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PREDICTORS OF EXPRESSED EMOTION IN RELATIVES OF PATIENTS WITH
BIPOLAR DISORDER

JENNIFER MARIE ANTLE
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Reviewed and approved* by the following:

Steffany Fredman
Assistant Professor, Human Development and Family Studies
Thesis Supervisor

Charles Geier
Assistant Professor, Human Development and Family Studies
Honors Adviser

* Signatures are on file in the Schreyer Honors College.

ABSTRACT

The construct of expressed emotion (EE) refers to emotional attitudes held by the relatives of patients with psychiatric illness, with a focus on relatives' criticism, hostility, and/or emotional overinvolvement (Leff & Vaughn, 1985). Emotional overinvolvement (EOI) refers to the relatives' intrusiveness, self-sacrifice, and emotional distress related to the patient's well being (Leff & Vaughn, 1985) and appears to represent a mix of relatives' appropriate and inappropriate emotional engagement with patients (Fredman, Baucom, Miklowitz, & Stanton, 2008). EE is a robust predictor of relapse and generally poorer outcomes across a range of psychopathologies (Butzlaff & Hooley, 1998). To identify families at high risk for EE and associated family dysfunction, researchers have sought to identify patient characteristics that might predict relatives' EE. The majority of these studies have been conducted using samples of individuals with schizophrenia and have not differentiated between relatives' criticism and EOI when classifying a family as high versus low EE. The current study sought to examine patient predictors of relatives' EE in the context of bipolar disorder, with the critical comments and EOI dimensions considered separately as assessed with the Camberwell Family Interview (Vaughn & Leff, 1976). The ability to identify patient characteristics that might be associated with relatives' EE increases the possibility of identifying high-risk families and steering them toward family-based treatments for bipolar disorder in the hopes of improving patient outcomes.

Using a treatment-seeking sample of patients with bipolar disorder ($N = 115$) and caregiving relatives (Fredman, Baucom, Miklowitz, & Stanton, 2008), we explored associations between clinician-rated patient symptom severity (mania, depression, psychosis), social functioning, and illness history variables (premorbid functioning, age at onset, number of years

ill, number of episodes, number of hospitalizations), and relatives' EOI and criticism. Results indicated that current symptom severity and functioning had small-to-medium size associations with EOI. Depressive and psychotic symptom severity were each positively and significantly associated with relatives' EOI (rs. = 248 and .251, respectively; ps = .016 and .015 respectively), and current social functioning was negatively and significantly correlated with EOI (r = -.323, p = .002). Psychosis was also significantly inversely associated with relatives' criticism (r = -.274, p = .008). Illness history variables, however, were not associated with EOI or criticism with the exception that the number of prior hospitalizations was negatively and significantly correlated with CC (r = -.221, p = .021). These findings suggest that the degree to which patients appear sick or impaired may be a salient characteristic in pulling for relatives' emotional engagement with patients rather than criticism.

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Chapter 1

Introduction

Characterizing Bipolar Disorder

Bipolar disorder is a mood disorder that affects 1.8% of the United States (Van Meter, Moreira, & Youngstrom, 2011). It is characterized by periods of manic episodes and major depressive episodes. The most common types of bipolar disorder are bipolar I and bipolar II disorders. Patients diagnosed with bipolar I disorder must meet the requirements for a manic episode and may also experience hypomanic episodes and major depressive episodes (American Psychiatric Association, 2013). A manic episode is defined by the Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition (DSM-5) as, "a distinct period of abnormally and persistently elevated, expansive, or irritable mood and abnormally and persistently increased goal-directed activity or energy, lasting at least 1 week and present most of the day, nearly every day" (American Psychiatric Association, 2013). Other symptoms include inflated self-esteem, decreased need for sleep, excessive talkativeness, racing thoughts, distractibility, increased goal directed activity, and making grandiose plans with no regard for the consequences (American Psychiatric Association, 2013). To meet criteria for a manic episode, one must have elevated, expansive, or irritable moods, plus three or more of the other symptoms previously listed, and distress or impairment resulting from these symptoms.

A patient who is diagnosed with bipolar II disorder must experience at least one lifetime episode of hypomania as well as a major depressive episode. Hypomania is similar to mania, although it must last at least four days, and it does not cause the patient the same degree of social or occupational impairment, nor does it necessitate hospitalization, as mania typically does (American Psychiatric Association, 2013). According to the DSM-5, a major depressive episode

must include at least five of the following symptoms nearly every day over at least a two-week period; one of which must be either the first or second symptom listed: 1) "Depressed mood most of the day, […], as indicated by either subjective report (e.g., feels sad, empty, or hopeless) or observation made by others", 2) "Markedly diminished interest or pleasure in all, or almost all, activities" (anhedonia), 3) "Significant weight loss when not dieting or weight gain", 4) "Insomnia or hypersomnia", 5) "Psychomotor agitation or retardation", 6) "Fatigue or loss of energy", 7) "Feelings of worthlessness or excessive or inappropriate guilt", 8) "Diminished ability to think or concentrate", 9) "Recurrent thoughts of death, recurrent suicidal ideation […] or suicide attempt" (American Psychiatric Association, 2013).

Bipolar disorder affects one's work performance, relationships, and life satisfaction. For example, holding a conversation with a friend during a depressive episode may require too much energy, yet during mania, a patient may find it difficult to resist talking so much that they overpower the conversation. While depressed, a patient may feel suicidal, and while manic, he or she may have the energy to act on their suicidal ideation. Alternatively, during a manic episode, the patient may engage in destructive behavior that has long-term negative consequences for both the patient and his or her family (e.g., reckless spending sprees, dangerous driving, sexual infidelities). Unfortunately, there are often high rates of comorbidity and suicide attempts among patients with bipolar disorder. Patients with bipolar disorder are fifteen times more likely to attempt suicide than the general population in the United States (Marangell et al., 2006).

Interpersonal Environment of Bipolar Disorder

In trying to improve outcomes for patients with bipolar disorder, researchers have begun looking at interpersonal factors that predict illness course. Family relationships are often

strained when a family member suffers from bipolar disorder because the severe and recurrent

nature of the illness can be stressful for the relative. Family members of patients with bipolar

disorder may report strained relationships because of caregiver burden (Alvarez-Jiménez et al.,

2010). Caregiver burden is defined as, "the extent to which caregivers perceive their emotional

or physical health, social life, and financial status as suffering as a result of caring for their

relative" (Zarit, Todd, & Zarit, 1986). Caregiver burden in the context of bipolar disorder is

associated with negative associations with one's mental and physical health. Family members

often sacrifice much of their time and money to assist patients and also face the burdens of grief,

worry, and stress (Perlick et al., 2008). Those with a high level of caregiver burden report lower

general health and more medical conditions. Perlick et al. (2008) reports that 93% of family

members of individuals with bipolar disorder who have been hospitalized report moderate or

high levels of caregiver strain. Caregivers with the highest reported stress had less adaptive

coping strategies, suggesting their interactions with the patient were negatively impacted (Perlick

et al., 2008). This has important implications for the well being of patients with bipolar disorder,

as overall negativity in families is associated with a higher chance of relapse and impairment

(Miklowitz & Johnson, 2009).

Expressed Emotion

In trying to understand the interpersonal context of bipolar disorder, the construct of

expressed emotion (EE) has emerged as a useful framework for understanding the association

between relatives' emotional attitudes towards patients and the course of the patients' illness.

EE is a construct that was originally developed in the context of schizophrenia and refers to

relative's emotional attitudes towards the patients, with a focus on criticism (also referred to as

"critical comments," CC), hostility, and/or emotional over-involvement (EOI; Leff & Vaughn,

1985). The gold standard for assessing EE is the Camberwell Family Interview (CFI; Vaughn & Leff, 1976), a one and a half hour semi-structured interview conducted with the relative in the patient's absence. A trained interviewer assesses the number of critical comments the caretaker makes about the patient, the presence or absence of hostility, and the degree to which the relative exhibits emotional over-involvement, defined as the extent to which the relative exhibits intrusiveness, excessive self-sacrifice, or an exaggerated emotional response to the patient's well-being (Leff & Vaughn, 1985). Intrusiveness is defined as overprotective behavior or unsolicited attempts to tell the patient what to do. For example, an intrusive family member may micro-manage a patient's medication intake, regardless of his or her past level of responsibility with medication. Excessive self-sacrifice is defined as a relative inappropriately going out of his or her way to help the patient at the expense of his or her own time or wellbeing. For example, a family member who depletes their retirement fund in order to compensate for a patient refusing to take medications that would help develop a long-term career may display excessive self-sacrifice. Exaggerated emotional response is characterized by inappropriate or excessive emotionality with regard to the patient's well-being, perhaps by making sweeping statements such as, "If you suffer, I am suffering!" while sobbing uncontrollably. A determination of EOI is made as a single, global score on the CFI based on the rater's impression of how intrusive, excessively self-sacrificing, and/or exaggeratedly emotional the relative is with respect to the patient's well being. An EOI score of three or higher (on a 6-point scale ranging from 0 to 5 in which 0 is the absence of EOI and 5 is an extremely high level of EOI), the presence of any hostility, or more than six critical comments indicates high EE (Vaughn & Leff, 1976). This method for considering a family high in EE may be problematic, as a relative could be high EE due to criticism, hostility, and/or EOI, though typically a family considered high EE is due to at

least one relative being high in criticism. Some researchers have also commented that ascribing

a single, global score for assessing EOI is methodologically limited, as different relative

behaviors (i.e., intrusiveness, excessive self-sacrifice, and exaggerated emotional response) are

combined in unspecified ways, making it difficult to ascertain whether a given relative is high in

one, two, or all three dimensions of EOI (Chambless, Bryan, Aiken, Steketee, & Hooley, 1999;

Fredman, Chambless, & Steketee, 2004; Wiedemann, Rayki, Feinstein, & Hahlweg, 2002).

Attempts to parse the different components of the EOI construct have indicated that

intrusiveness, excessive self-sacrifice, and exaggerated emotional response are related but

distinct subcomponents of the EOI construct and can be validly and reliably distinguished using

observational methods (Fredman et al., 2004). Moreover, work by Fredman, Baucom,

Miklowitz, and Stanton (2008) indicates that the CFI EOI score, at least in the context of bipolar

disorder, may actually represent both appropriate and inappropriate aspects of relatives'

emotional involvement with patients, as high levels of emotional engagement and self-sacrifice

may be reasonable at times given the severe and recurrent nature of the illness.

     High EE is associated with worse outcomes for patients across a range of

psychopathologies (Butzlaff & Hooley, 1998). Patients with high EE relatives are at greater risk

of relapse following hospitalization, and this has been demonstrated among patients with

schizophrenia (Vaughn, Snyder, Jones, Freeman, & Falloon, 1984; Vaughn & Leff, 1976),

depression (Hooley, Orley, and Teasedale, 1986), and bipolar disorder (Miklowitz, Goldstein,

Nuechterlein, Snyder, & Mintz, 1988). In the context of bipolar disorder, patients with highly

critical relatives also exhibit less improvement in manic and depressive symptoms compared to

those with relatives low in criticism over a two-year (Kim & Miklowitz, 2004).

Findings regarding the EOI component of EE have been more mixed. For example, EOI is associated with more residual symptoms after hospitalization among individuals with schizophrenia (Miklowitz, Goldstein, & Falloon, 1983) and greater likelihood of treatment dropout for individuals with anxiety disorders (Chambless & Steketee, 1999) and eating disorders (Szmukler, Eisler, Russell, & Dare, 1983). However, it is also associated with better outcomes for patients hospitalized for borderline personality disorder (Hooley & Hoffman, 1999) and adolescents at risk for psychosis (O'Brien et al., 2006), raising the possibility that there may be disorder-specific effects of high levels of relatives' engagements with patients.

Family-Based Treatment for Bipolar Disorder and Moderating Effects of Expressed Emotion

Given the accumulating evidence of the importance of the family environment in which psychiatric patients reside, researchers have attempted to develop disorder-specific interventions that decrease maladaptive interactional patterns between patients and relatives and facilitate adaptive family processes. In the context of bipolar disorder, Family Focused Therapy (FFT; Miklowitz & Goldstein, 1997) has garnered extensive support as an adjunct to medication for the disorder. FFT consists of 21 sessions of family therapy over nine months, whereby families are educated about the illness and learn strategies for improving communication and problem-solving skills. In a study by Miklowitz, George, Richards, Simoneau, and Suddath (2003), researchers randomized recently episodic patients with bipolar disorder to receive FFT or crisis management (CM), a two-session protocol designed to emulate community care, as an adjunct to medication. Over a two-year period, the researchers found that the combination of FFT and medication was associated with longer relapse-free intervals, and patients in FFT were more consistent with their medication than those in CM. Patients in FFT also reported lower levels of

mania and depression over a two-year period than did those in CM. In another study, patients participating in Integrated Family and Individual Therapy (IFIT), a treatment protocol in which patients received alternating individual therapy and FFT, experienced a 33% reduction in depression scores over 1 year, yet the average patient in CM only experienced an 11% reduction (Miklowitz, Richards et al., 2003). Similar findings were reported by Miklowitz et al. (2007), in which they compared patients with bipolar disorder in four different treatment options, including FFT, within the context of Systematic Treatment Enhancement Program for Bipolar Disorder (STEP-BD), and found that 76.9% of those who participated in FFT recovered in one year. In a study in which adolescents with bipolar disorder participated in FFT and pharmacotherapy versus pharmacotherapy plus enhanced care (EC), the patients who received FFT reported less depressive symptoms and better overall mood over time compared with those in EC (Miklowitz et al., 2008).

The effects of FFT appear to be moderated by family baseline EE. Two studies have shown that FFT may be especially helpful for patients with highly critical relatives (Kim & Miklowitz, 2004; Miklowitz et al., 2009). Furthermore, the type and amount of relatives' emotional involvement with patients may also moderate the effects of FFT. As demonstrated by Fredman, Baucom, Boeding, and Miklowitz (2014), patients whose relatives exhibited low levels of inappropriate self-sacrifice or emotional distress related to the patient's well-being at baseline experienced significant improvements in manic symptoms over a two-year period, regardless of whether they received family-based treatment for bipolar disorder (FFT or IFIT) or CM in addition to pharmacotherapy. In contrast, patients whose relatives were rated high on these variables did not improve unless they received family therapy. With respect to depressive symptoms, patients whose relatives displayed high levels of appropriate self-sacrifice

experienced significant declines in depressive symptoms whether or not they received FFT, whereas patients whose relatives demonstrated low levels of appropriate self-sacrifice did not improve unless they received FFT.

In sum, it appears that high EE in families is associated with negative outcomes for patients. In the context of bipolar disorder, specifically, high CC is a strong predictor of poorer outcome for manic and depressive symptoms (Kim & Miklowitz, 2004). With respect to EOI, its association with outcome appears to depend on the type and amount of involvement by relatives (Fredman et al., 2014). FFT for bipolar disorder seems to be particularly helpful for patients from families with high levels of CC, high inappropriate self-sacrifice and emotional response, and low appropriate self-sacrifice (Fredman et al., 2014; Kim & Miklowitz, 2004; Miklowitz et al., 2009). However, little is actually known about what predicts EE in the context of bipolar disorder. By identifying the predictors of EOI and CC, we may be able to identify families who may be more likely to be high in EE, or show low levels of appropriate involvement, and direct them toward FFT or other family-based treatment for bipolar disorder to improve patient outcomes.

Predictors of Expressed Emotion

Current symptom severity and social functioning. In examining predictors of EOI and CC, current symptom severity has emerged as a predictor of EE across a range of psychopathologies. A study by King (2000) suggests that greater negative symptom severity, reported through an interview with the patient, predicts both high EOI and high CC in mothers of patients with schizophrenia.

Anxiety and depressive symptoms have also been linked to higher levels of EE. Bentsen et al. (1996) found that patients with schizophrenia who displayed more anxious or depressed

behavior and less aggression were more likely to have relatives high in EOI. Likewise, according to Hooley (1986), patients suffering from depression who display less open and expressive communication with their relatives are more likely to have relatives who have high levels of EE, although this study did not differentiate between EOI and CC.

Several studies have also documented associations between lower social functioning and higher levels of EE in patients with schizophrenia, although they did not differentiate between EOI and CC (Barrowclough & Tarrier, 1990; Inoue, Tanaka, Shimodera, & Mino, 1997).

Illness history. Some studies suggest that premorbid functioning is associated with EE. For example, Miklowitz et al., (1983) observed that patients with schizophrenia who have lower levels of premorbid functioning had relatives with high EOI, as operationalized by the CFI as a score of three or higher. In contrast, Bentsen et al. (1998) found that premorbid functioning was not related to either EOI or CC in patients with schizophrenia. That study also found that patients who have a higher number of previous hospitalizations tend to have relatives high in CC (Bentsen et al., 1998). However, there was an interaction effect for CC between the number of hospitalizations and duration of the illness such that patients with three or more hospitalizations who had been ill longer had relatives with lower levels of CC (Bentsen et al. 1998).

As reviewed, the majority of research conducted on predictors of expressed emotion has been conducted in samples of individuals with schizophrenia. As a consequence, little is known about what predicts EE among relatives of individuals with bipolar disorder. Moreover, a number of studies did not differentiate between EE status based on EOI or CC; thus, it is difficult to know if the associations between the predictors are the specific aspect(s) of expressed emotion. Thus, the goal of the present study is to examine several predictors of relatives' expressed emotion in the context of bipolar disorder, looking at predictors of EOI and CC

separately. Based on findings across psychopathologies, such as schizophrenia (Bentsen et al., 1998; Miklowitz et al., 1983) and depression (Hooley, 1986), we hypothesize that symptom severity and illness history will be associated with higher levels of EOI. That is, we hypothesize that the severity of current symptoms and illness history will be positively correlated with EOI, whereas current social functioning, an indicator of the patient's current symptoms, and premorbid functioning, an indicator of illness history, will each be negatively correlated with EOI. We expect lower levels of social functioning and premorbid functioning to be associated with higher levels of EOI. As an exploratory hypothesis, we will examine the same predictors and their relation to CC.

Chapter 2

Methods

Participants

Participants in the present study included 115 patients with bipolar disorder who took part in one of two treatment outcome studies examining family therapy as an adjunct to medication for bipolar disorder (Miklowitz, George et al., 2003; Miklowitz, Richards, et al., 2003). There were an additional 14 participants who partook in research outside of the context of either trial who were included in a study to evaluate the construct validity of an observational coding system for emotional overinvolvement in the context of bipolar disorder (Fredman, Baucom, Miklowitz, & Stanton, 2008). All participants met diagnostic criteria for the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; DSM–IV; American Psychiatric Association, 1994) diagnosis of bipolar disorder, had regular contact with a key relative, and consented to taking medication. They were recruited either during treatment in the hospital for a mood episode or as outpatients who were referred by a physician. Participants were excluded from this study if they had signs of a developmental disability, alcohol or substance use disorder, or a neurological disorder within the past six months. Of these participants, 84% were diagnosed with Bipolar I, and 16% were diagnosed with Bipolar II according to the DSM-IV (American Psychiatric Association, 1994). All participants signed written informed consent in order to take part in this study.

The University of Colorado's Institutional Review Board and, later, the University of North Carolina's Institutional Review Board approved this study. The participants received standard medication for bipolar disorder and completed a videotaped interaction with a key relative.

The average age of participants was 35.43 years and the average age of onset was 23.07 years. The mean number of years of education was 14.47 years. The mean number of prior episodes was 4.40 and the mean number of hospitalizations prior to this study was 2.10. Females made up 58% of the sample and 7% were ethnic minorities. According to the Hollingshead-Redlich scale, which measures socioeconomic status (SES) on a scale of 1 to 5 where 1 indicates high SES and 5 indicates low SES; the mean level of SES was 2.20 (Hollingshead & Redlich, 1958). Of the key relatives that took part in this study, 53% were female, 63% were romantic partners of the patients, 31% were parents, and 6% were children or siblings.

Measures

Camberwell Family Interview (CFI; Vaughn & Leff, 1976). The Camberwell Family Interview is a one to two hour semi-structured interview conducted with a key relative of the patient. The interview is scored based on levels of criticism, EOI, hostility, warmth, and positive comments, but for the purpose of the present study, we will only examine criticism and EOI. Levels of criticism are measured through the number of critical comments made by the key relative about the patient throughout the duration of the interview. EOI is measured on a scale of zero to five, where zero indicates no emotional over-involvement and a score of five indicates extremely high emotional over-involvement. Interrater reliability for EOI was .80 ($p < .001$) and for criticism was .82 ($p < .001$).

Observational Coding System for Emotional Involvement/Overinvolvement (Fredman et al., 2008). Observational ratings of relatives' appropriate and inappropriate intrusiveness, excessive self-sacrifice, and exaggerated emotional response were made based on 10-minute pretreatment problem-solving interactions between patients and relatives. Coders determined levels of appropriateness and inappropriateness for each of the behaviors in the

above domains based on each individual's situation, such as their symptoms, situational limitations, and the extent to which relatives' responses realistically matched the patient's level of functioning. Behaviors were rated on a scale of one to five, in which a score of one indicated that the behavior did not exist and five indicated an extremely high level of the particular behavior. As described in Fredman et al. (2008), interrater reliability across the 6 scales ranged from adequate to good, with ICCs ranging from .70 - .86. Further information about the scoring system and rating procedures may be found in Fredman et al. (2008).

Schedule for Affective Disorders and Schizophrenia, Change Version (SADS-C; Spitzer & Endicott, 1978). SADS-C is a thirty-six item interview-based instrument that measures the most severe mood episodes during a particular period of time and provides ratings for manic, depressive, and psychotic symptoms. The measure is based on a scale of one to seven, where one indicates no symptoms and seven indicates a high degree of severity for a particular symptom. In the present study, ratings using the SADS-C was administered to participants at the beginning of the study to cover the 3 months prior to study entry, one month after study entry, and three, six, nine, twelve, eighteen and twenty-four months after study entry and were averaged within symptom domain (i.e., mania, depression, psychosis). Interrater reliability for the SADS-C items ranged from .81 to .92 ($p < .001$ for all). For the purposes of the present study, only baseline ratings were used as predictors of relatives' expressed emotion.

UCLA Social Attainment Survey (Goldstein, 1978). The UCLA Social Attainment Survey is a seven-item measure that assesses premorbid adjustment and current social functioning through an interview with the patient. This instrument measures levels of functioning in romantic relationships, leadership, and social activities. Interrater reliability for this measure ranged from .83 to .95 ($p < .001$ for all).

Variables. The variables were separated into two groups: symptom severity and functioning and illness history. The group of symptom severity and functioning was made up of current illness features including: depression, mania, psychosis, and current social functioning. The illness history group was made up of the patient's premorbid functioning, number of years ill, number of prior hospitalizations, and number of prior episodes.

Procedures

Analytic Plan. In the current study, we conducted Pearson correlations to examine the zero-order associations between CFI EOI, CFI Criticism, the six observed emotional involvement scales, the symptom severity and functioning variables, and the illness history variables. Due to the skewed nature of some of the variables that could not be corrected with transformations, we also conducted non-parametric correlations to confirm the pattern of associations. Interpretation of effect sizes for the zero order associations between the predictors and EOI and criticism was done consistent with Cohen's (1988) guidelines for small ($r = .20$), medium ($r = .30$), and large effects ($r = .50$). For variables with significant zero-order associations with EOI or criticism, we subsequently conducted follow up analyses in which EOI and criticism were regressed separately on those variables in order to determine the unique associations between the predictors and EOI and criticism.

Chapter 3

Results

Descriptive Statistics

After conducting descriptive statistics for all the variables, it was apparent that the data in our sample were skewed, so we conducted square root transformations on the variables with a skew of over one (Table 1). However, many variables were still skewed (e.g. the six behavioral observation scales, psychosis, premorbid functioning, and prior hospitalizations); thus, we conducted both parametric and non-parametric analyses to determine if the pattern of findings was consistent.

Symptom Severity and Functioning Variables

We hypothesized that current symptom severity would be positively and significantly correlated with EOI and that current social functioning would be negatively and significantly associated with EOI. As hypothesized, depressive and psychotic symptom severity were both positively and significantly positively associated with EOI, with small-to-medium effect size associations, and current social functioning was negatively and significantly correlated with EOI, with a moderate effect size association. Contrary to hypothesis, mania was not significantly associated with EOI. The pattern of findings was similar for parametric and non-parametric analyses (Tables 2 and 3, respectively). As displayed in Tables 2 and 3, current psychotic symptom severity was negatively and significantly associated with criticism, with a small-to-medium size association. There was an overall lack of significant findings in relation to the six behavioral observation scales with the following exceptions: psychosis and current social functioning had limited associations (Table 2 and Table 3). That is, across both the parametric

and non-parametric correlations, psychosis was significantly positively associated with both appropriate intrusiveness and inappropriate emotional response, while current social functioning was negatively associated with appropriate intrusiveness, inappropriate self-sacrifice, and inappropriate emotional response.

Illness History Variables

Regarding illness history, we predicted that these variables would be positively associated with EOI, with the exception of premorbid functioning, which would be negatively correlated with EOI. Contrary to our hypothesis, there were no significant correlations between any of the illness history variables and EOI. However, there was a negative and significant correlation between the number of the patient's prior hospitalizations and the number of critical comments made by the relative during the Camberwell Family Interview, with a small effect size association (Table 4 and Table 5). Similar to the symptom severity and functioning findings, there were no associations between the illness history variables and the six behavioral observation scales with the exception that premorbid functioning was negatively and significantly correlated with appropriate emotional response for the parametric correlations, with a small effect size association (Table 4), but not for the non-parametric correlations (Table 5).

Regression Analyses

A regression analysis of EOI on depression, psychosis, and current social functioning indicated that the omnibus model was significant, $F = 7.941$, $p = .000$. Examination of local fit indices revealed that depression and current social functioning were both associated with unique variance in EOI, but that psychosis was not after controlling for shared variance with depression and social functioning (Table 6).

A second regression analysis of CC on psychosis and prior hospitalizations indicated that the omnibus model was significant, $F = 6.417$, $p = .003$. When considering local fit indices, it appeared that psychosis was associated with unique variance in CC, but the number of prior hospitalizations was not after controlling for shared variance with psychosis (Table 7).

Chapter 4

Discussion

The purpose of this study was to examine patient predictors of relatives' expressed emotion, specifically EOI and CC, in the context of bipolar disorder. By examining what patient characteristics tend to be associated with high levels of EE, we may be able to identify high-risk families and direct them to FFT or other family-based treatments for bipolar disorder.

The main findings indicate that how sick a patient is currently, rather than the history of their illness, predicts the extent of relatives' EOI. That is, higher levels of depression and psychosis and lower levels of patient social functioning were associated with higher levels of EOI, although the association between psychosis and EOI ceased to be significant after controlling for depression and social functioning. In contrast, higher levels of psychosis were associated with lower levels of CC. No other indicators of patient symptom severity or functioning were associated with CC, and illness history was not associated with either EOI or CC after controlling for psychosis. These findings suggest that patients who are sicker pull for more engagement from relatives. More severe symptoms may indicate to relatives that the patient needs help, so they may be more likely to try act in a supportive manner.

Overall, there was a lack of significant findings with respect to the associations between symptom severity and illness history and the six behavioral observation scales, with the exception of the significant associations between psychosis and appropriate intrusiveness, premorbid functioning and appropriate emotional response, and current social functioning and inappropriate self-sacrifice and inappropriate emotional response. Specifically, psychosis was positively associated with appropriate intrusiveness, and premorbid functioning was negatively related to appropriate emotional response. In addition, current social functioning was negatively

correlated with inappropriate self-sacrifice and inappropriate emotional response. This suggests that patients who appear sicker, by virtue of having higher levels of psychotic symptoms or having a history of poor functioning, may have relatives whose level of engagement is commensurate with the level of pathology the patient is exhibiting. However, patients who are less able to function and care for themselves at present may pull for more inappropriate forms of engagement from relatives, perhaps because relatives are unsure of how to care for them. Overall, it appears that being sick pulls for both appropriate and inappropriate involvement from relatives.

Our findings regarding the predictive value of symptom severity to EOI are partially consistent with other studies on predictors of expressed emotion. For example, King (2000) reported that greater total symptom severity predicted higher levels of EOI and CC in mothers of patients with schizophrenia, but when looking at positive and negative symptoms separately, only the severity of negative symptoms (e.g. emotional withdraw and blunted affect) predicted of EOI and CC. Similarly, Miklowtiz et al. (1983) found that patients with schizophrenia who have more anxious and depressive behaviors have family members who are higher in EOI. These studies generally support our finding on the association between depression and EOI and psychosis and EOI. However, the present study suggests that psychosis is negatively associated with CC when controlling for prior hospitalizations, which contradicts the positive correlation found in King (2000). This difference in findings may be related to the differences in psychopathologies. Patients with bipolar disorder are more likely to be married than patients with schizophrenia, so perhaps spouses are less likely to be critical than other relatives. Other studies on patients with schizophrenia also support our finding on the relationship between lower

social functioning and higher EE, although these findings did not differentiate between EOI and CC (Barrowclough & Tarrier, 1990; Inoue et al., 1997).

Though our findings on symptom severity and its association with EE are consistent with some other studies in the literature, the relative lack of associations between the illness history variables and EE is different from what has been reported in the literature. For example, Bentsen et al. (1998) found that when the number of previous hospitalizations is greater than three, there is an association with higher CC, which contrasts to the finding in the present study that the number of hospitalizations is related to lower CC. In addition, the Bentsen et al. study found that the duration of the illness is related to CC, such that patients who have been ill longer have relatives with lower levels of CC. Along those lines, a study by Butzlaff and Hooley (1998) found that EE may be a more reliable construct when patients with varying psychiatric disorders have been ill longer, while we found that the number of years a patient has been ill was not correlated with EE. The differences between findings in these studies and the current study may be due to differences in psychopathologies. Perhaps the history of the patient's illness plays a stronger role in predicting relatives' EE in schizophrenia than in bipolar disorder, given that functioning in bipolar disorder may follow a more variable course, in keeping with the episodic nature of the illness.

The findings that current symptom severity and social functioning are more robust predictors of EOI than criticism may be understood as a proxy for relatives' concern for the patient and desire to be helpful. Thus, the sicker the patient appears to be, the more the relative may become emotionally engaged. In fact, it has been suggested in previous studies that the CFI EOI represents a combination of both helpful and unhelpful attitudes and behaviors in the relative (Fredman et al., 2008). If relatives display a higher level of EOI because they are

concerned and trying to help the patient, it makes sense that they would make the effort to not criticize the patient. Furthermore, considering the episodic nature of bipolar disorder, illness history may not predict EOI or CC because relatives may not feel the need to become emotionally engaged or criticize something that happened in the past. Rather, they may want to concentrate their efforts on helping the patient in the present and the future.

A notable limitation in this study was the lack of predictors about characteristics of the relatives in predicting relatives' EE, though some studies have found that this may be an important factor. According to a study by Karanci and Inandilar (2002), when relatives of patients with schizophrenia perceive patients to be sicker, they are more likely to display high levels of CC and EOI, though this study measured EE through the Expressed Emotion Scale (Berksun, 1992) instead of through the CFI. In particular, a relative's ability to cope is negatively associated with CC, but their perception of the frequency of the patient's symptoms is positively related to CC, and both of these factors as well as the relative's distress are positively associated with EOI (Karanci & Inandilar, 2002). In addition, we were not able to measure relatives' attributions for patients' symptoms. For example, previous studies of relatives of patients with bipolar disorder have suggested that relatives with high EE attitudes are more likely to believe that the patient's symptoms or behaviors are controllable (Wendel, Miklowitz, Richards, & George, 2000). Depending on how a relative views the overall functioning of a patient, they may exhibit different levels of EE. For example, family members may become frustrated with a patient who they believe should have higher overall functioning based on their cognitive abilities, but if they have a job, their frustrations may be put at ease. Along these lines, family members who believe poor overall functioning is something the patient can control have higher levels of CC than those who do not blame the patient for their illness (Alvarez-Jiménez et

al., 2010; Miklowitz & Johnson, 2009). Finally, relatives' own psychopathology and level of functioning may be useful to examine in future studies because those who are struggling with their own mental health may be more likely to hold critical attitudes towards patients. For example, a study by Chambless, Bryan, Aiken, Steketee, and Hooley (2001) found that certain characteristics of the relative, such as angry feelings and behaviors, were linked to hostility and criticism toward patients with panic disorder.

Overall, the current study expands upon the literature in other psychopathologies by examining predictors of EE in patients with bipolar disorder. Patients with more severe symptoms may pull for relatives with higher levels of EOI and relatively lower levels of criticism. By identifying these patients, it may be easier to implement earlier family based treatment options, which may improve patient outcomes.

Appendix A

Tables

Table 1

Descriptive Statistics with Square Root Transformations (N=115)

Variable	*M*	Minimum	Maximum	*SD*	Skew
CFI EOI	1.91	0	5.00	1.291	.271
CFI Criticism – T	1.6607	0	5.00	1.07858	.139
App. INT – T	1.3336	1.00	2.24	.36850	.680
Inapp. INT – T	1.3659	1.00	2.24	.37981	.483
App. SS – T	1.3545	1.00	2.24	.33788	.373
Inapp. SS – T	1.2012	1.00	2.24	.36354	1.588
App. ER – T	1.3142	1.00	2.24	.39033	.824
Inapp. ER – T	1.1867	1.00	2.24	.32514	1.572
Depression	2.9286	1.00	5.27	1.08011	.097
Mania	3.2872	1.00	5.29	1.19622	-.254
Psychosis – T	1.2690	.87	2.12	.30612	.972
Current Social Functioning	3.2713	1.29	4.75	.85790	-.238
Premorbid Functioning – T	5.0088	3.00	5.92	.62190	-1.443
Years Onset – T	3.0986	0	6.40	1.72791	-.215
Prior Hospitalizations – T	1.0332	0	4.69	1.02075	.803
Prior Episodes – T	1.8630	0	4.24	.96998	-.144

Note. N ranged from 62 to 115 due to missing data in the Camberwell Family Interview (CFI); EOI = Emotional Over-Involvement; App. INT = Appropriate Intrusiveness; Inapp. INT = Inappropriate Intrusiveness; App. SS = Appropriate Self Sacrifice; Inapp. SS = Inappropriate Self Sacrifice; App. ER = Appropriate Emotional Response; Inapp. ER = Inappropriate Emotional Response

Table 2

Pearson Correlations of CFI EOI, CFI Criticism, Six Behavioral Observation Scales, and Current Symptom Severity and Functioning with Square Root Transformations

Measures	1	2	3	4	5	6	7	8	9	10	11	12
1. CFI EOI	___	.063	.215*	.135	.263**	.127	.083	.304**	.248*	.133	.251*	-.323**
2. CFI Criticism – T		___	.003	-.019	.049	.033	.011	-.076	.124	-.128	-.274**	.115
3. App. INT – T			___	.257**	.431**	.372**	.031	.279**	-.033	.154	.296**	-.230*
4. Inapp. INT – T				___	.260**	-.016	.233*	.321**	-.039	.092	.088	-.110
5. App. SS – T					___	.280**	.147	.298**	-.012	.048	.036	-.094
6. Inapp. SS – T						___	.005	.308**	.023	.003	.162	-.330**
7. App. ER – T							___	.296**	.142	.051	-.071	-.071
8. Inapp. ER – T								___	-.125	.110	.208*	-.369**
9. Depression									___	.029	-.117	.128
10. Mania										___	.309**	-.088
11. Psychosis – T											___	-.401**
12. Current Social Functioning												___

Note. CFI = Camberwell Family Interview; EOI = Emotional Over-Involvement; App. INT = Appropriate Intrusiveness; Inapp. INT = Inappropriate Intrusiveness; App. SS = Appropriate Self Sacrifice; Inapp. SS = Inappropriate Self Sacrifice; App. ER = Appropriate Emotional Response; Inapp. ER = Inappropriate Emotional Response, T = Square Root Transformed Variable.

* $p < .05$. ** $p < .01$

Table 3

Nonparametric Correlations of CFI EOI, CFI Criticism, Six Behavioral Observation Scales, and Current Symptom Severity and Functioning with Square Root Transformations

Measures	1	2	3	4	5	6	7	8	9	10	11	12
1. CFI EOI	____	-.031	.179*	.105	.218**	.076	.064	.246**	.193*	.111	.236**	-.224**
2. CFI Criticism – T		____	-.002	-.024	.017	.011	.018	-.060	.079	-.096	-.226**	.099
3. App. INT – T			____	.218**	.387**	.320**	.044	.218**	-.037	.126	.207*	-.169*
4. Inapp. INT – T				____	.224**	-.055	.188*	.252**	-.021	.091	.109	-.077
5. App. SS – T					____	.218**	.138	.310**	-.003	.056	.054	-.074
6. Inapp. SS – T						____	-.036	.215**	.020	.030	.156	-.249**
7. App. ER – T							____	.239**	.114	.038	-.071	-.048
8. Inapp. ER – T								____	-.109	.065	.178*	-.295**
9. Depression									____	.008	-.050	.082
10. Mania										____	.237**	-.074
11. Psychosis – T											____	-.285**
12. Current Social Functioning												____

Note. CFI = Camberwell Family Interview; EOI = Emotional Over-Involvement; App. INT = Appropriate Intrusiveness; Inapp. INT = Inappropriate Intrusiveness; App. SS = Appropriate Self Sacrifice; Inapp. SS = Inappropriate Self Sacrifice; App. ER = Appropriate Emotional Response; Inapp. ER = Inappropriate Emotional Response, T = Square Root Transformed Variable.
* $p < .05$. ** $p < .01$

Table 4

Pearson Correlations of CFI EOI, CFI Criticism, Six Behavioral Observation Scales, and History Variables with Square Root Transformations

Measures	1	2	3	4	5	6	7	8	9	10	11	12
1. CFI EOI	____	.063	.215*	.135	.263**	.127	.083	.304**	-.155	.016	.084	-.051
2. CFI Criticism – T		____	.003	-.019	.049	.033	.011	-.076	.105	.033	-.221*	.063
3. App. INT – T			____	.257**	.431**	.372**	.031	.279**	-.123	-.035	.184	-.042
4. Inapp. INT – T				____	.260**	-.016	.233*	.321**	-.093	.002	.099	.164
5. App. SS – T					____	.280**	.147	.298**	-.146	.010	.037	.135
6. Inapp. SS – T						____	.005	.308**	-.060	.092	.020	.096
7. App. ER – T							____	.296**	-.231*	.009	.061	-.039
8. Inapp. ER – T								____	-.199	-.077	.144	-.097
9. Premorbid Functioning – T									____	.019	-.148	.062
10. Years Onset – T										____	.293**	.729**
11. Prior Hospitalizations – T											____	.443**
12. Prior Episodes – T												____

Note. CFI = Camberwell Family Interview; EOI = Emotional Over-Involvement; App. INT = Appropriate Intrusiveness; Inapp. INT = Inappropriate Intrusiveness; App. SS = Appropriate Self Sacrifice; Inapp. SS = Inappropriate Self Sacrifice; App. ER = Appropriate Emotional Response; Inapp. ER = Inappropriate Emotional Response, T = Square Root Transformed Variable.
* $p < .05$. ** $p < .01$

Table 5

Nonparametric Correlations of CFI EOI, CFI Criticism, Six Behavioral Observation Scales, and History Variables with Square Root Transformations

Measures	1	2	3	4	5	6	7	8	9	10	11	12
1. CFI EOI	____	-.031	.179*	.105	.218**	.076	.064	.246**	-.131	-.003	.072	-.032
2. CFI Criticism – T		____	-.002	-.024	.017	.011	.018	-.060	.083	.018	-.181*	.019
3. App. INT – T			____	.218**	.387**	.320**	.044	.218**	-.146	-.026	.126	.031
4. Inapp. INT – T				____	.224**	-.055	.188*	.252**	-.079	-.010	.068	.131
5. App. SS – T					____	.218**	.138	.310**	-.112	-.005	.038	.106
6. Inapp. SS – T						____	-.036	.215*	.030	.045	.008	.113
7. App. ER – T							____	.239**	-.098	.027	.014	-.019
8. Inapp. ER – T								____	-.148	-.063	.154	-.048
9. Premorbid Functioning – T									____	.110	-.084	.069
10. Years Onset – T										____	.209**	.570**
11. Prior Hospitalizations – T											____	.339**
12. Prior Episodes – T												____

Note. CFI = Camberwell Family Interview; EOI = Emotional Overinvolvement; App. INT = Appropriate Intrusiveness; Inapp. INT = Inappropriate Intrusiveness; App. SS = Appropriate Self Sacrifice; Inapp. SS = Inappropriate Self Sacrifice; App. ER = Appropriate Emotional Response; Inapp. ER = Inappropriate Emotional Response, T = Square Root Transformed Variable.
* $p < .05$. ** $p < .01$

Table 6

Regression of CFI EOI on Depressive Symptom Severity, Psychosis Severity, and Current Social Functioning (with Square Root Transformations)

Variables	R^2	B	SE	β	sr^2	95% CI	
						Lower Bound	Upper Bound
	.254						
Depression		.346*	.116	.311	.09	.114	.577
Psychosis – T		.812	.414	.220	.04	-.015	1.638
Current Social Functioning		-.426*	.152	-.315	.08	-.730	-.123

Note. CFI EOI = Camberwell Family Interview Emotional Over-involvement; T = Square Root Transformed Variable; CI = Confidence Interval
*p < .05

Table 7

Regression Analysis of CFI Criticism, Psychosis and Prior Hospitalizations (with Square Root Transformations)

Variables	R^2	B	SE	β	sr^2	95% CI Lower Bound	Upper Bound
	.130						
Psychosis – T		-.970**	.337	-.291	.08	-1.641	-.299
Prior Hospitalizations		-.180	.101	-.180	.03	-.381	.022

Note. CFI = Camberwell Family Interview; T = Square Root Transformed Variable; CI = Confidence Interval
*p < .05, **p < .01

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caregivers: A longitudinal study. *The Gerontological Society of America*, *26*(3), 260–266.

Academic Vita

Jennifer Antle
1801 West Branch Road
State College, PA 16801
jya5148@psu.edu

EDUCATION

The Pennsylvania State University, University Park, PA   Expected: May 2015
Schreyer Honors College
Bachelor of Science in Human Development and Family Studies
Minor: Psychology

International Studies Institute, Florence, Italy   Summer 2013
Studied Roman history, Italian family and relationships, and Italian childhood

HONORS AND AWARDS

Dean's List   Fall 2011 to present
Francis R. Pentz and Helen M. Pentz Memorial Scholarship   Fall 2011 to Spring 2013
Janis Jacobs Study Abroad Scholarship   Summer 2013
Frederick and Jeanne Riebel Lord Academic Excellence Scholarship Fall 2014 to Spring 2015
Mary Burket Morrow Scholarship   Fall 2014 to Spring 2015

RESEARCH EXPERIENCE

Honors Thesis, Schreyer Honors College   April 2015
- Conducting empirical research on predictors of relatives' expressed emotion in the context of bipolar disorder under the direction of Steffany Fredman, Ph.D.
- Collaborating with an advisor to submit paper for publication
- Experience using SPSS to conduct correlation and regression analyses
- Completed the Collaborative Institutional Training Initiative (CITI)

Research Assistant, The Couples Studies Lab (Director: Steffany Fredman, Ph.D.)
Jan. 2015 to present
- Conduct literature reviews for studies in the lab
- Assist with compiling measures in code book and setting up databases
- Contribute to conference presentations and manuscript preparations

LEADERSHIP EXPERIENCE

Penn State Oriana Singers, *President*   Sept. 2013 to present

- Oversee Vice President, Treasurer, Secretary, Librarians, and Section Leaders
- Organize retreats and extended rehearsals
- Collaborate with director to enhance communication and organization of the choir

Women's Leadership Initiative, *Member*   Aug. 2013 to May 2014
- Selected to be among thirty student leaders based on academic performance and leadership potential
- Participated in seminars to enhance leadership potential
- Partnered with a mentor to improve professional development

Penn State Dance Marathon, *Oriana and Glee Club Merchandise Chair* Sept. 2012 to May 2014
- Coordinated merchandise orders and design for group of thirty
- Helped raise over $70,000 with the organization since 2012
- Provided emotional support and friendship to families affected by pediatric cancer

VOLUNTEER EXPERIENCE

Community Help Centre   Jan. 2014 to present
- Completed 180 hours of training in hotline counseling
- Volunteered over 340 hours on a 24-hour hotline, conducting basic needs referrals and short term counseling
- Mastered basic psychological theories and counseling skills to aid clients

Meals on Wheels   Oct. 2013 to present
- Aid in meal preparation for chefs
- Assist in packaging meals in an assembly line
- Deliver meals to community members