while the remaining two agreed on a different category (in which case the statement was categorized as uncodable). For all statements that were assigned a category, overall reliability of coding was acceptable (Fleiss, 1986), Fleiss kappa = .69. However reliabilities for Category 2 (kappa = .52) and Category 5 (kappa = .60) were lower than desirable, with other categories at acceptable levels (.72 for Category 1, .73 for Category 3, and .80 for Category 4).

By definition, Category 1 represented disorder-related (DR) events, whereas Categories 3 and 4 represented non-DR events (note, a relative could attribute them to illness-related factors, but the events themselves were not explicitly disorder-related). These categories comprised just over half of all events from this sample, with 23.6% of events coded as anxiety-related symptoms (Category 1), 1.6% coded as anger or irritability (Category 3), and

25.2% coded as interpersonal problems (Category 4). Category 2 represented events potentially related to comorbid depression, similar to negative symptoms in schizophrenia (Hooley, 1987) or the depressive symptoms examined by Hinton and colleagues (2009). In our sample, the frequency of events in this category was quite low (6.7%), which prevented them from being examined as a separate category. Because it was not clear whether such events would be considered as DR or non-DR, and because the reliability of this category was relatively low, statements in Category 2 were dropped from analyses. Similarly, Category 5 included a wide variety of events that were difficult to code; thus, comments with events in this category were excluded from the calculation of event-specific attribution variables. DR events therefore were represented by Category 1, and non-DR events were represented by a combination of Categories 3 and 4.

Procedure

Original Assessment—All patients and relatives provided written informed consent. Patients completed the SCID-P, and relatives completed the CFI, before patients began treatment. The present study utilizes the pre-treatment assessment data.

Attributional coding—Extraction and coding of attributional statements were conducted by five research assistants who were uninformed as to the purpose of this study. The raters (four undergraduate students and one post-baccalaureate research assistant) were trained to reliability (.80) with the first author in the LACS, and they then independently extracted attributional statements from transcripts of the CFI.

Creating attribution variables—For each relative, three separate controllability attribution scores and three separate illness attribution scores were calculated. First, an overall controllability attribution score for combined events was calculated by averaging the controllability scores for each statement made by that relative, regardless of the type of event (i.e., for events in any category). An overall illness attribution score was created in the same way. This process created proportional scores ranging between 0 and 1, with higher scores representing a greater tendency to make controllable or illness attributions (respectively) for all events combined. Second, we calculated event-specific attribution scores: DR controllability, non-DR controllability, DR illness, and non-DR illness. Each relative's DR controllability score was calculated by averaging the controllability scores for all statements by the relative in which the event had been coded as DR (i.e., in Category 1). Similarly, each relative's non-DR controllability score was calculated by averaging the controllability scores for all statements by the relative in which the event had been coded as non-DR (i.e., in Category 3 or Category 4). DR illness and non-DR illness scores were calculated in the same fashion.

Data Analysis

For all inferential statistics, the attribution variables were transformed using the arcsine function, due to their proportional nature (Cohen & Cohen, 1983). To evaluate Hypothesis 1 (that relatives would make more illness than controllable attributions for DR events, but more controllable than illness attributions for non-DR events), we compared the DR controllability scores with the DR illness scores, and the non-DR controllability scores with

the non-DR illness scores, using paired-*t* tests. To evaluate Hypotheses 2 (controllability attributions for combined events would be associated with greater criticism and hostility) and 3 (non-DR illness attributions would demonstrate stronger associations with EOI than DR illness attributions), we used two steps. First, we evaluated bivariate associations of all attribution scores with the components of EE, using Pearson correlations for criticism and point biserial correlations for the dichotomized hostility and EOI variables. To fully evaluate Hypothesis 3, we compared the magnitudes of the point biserial correlation of EOI with illness attributions for DR events to the point biserial correlation of EOI with illness attributions for non-DR events, using the procedure described by Steiger (1980). Second, we used regression analyses to investigate the unique associations of the four event-specific attribution variables with each component of EE. Linear regression was used to examine criticism, and logistic regressions were used to examine the two dichotomized variables of hostility and EOI. In each regression, the independent variables were the four event-specific attribution scores. We examined normality plots of residuals, variance inflation factors, and standardized DFBETAs to assess for violations of assumption. In all regressions, residuals appeared randomly distributed, and no problems with multicollinearity were identified (all VIF < 1.25). Only one possible outlier was detected (standardized DFBETA = 1.04), but re-running analyses without this case resulted in little change to the results. Thus, all cases were retained for all analyses.

Given the exploratory nature of this study, we maintained an alpha level of .05 in all tests. We also report effect sizes and note results that trended toward significance ($p < .10$).

Results

Relatives' Attributions

The mean number of attributions per relative was 25.10 ($SD = 10.07$), with a range of 8 to 48. Mixed attributions (a combination of both ends of a dimension) occurred in only 0.5% of statements on the controllability dimension and in no statements on the illness dimension. Uncodable attributions occurred in 21.2% of statements on the controllability dimension and 11.7% of statements on the illness dimension.

As shown in Table 1, relatives were similarly likely to attribute combined events to controllable factors and to patients' illness. However, when DR and non-DR events were examined separately, clear differences emerged. Consistent with Hypothesis 1, relatives were significantly more likely to make illness attributions than controllability attributions for DR events and, conversely, significantly more likely to make controllability attributions rather than illness attributions for non-DR events. Effect sizes were large and medium, respectively.

For combined events, relatives' tendency to make controllability attributions was significantly, negatively correlated with their tendency to make illness attributions ($r = -.42$, $p < .01$), with a medium effect size. Although this overall pattern would suggest that controllability and illness attributions are strongly (inversely) linked, all correlations among the four event-specific attribution scores were nonsignificant and small in size (see Table 2).

Bivariate Associations of Attributions with EE

With regard to combined events, the only significant association was the medium-sized correlation between criticism and controllability attributions (see Table 3). With regard to attributions for DR and non-DR events, a different picture emerged. Contrary to Hypothesis 2, relatives higher in criticism tended to make fewer controllability attributions for DR events than those lower in criticism; the effect was small to medium but nonsignificant. Similarly, relatives with hostility made significantly fewer controllability attributions for DR events compared to nonhostile relatives. These surprising results are in contrast to the notion that relatives who believe patients can control their disorder-related behaviors are more critical and hostile. On the other hand, Hypothesis 2 was partly confirmed with regard to attributions for non-DR events: Relatives who were higher in criticism made significantly more controllability attributions for non-DR events than those lower in criticism. There were no differences for hostility.

Finally, illness attributions for DR events demonstrated near-zero associations with any component of EE, whereas illness attributions for non-DR events tended to be more common among relatives who exhibited some EOI compared to those who exhibited no EOI. This effect, which was consistent with Hypothesis 3, was small to medium in size, but it was nonsignificant. Also, the magnitudes of these correlations were not significantly different, $t(43) = 1.09, p = .28$. Lastly, relatives who attributed more non-DR events to illness-related factors also tended to be higher in criticism, with a small to medium effect size.

Multivariate Associations of Attributions with EE

We first analyzed multivariate associations of attributions for combined events with the three components of EE. The linear regression of criticism ($F[2, 45] = 2.30, p = .11$) and the logistic regressions of hostility ($\chi^2[2] = 2.93, p = .23$) and EOI ($\chi^2[2] = 0.63, p = .73$) were all nonsignificant. All coefficients were also nonsignificant ($ps > .10$), with the exception of that for controllability attributions in the regression of criticism ($\beta = .33, p < .05$).

Evaluation of event-specific attributions yielded a different pattern. The regression of relatives' criticism was significant ($F[4, 40] = 5.46, p = .001; R^2 = .35$), and the logistic regression of hostility trended toward significance ($\chi^2[4] = 9.09, p < .06$; Cox & Snell $R^2 = .18$). Higher criticism was associated with more controllability attributions and illness attributions for non-DR events, and fewer illness attributions for DR events (see Table 4). The presence of hostility was associated with making illness attributions for non-DR events (i.e., erroneous illness attributions) and trended toward an association with making fewer controllability attributions for DR events (see Table 4). Finally, the regression of EOI was nonsignificant ($\chi^2[4] = 4.68, p = .32$; Cox & Snell $R^2 = .10$), with only illness attributions for non-DR events trending toward a significant association with greater EOI (see Table 4).

Discussion

Consistent with prior research (review by Barrowclough & Hooley, 2003), we found that controllability attributions for patients' negative behaviors and events were associated with

higher criticism in relatives, when all types of events were considered together. We did not replicate prior findings regarding associations of controllability attributions and hostility, perhaps because our dichotomized hostility variable yielded lower power than the continuous critical comments score. Also as hypothesized, the type of event (disorder vs. non-disorder related) proved to be important. Relatives made more controllable attributions than illness attributions for events not pertaining to the patient's disorder and, conversely, more illness attributions than controllable attributions for events related to patients' anxiety disorders.

Although unsurprising, these results indicate that relatives of individuals with anxiety disorders do make different types of attributions based on the type of behavior or event they are considering. It is noteworthy that, even for events that were objectively related to disorders, relatives made an illness attribution only 34% of the time. This finding was similar to the 31% of dementia symptoms that caregivers attributed to patients' dementia in Hinton et al.'s (2009) study. Thus, the behavior or event being considered is linked to the type of attribution a relative makes, but relatives are still unlikely to spontaneously attribute even DR symptoms to patients' disorders. This pattern implies that efforts to provide psychoeducation about disorders to patients' family members (e.g., de Jesus Mari & Streiner, 1994; Penn & Mueser, 1996; Pitschel-Waltz, Leucht, Bauml, Kissling, & Engel, 2001) may be highly appropriate, as relatives may not recognize many symptoms as something related to patients' disorders.

Moreover, although relatives' tendencies to make controllable and illness attributions for combined events were substantially negatively correlated, this pattern was not obtained for event-specific attributions. Indeed, controllability attributions for DR events were unrelated to controllability attributions for non-DR events, with a similar lack of association between illness attributions for DR and non-DR events. These nonsignificant associations argue against the notion that relatives have overarching tendencies toward making certain types of attributions. The attributional process of relatives appears to be complex, with multiple factors that likely influence the attributions they make. Even if psychoeducation helps in altering attributions that relatives make for DR behaviors and events, our results suggest there is a need for clinicians working with family members to expand their focus beyond DR events. Broader interventions that address patients' and relatives' relationships and interpersonal functioning may be needed to have an impact on the broader types of attributions relatives make. Clearly, more research is needed, as these findings originate from a single, small sample of relatives of patients with a primary diagnosis of either OCD or PDA. However, the results do suggest that a more nuanced examination of relatives' attributions is warranted.

Finally, the associations of EE components with event-specific attributions differed from those with global attributional tendencies. Consistent with prior research (Barrowclough & Hooley, 2003), the broad tendency to make controllable attributions for any type of event was associated with higher levels of criticism in our sample, with no clear associations involving overall illness attributions. However, at the event-specific level, criticism and hostility were primarily related to controllable attributions for non-DR events, rather than DR events. This distinction has ramifications. In their review of 13 published studies that all

detected a link between controllability attributions and EE, Barrowclough and Hooley (2003) reasonably concluded that “criticism and hostility in relatives reflected their underlying beliefs that patients could do more to control their symptoms and problems” (p. 861). Our results, however, suggest that it is relatives' beliefs about controllability of *non*-DR events that are associated with higher levels of criticism. Again, our results are based on cross-sectional data from a small sample of relatives of individuals with anxiety disorders; thus, it is not clear that the results will be replicable or generalizable. However, if our results are replicated, they suggest that family-based interventions for disorders that focus on attempting to help relatives achieve a more even-handed attributional style for disorder-related problems (e.g., Pitschel-Waltz et al., 2001) may not have a strong impact on relatives' criticism. These results further reinforce the notion that family-based interventions may need to focus more broadly on relatives' perceptions of patients' non-disorder behaviors, rather than relatives' knowledge about a disorder.

In addition, although our analyses revealed no association of relatives' EE with their overall tendency to make illness attributions for any type of event, illness attributions for non-DR events had a small- to medium-sized bivariate association with EOI. Moreover, illness attributions for non-DR events also demonstrated similarly sized associations with criticism and hostility. Although these findings were nonsignificant, they suggest a need for further research in this area. Attributing non-DR events to illness-related factors may be associated with multiple elements of EE, not just EOI. A combination of EOI with high criticism and hostility represents a highly toxic family environment, in which relatives are intrusively critical toward patients. Such attributions may be reflective of relatives who view patients as helpless or less capable of change, which could present a barrier to successful treatment. Thus, if future studies replicate our finding that illness attributions for non-DR events are associated with all three domains of EE, these attributions would represent a particularly important target for family interventions.

This type of view would likely be influential in any disorder, but it may be particularly salient in behavioral treatments of anxiety, which require patients to routinely take on difficult, anxiety-producing tasks. Family-based interventions might need to focus on aiding patients and relatives in distinguishing between problems that are consequences of anxiety disorders and those that are not, and in appreciating the capacity to face fears, even for those with fairly debilitating disorders. Such an approach would be consistent with recent recommendations that psychoeducation for relatives of individuals with anxiety disorders be carefully delivered, so as to facilitate an optimal balance of appropriate and accurate attributions in relatives, without under-attributing or over-attributing problems to a patient's disorder (e.g., Renshaw, Steketee, Rodrigues, & Caska, 2010). Although such recommendations have also been made in the context of other disorders (e.g., Barrowclough & Hooley, 2003; López, Nelson, Snyder, & Minz, 1999), this issue has yet to receive empirical attention in a controlled study of treatment.

Interpretation of all of the above findings must be made in the context of the limitations of the present study. The study sample was relatively small, resulting in lower power and wider error bands in results. Further, the sample of relatives, although largely made up of spouses, also included some parents, siblings, and adult children in numbers too small to evaluate

whether results differed across type of relatives. In addition, the current sample comprised relatives of individuals with only OCD or PDA; therefore, it is not known whether these results would extend to other anxiety disorders. Also, because data were cross-sectional, we cannot determine whether attributions precede EE, EE precedes attributions, or whether they are associated bidirectionally. Finally, the study was conducted over 20 years ago with an earlier version of the DSM. Although this timing may raise questions about the generalizability of findings to the present day, there has been little substantive change in the DSM criteria for OCD and PDA from DSM-III-R to the current DSM-5. Moreover, studies continue to show the relevance of family processes to individual psychopathology, and there is little reason to expect that the associations of relatives' attitudes with their underlying attributions have changed over time.

Acknowledgments

We thank Gail Steketee, Ph.D. for her work in the design and execution of the study from which these data were drawn.

Source of Funding: This work was supported by Grant R01-MH44190 from the National Institutes of Health.

References

- Alvarez-Jiménez M, Gleeson JF, Cotton SM, Wade D, Crisp K, Yap MB, McGorry PD. Differential predictors of critical comments and emotional over-involvement in first-episode psychosis. *Psychol Med*. 2010; 40:63–72. DOI: 10.1017/S0033291708004765 [PubMed: 19079825]
- Barbato A, D'Avanzo B. Efficacy of couple therapy as a treatment for depression: A meta-analysis. *Psychiatr Q*. 2008; 79:121–132. DOI: 10.1007/s11126-008-9068-0 [PubMed: 18259866]
- Barrowclough C, Gregg L, Tarrier N. Expressed emotion and causal attributions in relatives of post-traumatic stress disorder patients. *Behav Res Ther*. 2008; 46:207–218. DOI: 10.1016/j.brat.2007.11.005 [PubMed: 18177841]
- Barrowclough C, Hooley JM. Attributions and expressed emotion: A review. *Clin Psychol Rev*. 2003; 23:849–880. DOI: 10.1016/S0272-7358(03)00075-8 [PubMed: 14529701]
- Barrowclough C, Johnston M, Tarrier N. Attributions, expressed emotion, and patient relapse: An attributional model of relatives' response to schizophrenic illness. *Behav Ther*. 1994; 25:67–88. DOI: 10.1016/S0005-7894(05)80146-7
- Beck, JG. *Interpersonal processes in the anxiety disorders: Implications for understanding psychopathology and treatment*. Washington, DC: APA; 2010.
- Brewin CR, MacCarthy B, Duda K, Vaughn CE. Attribution and expressed emotion in the relatives of patients with schizophrenia. *J Abnorm Psychol*. 1991; 100:546–554. DOI: 10.1037/0021-843X.100.4.546 [PubMed: 1757668]
- Butzlaff RL, Hooley JM. Expressed emotion and psychiatric relapse: A meta-analysis. *Arch Gen Psychiat*. 1998; 55:547–552. DOI: 10.1001/archpsyc.55.6.547 [PubMed: 9633674]
- Chambless DL, Steketee G, Bryan AD, Aiken LS, Hooley JM. The structure of expressed emotion: A three-construct representation. *Psychol Assessment*. 1999; 11:67–76. DOI: 10.1037/1040-3590.11.1.67
- Chambless DL, Steketee G. Expressed emotion and behavior therapy outcome: A prospective study with obsessive-compulsive and agoraphobic outpatients. *J Consult Clin Psych*. 1999; 67:658–665. DOI: 10.1037/0022-006X.67.5.658
- Cohen, J., Cohen, P. *Applied multiple regression/correlation analysis for the behavioral sciences*. 2nd. Hillsdale, NJ: Erlbaum; 1983.
- Faul F, Erdfelder E, Lang AG, Buchner A. G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behav Res Meth*. 2007; 39:175–191. DOI: 10.3758/BF03193146

- Fleiss, JL. The design and analysis of clinical experiments. New York: John Wiley; 1986.
- Glick ID, Clarkin JF, Spencer JH, Haas GL, Lewis AB, Peyser J, et al. Lestelle V. A controlled evaluation of inpatient family intervention: I. Preliminary results of the six-month follow-up. *Archives of General Psychiatry*. 1985; 42:882–886. DOI: 10.1001/archpsyc.1985.01790320054007 [PubMed: 3899049]
- Greenley JR. Social control and expressed emotion. *J Nerv Ment Dis*. 1986; 174:24–30. DOI: 10.1097/00005053-198601000-00004 [PubMed: 3941307]
- Hinton L, Chambers D, Velásquez A. Making sense of behavioral disturbances in persons with dementia: Latino family caregiver attributions of Neuropsychiatric Inventory domains. *Alz Dis Assoc Dis*. 2009; 23:401–405. DOI: 10.1097/WAD.0b013e3181a6bc21
- Hollingshead, AB. Four-factor index of social status. 1975. Retrieved from <http://psy6023.alliant.wikispaces.net/file/view/Hollingshead+SES.pdf>
- Hooley, JM. The nature and origins of expressed emotion. In: Halweg, K., Goldstein, MJ., editors. *Understanding major mental disorder: The contribution of family interaction*. New York: Family Process Press; 1987. p. 176–194.
- Jansen JE, Gleeson J, Cotton S. Towards a better understanding of caregiver distress in early psychosis: A systematic review of the psychological factors involved. *Clin Psychol Rev*. 2015; 35:56–66. DOI: 10.1016/j.cpr.2014.12.002 [PubMed: 25531423]
- López SR, Nelson KA, Snyder KS, Mintz J. Attributions and affective reactions of family members and course of schizophrenia. *J Abnorm Psychol*. 1999; 108:307–314. DOI: 10.1037/0021-843X.108.2.307 [PubMed: 10369041]
- Monson CM, Fredman SJ, MacDonald A, Pukay-Martin ND, Resick PA, Schnurr PP. Effect of cognitive-behavioral couple therapy for PTSD: A randomized controlled trial. *JAMA*. 2012; 308:700–709. DOI: 10.1001/jama.2012.930 [PubMed: 22893167]
- O'Farrell, TJ., Fals-Stewart, W. *Behavioral couples therapy for alcoholism and drug abuse*. New York: Guilford; 2006.
- Peter, H., Hand, I. Patterns of patient-spouse interaction in agoraphobics: Assessment by Camberwell Family Interview (CFI) and impact on outcome of self-exposure treatment. In: Hand, I., Wittchen, HU., editors. *Panic and phobias, 2: Treatments and variables affecting course and outcome*. Berlin, Germany: Springer Verlag; 1988. p. 240–251.
- Pitschel-Waltz G, Leucht S, Bauml J, Kissling W, Engel RR. The effect of family interventions on relapse and rehospitalisation in schizophrenia – A meta-analysis. *Schizophrenia Bull*. 2001; 27:73–92. DOI: 10.1093/oxfordjournals.schbul.a006861
- Renshaw KD, Chambless DL, Steketee G. The relationship of relatives' attributions to their expressed emotion and to patients' improvement in treatment for anxiety disorders. *Behav Ther*. 2006; 37:159–169. DOI: 10.1016/j.beth.2005.11.001 [PubMed: 16942969]
- Renshaw, KD., Steketee, G., Rodrigues, CS., Caska, CM. Obsessive compulsive disorder. In: Beck, JG., editor. *Interpersonal processes in the anxiety disorders: Implications for understanding psychopathology and treatment*. Washington, DC: APA; 2010. p. 153–178.
- Spitzer, RL., Williams, JBW., Gibbon, M., First, MB. *Structured Clinical Interview for DSM–III–R–Patient Version*. New York: Biometrics Research Department, New York State Psychiatric Institute; 1989.
- Steiger JH. Tests for comparing elements of a correlation matrix. *Psychol Bull*. 1980; 87:245–251. DOI: 10.1037/0033-2909.87.2.245
- Stratton, P., Munton, AG., Hanks, HJL., Heard, D., Davidson, C. *Leeds attributional coding system*. Leeds, UK: University of Leeds; 1988.
- Tarrier N, Barrowclough C, Ward J, Donaldson C, Burns A, Gregg L. Expressed emotion and attributions in the carers of patients with Alzheimer's disease: The effect on carer burden. *J Abnorm Psychol*. 2002; 111:340–349. DOI: 10.1037/0021-843X.111.2.340 [PubMed: 12003455]
- van Os J, Marcelis M, Germeys I, Graven S, Delespaul P. High expressed emotion: Marker for a caring family? *Compr Psychiat*. 2001; 42:504–507. DOI: 10.1053/comp.2001.27899 [PubMed: 11704944]

- Vaughn CE, Leff JP. The measurement of expressed emotion in the families of psychiatric patients. *Brit J Soc Clin Psychol.* 1976; 15:157–165. DOI: 10.1111/j.2044-8260.1976.tb00021.x [PubMed: 938822]
- Weiner B, Perry R, Magnussen J. An attributional analysis of reactions to stigmas. *J Pers Soc Psychol.* 1988; 5:738–748. DOI: 10.1037/0022-3514.55.5.738
- Zinbarg RE, Lee JE, Yoon KL. Dyadic predictors of outcome in a cognitive-behavioral program for patients with generalized anxiety disorder in committed relationships: A “spoonful of sugar” and a dose of non-hostile criticism may help. *Behav Res Ther.* 2007; 45:699–713. DOI: 10.1016/j.brat.2006.06.005 [PubMed: 16904063]

Table 1
Percentage of Statements Attributed to Controllability and Illness for All Events and by Category of Events

	Controllability	Illness	<i>t</i>	<i>d</i>
Overall	19%	20%	-0.23	0.03
Disorder-Related	11%	34%	-7.17***	1.06
Non-disorder Related	28%	11%	4.34***	0.63

 $p < .001$.

Table 2
Intercorrelations Among Attributions

	1	2	3
1. Controllability: DR events			
2. Controllability: non-DR events	.08		
3. Illness: DR events	.00	.18	
4. Illness: non-DR events	-.19	-.22	.07

Note. DR = disorder-related.

Table 3
Bivariate Associations of Attribution Variables with Components of EE

	Criticism r_p	Hostility r_{pb}	EOI r_{pb}
Controllability: All events	.29 [*]	.21	.03
Controllability: DR events	-.27 [†]	-.30 [*]	.16
Controllability: non-DR events	.35 [*]	.14	-.03
Illness: All events	-.04	.02	.09
Illness: DR events	-.14	.00	.04
Illness: non-DR events	.27 [†]	.22	.26 [†]

Note. Values for criticism represent bivariate correlations. Values for hostility and EOI represent results from one-way ANOVAs. DR = Disorder-related.

[†]
 $p < .10$.

^{*}
 $p < .05$.

Table 4
Multivariate Associations of Attribution Variables with Components of EE

	Criticism β	Hostility <i>OR</i>	EOI <i>OR</i>
Controllability: DR events	-.21	0.15 [†]	2.40
Controllability: non-DR events	.49 ^{***}	2.32	1.01
Illness: DR events	-.26 [*]	0.77	1.31
Illness: non-DR events	.35 ^{**}	3.49 [†]	3.24 [†]

Note. Values for criticism represent standardized regression coefficients from a linear regression. Values for hostility and EOI represent odds ratios from logistic regressions. DR = Disorder-related.

[†] $p < .10$.

^{*} $p < .05$.

^{**} $p < .01$.

^{***} $p < .001$.