2011-07-29

Communication Deviance, Expressed Emotion, and Family Cohesion in Schizophrenia

Radha G. Carlson
University of Miami, radhacarlson@gmail.com

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COMMUNICATION DEVIANCE, EXPRESSED EMOTION, AND FAMILY
COHESION IN SCHIZOPHRENIA

By

Radha G. Carlson

A DISSERTATION

Submitted to the Faculty
of the University of Miami
in partial fulfillment of the requirements for
the degree of Doctor of Philosophy

Coral Gables, Florida

August 2011

UNIVERSITY OF MIAMI

A dissertation submitted in partial fulfillment of
the requirements for the degree of
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COMMUNICATION DEVIANCE, EXPRESSED EMOTION, AND FAMILY
COHESION IN SCHIZOPHRENIA

Radha G. Carlson

Approved:

_____
Amy Weisman de Mamani, Ph.D.
Associate Professor of Psychology

_____
Terri A. Scandura, Ph.D.
Dean of the Graduate School

_____
Kristin Lindahl, Ph.D.
Associate Professor of Psychology

_____
Craig Marker, Ph.D.
Assistant Professor of Psychology

_____
Edward Rappaport, Ph.D
Associate Professor in the
College of Arts and Sciences

_____
Laura Kohn Wood, Ph.D.
Associate Professor in the
Department of Educational and
Psychological Studies

CARLSON, RADHA G.   (Ph.D., Psychology)
<u>Communication Deviance, Expressed Emotion, and</u>   (August 2011)
<u>Family Cohesion in Schizophrenia</u>

Abstract of a dissertation proposal at the University of Miami.

Dissertation supervised by Professor Amy Weisman de Mamani.
No. of pages in text. (87)

Although schizophrenia is a biologically-based disorder, environmental stress (including

stress within familial relationships) plays a major role in the onset and maintenance of

symptoms. This study examined family variables that have implications for

psychotherapeutic treatment of schizophrenia. Previous research has found

Communication Deviance (CD), Expressed Emotion (EE), and family cohesion (FC) to

be related to symptom severity. However, the exact nature of the relationship between

these constructs is unclear. The current study tested a model whereby the tone and

content of family member's communication (EE) and the sense of family unity (FC) are

hypothesized to mediate the relationship between CD and psychiatric symptoms. This

model stems from the theory that high CD is likely to be experienced as frustrating

because it hinders relatives' communication goals. Thus, relatives may resort to more

critical and hostile methods of expressing their thoughts (High EE). Simultaneously,

inability to share experiences in a clear manner may lead patients and family members to

feel more disconnected (low FC). High EE and low FC in turn were hypothesized to lead

to increased symptoms. This study did not find support for the above model.

Communication Deviance was not related to severity of psychiatric symptoms, and

Expressed Emotion and family cohesion were also unrelated to communication deviance

and psychiatric symptoms in the larger model. Higher family cohesion was related to

fewer psychiatric symptoms when looking at individual correlations, but this relationship

disappeared once other variables were included in analyses. The largely null study

findings may be due to limited variance in many of our primary study variables (e.g., CD,

family cohesion). Other explanations are also entertained.

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Chapter 1: Introduction

Schizophrenia is considered to be one of the most severe forms of psychiatric

illness with a worldwide prevalence of 1.4 to 4.6 per 1000 (Jablensky, 2000). It is

characterized by significant impairment as the result of disordered thinking, disorganized

behavior, hallucinations, delusions, and negative symptoms such as affective flattening,

poverty of speech, and lack of motivation (American Psychiatric Association, 2000).

There is strong evidence that schizophrenia is a biologically-based disorder, with altered

activity in many parts of the brain including dopamine, GABA, and glutamate systems

(Winterer, 2006). Specific areas of the brain that are particularly implicated include the

prefrontal cortex, anterior cingulated cortex, cerebellum, basal ganglia, and hippocampus

(Fusar-Poli et al., 2007). Research clearly supports a diathesis-stress model of

schizophrenia in which environmental stressors interact with biological factors, triggering

the onset of the illness and a recurrence of symptoms (Nuechterlein & Dawson, 1984;

Walker & Diforio, 1997). The family climate is one type of environmental factor that has

been found to have a significant impact on the course of schizophrenia (Hooley, 2007).

Because both biological and environmental factors impact the illness, many experts argue

that the treatment of choice for schizophrenia would include a combination of medication

and psychotherapeutic intervention, with a strong emphasis on family psychoeducational

interventions (Weisman de Mamani, Dunham, Aldebot, Tuchman, & Wasserman, 2009).

For example, the Schizophrenia Patient Outcomes Research Team (PORT) regularly

reviews a wide range of interventions and periodically releases a list of best practices

treatment recommendations. Research from 20 outcome studies reviewed in the 2004

PORT report indicated that family interventions typically cut relapse rates by a

remarkable fifty percent (Lehman et al., 2004). Based on these and other findings PORT concluded that family interventions for schizophrenia have strong empirical support. Thus, greater research and implementation of family based approaches are sorely needed.

Brief Description of the Current Study

This dissertation will examine several family variables that have important implications for psychotherapeutic treatment of schizophrenia. One frequently researched measure of the family environment is Expressed Emotion (EE), defined as hostile, critical, or emotionally overinvolved attitudes expressed by a person towards an ill family member (Hooley & Parker, 2006). Expressed Emotion is one of the most consistent predictors of relapse for schizophrenia (Hooley, 2007). Another family variable, Communication Deviance (CD), has been studied over the last 4 decades and has been linked to both the onset and course of the illness (Goldstein, 1985; Docherty, Gordinier, Hall, & Cutting, 1999). CD can be defined as lack of clarity in communication resulting in difficulty sharing a common focus of discussion with an ill relative (Singer & Wynne, 1966). There is evidence that EE and CD are related to each other, and that the combination of both can be particularly detrimental (Kymalainen & Weisman de Mamani, 2008). Although not studied as frequently in schizophrenia as EE and CD, family cohesion is yet another measure of the family environment that has been linked to severity of schizophrenia symptoms (Weisman, Rosales, Kymalainen, & Armesto, 2005). Family cohesion can be defined as one's perception of their family as supportive, cooperative, and interconnected (Harris & Molock, 2000). Surprisingly, no published studies have examined the relationship between family cohesion and

communication deviance, despite the intuitive link between the ability to share experiences coherently and the sense of connectedness in the family.

Although each of these variables have been examined in the context of schizophrenia, it is not clear how they fit together to form a comprehensive model of the impact of family variables on the presentation of this illness. For example, does clarity of communication in and of itself directly impact psychiatric symptoms? Or do the stress, frustration, and disruption of familial relationships, resulting from communication deviance, provide the more direct link between CD and symptoms? To help clarify this question, the current study proposes to test a model whereby the tone and content of family member's communication (EE) and the sense of family unity are expected to mediate the relationship between communication clarity (CD) and psychiatric symptoms.

The above hypothesis stems from the idea that difficulty communicating clearly (high CD) can result in great misunderstandings and frustrations, causing relatives to feel more critical and hostile (High EE). Additionally, inability to share a focus of attention (high CD) may cause patients (and family members) to feel less unified with their relatives (low family cohesion). Strongly in line with prior research, High EE and low family cohesion are in turn hypothesized to lead to poorer psychiatric functioning in patients (Kymalainen & Weisman de Mamani, 2008).

Clarification of the relationship between CD, EE, family cohesion, and symptoms is necessary for multiple reasons. First, a better grasp of mediators of symptom severity would allow us to better predict the prognosis of the disorder. Perhaps most importantly, however, understanding how family variables interact to impact psychiatric symptoms could inform the development of more effective interventions for schizophrenia. For

example, if we find that communication deviance is fully mediated by EE and family cohesion, it may be recommended to focus more attention on the remediation of these mediators rather than trying to change CD.

In addition to examining the above model, this study will also assess whether there are ethnic and cultural differences in the relationship between EE, CD, family cohesion, and psychiatric symptoms. Cultural research with schizophrenia is important when considering how the environment impacts the course of this illness, as patients from more "traditional" or "collectivistic" cultures (e.g., Nigeria, India, Columbia) have less severe symptoms and fewer psychiatric relapses as compared to patients from more industrialized and individualistic societies (e.g., Denmark, United Kingdom, United States) (World Health Organization, 1992). This body of research is controversial though, as some studies have discovered mixed findings when comparing outcome across cultures. For example, one review of 23 longitudinal studies found that outcomes were better in some "developing" countries, but were worse in others, and that outcomes varied based on a host of characteristics within each culture (Cohen, Patel, Thara, & Gureje, 2008). The authors of this review called for closer examination of the role of family functioning in the differential outcomes of patients with schizophrenia, to better understand the nuances involved in these family relationships rather than making broad generalizations (Cohen, Patel, Thara, & Gureje, 2008). Studies examining ethnic differences in symptoms within the United Stated have also found some mixed findings. For example, Brekke and Barrio (1997) found that Anglos had overall more severe symptoms than African-Americans. Latinos had symptoms that fell between the two groups, though did not significantly differ from either. Barrio and colleagues (2003) did

not find any differences in overall symptom severity between Anglos, African-Americans, and Latinos. Strakowsi and colleagues (1996) found that African-Americans had more severe symptoms than Anglos. Thus, ethnic differences in symptom severity is obviously a complex topic that does not provide clear-cut, consistent results. Thus, one of the aims of the current study is to further evaluate possible cultural variables that may help bring further understanding to more generalized findings.

In addition to understanding how culture impacts the etiology of symptoms, it is also important to identify cultural differences so treatments can be better tailored for the needs of the client (Weisman de Mamani et al., 2009). For example, if we find that EE is a mediator for Hispanic families, but not African-American families, it would indicate that EE may be important to target in therapy with Hispanic clients, but not with African-American clients. Additionally, individualism/ collectivism will be examined as a mediator of ethnic differences to see if this value accounts for cultural findings. The variables of interest and further justification for this study are described in more detail below.

Psychiatric Symptoms

Schizophrenia is characterized by three major clusters of symptoms: classic positive symptoms such as hallucinations and delusions, negative symptoms such as avolition and flat affect, and disorganized symptoms such as bizarre behavior and thought disorder (Beck, Rector, Stolar, & Grant, 2009; Grube, Bilder, & Goldman, 1998). Schizophrenia is an episodic illness in that symptoms tend to be recurring and remit, and these exacerbations can be triggered by environmental factors such as stress. Thus, severity of psychiatric symptoms is typically the primary method of measuring outcome

and functioning in schizophrenia research (Tandon, Nasrallah, & Keshavan, 2009).

Overall symptom level is important not just as an outcome in and of itself, but also

because it is related to a host of other outcome measures for individuals with

schizophrenia. For example, one meta-analysis (Eack & Newhill, 2007) found that

overall symptomatology was negatively related to quality of life (weaker negative

relationships were found when just looking at quality of life and positive symptoms or

negative symptoms). As overall psychiatric symptoms are susceptible to environmental

stressors and are a primary measure of functioning in schizophrenia research, a total

measure of psychiatric symptoms will be the outcome variable used in this study.

Communication Deviance

Communication deviance (CD) can be defined as lack of clarity in

communication resulting in difficulty sharing a common focus of discussion with an ill

relative (Singer & Wynne, 1966). Miklowitz and Stackman (1992) further define CD as

"an unusual way of perceiving, talking about, and reasoning about the world… It is both

a perceptual-cognitive disturbance and a disturbance in linguistic-verbal reasoning"

(p.36). CD can be measured in many different ways. Traditionally, it was coded using

speech samples from projective tests such as the Thematic Apperception Test (TAT) and

the Rorschach (Singer & Wynne, 1966). CD can also be rated from family interaction

tasks (e.g., Lewis, Rodnick, & Goldstein, 1981). More recently methods have been

developed to measure CD from standardized interviews more commonly used in

schizophrenia family research, such as the Camberwell Family Interview and the Five

Minute Speech Sample (Kymalainen, Weisman, Rosales, & Armesto, 2006). CD is

coded by identifying specific types of deviant communication. Examples of

communication deviance include usage of odd words, incomplete ideas, contradictions of previous statements, tangentiality, unintelligible comments, and unclear references (Kymalainen et al., 2006). For methods involving visual stimuli (Rorschach, TAT), additional codes are used based on difficulties with perceptions of visual material (e.g., speaker appears unsure of what they are looking at and are unable to describe it consistently) (Singer & Wynne, 1966). To help illustrate, here are some examples of communication deviance as coded in previous studies:

1. "I woulda I, I, I work now, I couldn't work before, I had to be here all the time. She did graduate from Lawrence High School last year. And she isn't, she tried going to college at Northern Essex community college." CD codes given: reiteration, abandoned, abruptly ceased, uncorrected remarks (Kymalainen et al., 2006).

2. "He used to walk with me and ummm I don't know, he had athletic feet or something and when it got bacterial he didn't want to go back walking anymore." CD code given: odd word usage (Kymalainen et al., 2006).

3. "What I wish for the most is that he recover, and that he doesn't have another relapse, and that he doesn't have another relapse like the one he just had because when he relapses, he was in the hospital for one month and it hurt me much that relapse that he had, because even I got a little sick over seeing how he relapsed and was in the hospital." CD code given: reiteration of words/phrases (Kymalainen et al., 2006).

4. "Being sick is, it's not bad. You can do *things* and plus you can make people afraid of you." CD code given: vague references (Docherty et al., 1999).

5. "I was trying to *predict* them people that I need, I need to get out of there."

    CD code given: Wrong word reference (Docherty et al., 1999).

Communication Deviance is relevant to the study of schizophrenia as it has been linked to both the onset and course of the disorder. For example, CD in family members rated at the time of adolescence predicts presence of schizophrenia-spectrum disorders five and 15 years later (Doane, West, Goldstein, Rodnick, & Jones, 1981; Goldstein, 1985). There is not a general consensus on what explains the link between CD and later diagnosis, though a review of the literature below seems to indicate CD acts as both a psychosocial stressor as well as a possible genetic indicator of a larger vulnerability to schizophrenia.

Beyond predicting the onset of the illness, CD has also been linked to poorer outcome and more severe symptoms in schizophrenia, particularly in the domain of cognitive functioning, disorganization, and thought disorder (Miklowitz & Stackman, 1992).   For example, one study found that patients with severe formal thought disorder had parents with higher CD than patients with more constricted forms of thinking (Sass, Gunderson, Singer, & Wynne, 1984). Other studies have found a relationship between CD and more global indices of psychiatric functioning. In a cross-sectional study, Docherty and colleagues (1999) found a positive relationship between parents' CD and patients' overall psychiatric symptoms as measured by the Brief Psychiatric Rating Scale (BPRS). Rund, Øie, Borchgrevink, and Fjell (1995) found a relationship between parental CD and treatment outcome in terms of higher CD predicting less change for Global Assessment Scale scores over the course of a psychoeducational treatment. Another study found similar results with children with schizophrenia, in which higher

parents' CD was related to severity of impairment using the Children's Global Adjustment Scale as well as poorer attentional functioning (Asarnow, Goldstein, & Ben-Meir, 1988). Velligan and colleagues (1996) found that parental CD measured at time of discharge predicted psychiatric relapse (defined as a marked increase in BPRS scores) during a 1 year follow-up period. Interestingly, patients' own levels of CD did not predict relapse in this study, thus contributing to the hypothesis that it is the family members' CD that is uniquely influencing psychiatric symptoms, rather than parental CD being a simple correlate of increased CD in patients.

Several studies have found that parents of patients with schizophrenia have higher levels of CD than parents of other groups. For example, Docherty (1995b) found that parents of patients with schizophrenia had higher instances of unclear references (a subtype of CD) than parents without mentally-ill offspring. Docherty, Hall, and Gordinier (1998) also found that communication disturbances were higher in parents of patients with schizophrenia than control participants. There is some evidence that other family members, such as siblings, also have elevated levels of CD compared to control participants (Docherty, Gordinier, Hall, & Dombrowski, 2004). Communication deviance is not specific to schizophrenia, however. Elevated rates of CD have also been found in the parents of an offspring with a variety of mental illnesses and learning disabilities (Ditton, Green, & Singer, 1987; Miklowitz et al., 1991; Miklowitz & Stackman, 1992). However, rates of CD are higher in parents of individuals with schizophrenia when compared to other groups, and levels of CD seem to be higher in more severe psychiatric illnesses (Miklowitz & Stackman, 1992; Asarnow et al., 1988).

Additionally, people with schizophrenia are more likely than other groups to have two parents with high CD (Miklowitz & Stackman, 1992).

Although CD has been found to predict later emergence of schizophrenia across multiple studies, as well as more severe symptoms or higher relapse rates, it is unclear what exactly accounts for this association. Miklowitz and Stackman (1992) reviewed evidence for and against the following four models regarding the link between parental CD and psychopathology in offspring: (1) CD serves as a psychosocial stressor that triggers the onset of the disorder, (2) parental CD is a reaction to having an offspring with schizophrenia, (3) CD and development of schizophrenia are linked by way of a shared vulnerability indicator (either psychosocial or genetic risk factor), and (4) CD may be a genetic indicator giving signs to a larger heritability of schizophrenia-spectrum symptoms. Miklowitz and Stackman (1992) concluded that there was evidence for CD as a psychosocial stressor, as well as evidence for CD as sign of a shared vulnerability. The authors did not find sufficient evidence for CD to be a reaction to psychopathology of the offspring, or CD to be a measure of overall psychopathology in the parent. A look at the updated literature below reveals a similar picture in which some aspects of CD appear to be signs of a genetic vulnerability, but other aspects may serve more as a psychosocial stressor.

In regard to the genetics model of communication deviance, CD does show some genetic link to schizophrenia. For example, CD is associated with a family history of schizophrenia spectrum disorders (though not schizophrenia disorders in the actual parent) (Subotnik, Goldstein, Neuchterlein, Woo, & Mitz, 2002). Some researchers have wondered if CD is actually a proxy measure for parental psychopathology (Miklowitz &

Stackman, 1992). Evidence exists that CD is not indicative of formal parental psychopathology, as measured by the existence of a current or past diagnosis or by current and past levels of functioning as measured by the Global Assessment Scale (Goldstein, Talovic, & Nuechterlein, 1992). Another study compared levels of CD and schizotypy in controls and parents of patients with schizophrenia. This study found that parents of the patients had higher levels of CD, but not higher levels of schizotypy, than the controls (Docherty, 1993). Thus, although CD may be linked to a genetic vulnerability for schizophrenia, and may in itself be a low level of psychopathology, it does not appear to be a proxy measure of present formal psychopathology in the parent. In other words, parents of individuals with schizophrenia do not have high levels of CD because they have schizophrenia themselves, but they may have high CD in part as a genetic marker of a vulnerability to schizophrenia. In fact, some subtypes of CD (Misperceptions, Closure Problems) do relate to other vulnerability markers for schizophrenia (poor performance on tasks measuring specific attentional, perceptual, and information processing). Additionally, although CD is proposed to be a subclinical version of thought disorder in relatives of people with schizophrenia due to genetic factors, one study found that parents of patients with schizophrenia did not demonstrate higher levels of actual thought disorder than control parents (Docherty, 1995b). Thus, although CD may contribute to the development of thought disorder in offspring, CD does not indicate actual formal thought disorder in and of itself. This conclusion is further supported by the fact that CD is not higher in actual patients with schizophrenia than in their parents or siblings, even though the patients do have higher incidences of formal thought disorder (Docherty et al., 1999; Docherty, 1995b; Docherty et al., 2004).

In support of a model depicting CD as a psychosocial stressor, there is evidence that the link between CD and psychiatric diagnosis goes beyond a genetic association. Unfortunately, most studies are unable to fully differentiate whether CD impacts schizophrenia through genetics or through the environment because the studies are confounded by the fact that most patients are raised by their biological parents. A series of results from The Finnish Adoptive Study of Schizophrenia helps to elucidate the nature versus nurture question of CD. This longitudinal study follows adoptees, some of whom have biological parents with schizophrenia. Participants are categorized as having high versus low genetic risk, and the level of communication deviance of the adoptive parents was also measured. In this way, this series of studies is able to partial out how much genetics versus CD versus the interaction of the two impacts the development of a later psychiatric illness. Results across published findings indicate that it is the interaction of CD and genetic vulnerability that best predicts presence of a psychiatric illness over the course of a 21 year follow-up. In other words, level of CD does predict whether a genetically vulnerable adoptive offspring develops a psychiatric illness, however, it does not seem to have predictive power for those without an existing genetic vulnerability. Because the parents with CD in this study were not biologically related to the children, the fact that CD was still predictive of later illness indicates that CD likely has an effect beyond being a genetic marker. CD was present at equal frequency for adoptive parents of children with low and high genetic risk, so these findings do not appear to be an artifact of high-CD families tending to adopt genetically vulnerable children (Tienari et al., 2004; Wahlberg et al., 2004). Additionally, because this study measured CD before the onset of any disorder, results suggest that CD precedes the

illness rather than being a reaction to an overtly ill offspring. Using a more specific

outcome, Wahlberg and his colleagues in 1997 found that communication deviance in

adoptive parents predicted greater thought disorder in adoptive offspring. In this study,

genetics alone and CD alone did not predict thought disorder, however the interaction of

the two was a significant predictor. So, once again, it appears that the combination of

genetic vulnerability and CD in the environment may be more important than either

factor alone.

Miklowitz and Stackman (1992) delineate two subtypes of CD: perceptual-

cognitive subtypes (misperceptions, failure to integrate, closure problems) and linguistic-

reasoning subtypes (fragmented sentences, unintelligible phrases). Miklowitz and

Stackman (1992) propose that the perceptual-cognitive subtypes act as indicators of

genetic vulnerability, versus the linguistic-reasoning subtypes are more psychosocial in

nature. Similarly, Wahlberg and colleagues (2000) found that certain types of thought

disorder may have genetic underpinnings, whereas other types may be related to

environmental factors. In this study, a subtype of thought disorder called Idiosyncratic

Verbalizations was related to both adoptive parents' CD (environment) and having a

biological relative with psychosis (genetics). Conversely, a subtype of thought disorder

called Fluid Thinking was only related to genetic vulnerability. Some researchers have

compared the relationship between CD subtypes and specific neurocognitive abilities.

For example, one study examined attentional deficits and found that the CD code

"misperceptions" was related to poor performance on a continuous performance

attentional test with visual stimuli. The CD code of odd language was associated with

poor attentional performance on an audio task. Finally, CD codes representing difficulty

with higher level cognitive processes (abstraction, integration of TAT elements to make a story) were related to selective attention/executive control (Velligan, Mahurin, Echert, Hazleton, & Miller, 1997).   These findings are similar to Miklowitz and Stackman's (1992) conclusion that some aspects of CD and thought disorder are more genetically-bound, and that more linguistically-based types have an environmental component. However, the subtypes of CD have not been examined in relation to outcome or family environment variables. Further clarification of the impact of CD subtypes is needed. This study will set the stage for such future research by first examining the relationships between total CD with the following study variables: family cohesion, EE, and psychiatric symptoms. Each of these variables is described in more detail below.

There are two ways in which CD is hypothesized to impact the development of schizophrenia. First, CD likely contributes to stress in the family environment by interfering with the family's ability to communicate and manage problems together effectively (Velligan et al., 1996), and stress is known to trigger the onset and recurrence of symptoms (Corcoran et al., 2003). Second, family members with CD are not likely to model appropriate logical thought processes which interferes with learning, information processing, and thinking (Wahlberg et al., 2000). Both of these models assume CD acts as a long-term influence, and they are not mutually exclusive. There is evidence for both of these hypotheses. For example, for genetically vulnerable children, CD in mothers is related to reduced psychosocial competence as measured by teachers, peers, and parents (Doane et al., 1982). CD has been hypothesized to be a psychosocial stressor that impedes an at-risk child's development of attention and logical thought processes as well. High scores of CD in parents have been linked to poor performance on attention and

information processing tasks in their offspring with schizophrenia (Miklowitz, 1994).

Although these studies show a link between CD and specific deficits, it is still unclear if

exposure to CD contributes to poor attention, processing, and social competence or if

both CD and the specific deficits are indicators of a genetic neurocognitive disturbance.

 To help answer this question, one experimental study randomly assigned

adolescents with learning disabilities to listen to instructions that were rated as high or

low communication clarity (a simulation of communication deviance). Adolescents

exposed to unclear communication used less efficient cognitive strategies and had poorer

performance (Shields, Green, Cooper, & Ditton, 1995). Although this study was not with

individuals with schizophrenia, these results do suggest that CD can act as an

environmental factor that impacts cognitive functioning.

 Waxler (1974) conducted a similar study with individuals with schizophrenia and

their parents as well as parents and offspring with no psychiatric illness. Waxler (1974)

was interested in whether type of parent (i.e., parent of offspring with schizophrenia

versus parents of offspring without schizophrenia) impacted the performance of the

offspring on cognitive tasks. She was also interested in the impact of the offspring (those

with versus without schizophrenia) on parent performance on cognitive tasks. This

question is of interest as some researchers have postulated that communication deviance

may be a response to having a disturbed child, rather than a unidirectional relationship

contributing to the presence and severity of the illness. The study created artificial family

groupings consisting of two parents and an offspring and had the trio complete a task

designed to measure abstract problem solving. All participants completed the task

individually before and after the group task. Waxler (1974) compared the individual

performances to determine if the different artificial family pairings impacted cognitive performance. The results showed that the parents of people with schizophrenia had little effect on the performance of the "healthy" offspring and an offspring with schizophrenia had little effect on the performance of "healthy" parents. However, "healthy" parents seemed to have a protective effect on offspring with schizophrenia in that when the participants with schizophrenia were randomly assigned to "healthy" parents, their performance became similar to those of "healthy" offspring. In fact, these individuals began with a deficit in their cognitive performance but improved after interacting with the "healthy" parents. Although Waxler (1974) did not measure communication deviance directly, it can be proposed that the way in which the parents were communicating (e.g., clearly, unclearly) as well as their ability to collaborate with the offspring on the problem-solving task (e.g., being able to share a focus of attention) may have accounted for these findings.

Thus, based on findings with adoption studies, as well as indirect evidence from experimental studies, it appears that CD likely has an impact on psychiatric outcome beyond a mere genetic link. One method through which CD may impact functioning could be through miscommunication, stress, and dysfunction in the general family environment. For example, Docherty (1993) found that parents high in CD did not seem to be aware of their communication deviances, as CD did not relate to self-rated odd communication components on a schizotypy scale. Docherty commented anecdotally that participants high in CD appeared to assume that others understood what they were trying to say and were unaware that their communication was actually unclear. Docherty continued to hypothesize that this observation was indicative of a larger deficit in social

skills, particularly in being able to take the perspective of others. These observations support the hypothesis that CD contributes to the stress within the family, as perhaps it is not only difficult to communicate and solve problems together as a family, but family members may not even be aware of the factors contributing to this difficulty.

High levels of CD are related to other family variables as well. A variety of studies, reviewed by Miklowitz and Stackman (1992), found relationships between CD and the following: less acknowledgment of the perceptions of other family members, avoidance of sharing emotions, less eye contact, rigid facial expression, and overall levels of marital and family distress. For example, Lewis and colleagues (1981) had families (parents and an offspring with schizophrenia) complete an interaction task in which they were required to speak about a specific topic and also talk about their feelings with each other. The researchers found that families rated as high CD were more likely to lose focus of the conversation when discussing the specific topic as well as when expressing emotions. Specifically, high CD families were more likely to avoid or only indirectly express emotions, although researchers noted these families appeared to be tense and uneasy. This includes both expressing their own feelings as well as asking about the feelings of others. This study also found that parents rated as High CD avoided eye contact more frequently and had rigid facial expressions. Families rated as Low CD seemed to be more relaxed and open with communication.

Studies have also found a relationship between CD and family variables outside of schizophrenia. For example, Herman and Jones (1976) examined the relationship between communication deviance and interpersonal acknowledgement, defined as one person responding to the other directly or in a relevant manner, thus acknowledging the

person's experiences. The sample included families, with adolescent children, who were seeking help at a community clinic for problems related to the child. The researchers found that families rated as High CD, compared to those rated as low CD, made more non-acknowledging responses (e.g., ignoring the responses of the other person) and less acknowledging responses (e.g., showing interest in understanding the other person's perspective) in an interactive Rorschach task. Velligan, Christensen, Goldstein, and Morgolin (1988) similarly found that families high in CD had higher overall family distress and engaged in maladaptive alliances between certain family members. Despite the above results, which establish a relationship between CD and multiple measures of family relationships and behaviors, scant research has examined the role that family variables play in the relationship between CD and psychiatric symptoms. It is the purpose of this study to assess whether two specific measures of the family environment, Expressed Emotion and family cohesion, may mediate the relationship between CD and schizophrenia symptoms.

Cultural Findings with CD

As noted previously, cultural factors appear to influence the course of schizophrenia and findings from this line of research have important implications for treatment approaches (Weisman de Mamani et al., 2009). Studies looking at cultural differences in CD have found interesting, and sometimes conflicting, results. Kymalainen et al. (2006) found that Whites and African-Americans had higher levels of CD (and EE) than Latinos. Interestingly, no differences were found between Whites and African Americans. Conversely, another study found no differences in CD levels between Mexican-American and Anglo-American parents (Doane et al., 1989).

Participants were able to speak in English or Spanish in both of these studies, so findings

are not an artifact of having to speak in a non-native language in one study and not the

other. It should be noted that the study conducted by Doane and colleagues (1989)

carefully matched Mexican-American and Anglo-American patients based on the history

of their illnesses. It could be that baseline levels of CD are lower in Hispanic/Latino

families, but that matching groups based on severity of illness (which, as discussed

above, may be less severe for Hispanic patients) may result in a non-representative

sample of Hispanic patients, and thus washes out any differences in CD that may be

found between ethnicities. Additionally, it is unclear if the samples of these two studies

were similar or different in other cultural variables, such as individualism/collectivism.

The different findings between studies may also be due to different methods of measuring

CD. Doane and colleagues (1989) measured CD using the Thematic Apperception Test

(TAT), while Kymalainen et al. (2006) measured CD using the Five Minute Speech

Sample (FMSS). The primary difference between these two methods is the TAT includes

codes based on telling a story using visual stimuli (e.g., misperceptions, integration of

elements), versus the FMSS relies on purely linguistic codes from a sample of speech in

which the family member speaks about the patient (e.g., unintelligible remarks). As

mentioned above, Miklowitz and Stackman (1992) proposed that the first type of CD

codes may be indicators of genetic vulnerability, while the more linguistically-based

codes may be more environmentally transmitted. Thus, we would expect the more

genetically-linked codes to be more consistent across groups, while the environmentally-

linked codes may be more free to vary. The conflicting findings between Doane et al.

(1989) and Kymalainen et al. (2006) might be due to difference in CD measures. The

current study will attempt to replicate Kymalainen et al.'s (2006) findings using the

FMSS. The study will also aim to elucidate cultural values (i.e., individualism/

interdependence) that may mediate this relationship.

It is a well-known phenomenon that individuals from more traditional cultures

tend to have a more interdependent or collectivistic view of themselves as they relate to

their family members, when compared to their mainstream U.S. counterparts (Weisman

et al., 2005; Markus & Kitayama, 1991; Weisman de Mamani et al., 2009). Collectivism

refers to a value in which groups place greater importance on the good of the group rather

than the goals of the individual (Oyserman, Coon, & Kemmelmeier, 2002). Individuals

with strong collectivistic attitudes often have personality traits that are more

interpersonally focused, such as warmth, are more responsive to others' needs, and often

have less conflict and are instead more cooperative and harmonious (Oetzel, 1998;

Oyserman et al., 2002). Weisman de Mamani and colleagues (2007) found a strong trend

for Hispanic family members of an individual with schizophrenia to identify stronger

interdependent values than Anglo American family members. In a meta-analysis of 50

cross-cultural studies, Oyserman and colleagues (2002) found that, in most cases,

Americans are higher in individualism and lower in collectivism than people in other

countries. Looking at variations within the U.S., Oyserman and colleagues (2002) found

that overall Anglo-Americans (referred to as "European-Americans") were higher in

independence and lower in collectivism than others, when other ethnic groups were

pooled together. When looking at specific differences, Hispanics were more

collectivistic than Anglo Americans (no differences were found in independence).

However, African-Americans were higher in independence than Anglo-Americans, and

no difference was found on collectivism. However, at least one study looking at within-U.S. variations found that African-Americans endorsed more collectivistic attitudes than Anglo-Americans, but interestingly, African-Americans also endorsed the highest levels of individualism (Coon & Kemmelmeier, 2001). Thus, these two dimensions do not appear to be exclusive, as African-Americans may both be highly loyal to their community but also value self-reliance.

Since Hispanic cultures appear to emphasize maintaining harmony within a group more so than Anglo cultures, it seems reasonable to expect Hispanic family members to focus more on communicating clearly and patiently with ill family members. Additionally, as mentioned previously, Docherty (1993) hypothesized that individuals high in CD may have difficulty taking the perspective of others. Being in tune with other group members and thinking about the perspective of others (rather than relying only on one's own perspective) may be a skill that individuals high in collectivism develop more acutely. Over time, this skill may increase clarity of communication and thus decrease CD. There is some evidence to support this claim. One study had Chinese and American pairs complete a communication task that required the participants to take the perspective of others. The researchers found that the Chinese participants, relative to American participants, were more skilled at taking the perspective of others (Wu & Keysar, 2007). Another study found that in a sample of American college students, collectivism was positively related to more empathic dispositions. This may suggest that individuals from collectivistic societies have lower levels of CD because of a cultural characteristic that enhances communication skills and increases the ability to relate to others empathically. In the current study it is hypothesized that individualism/collectivism may explain part of

the relationship between ethnicity and CD. Additionally, as mentioned above, individuals from more collectivistic societies have less severe symptoms. If we do find that CD levels vary by ethnicity, it is logical to wonder whether CD can help explain the relationship between ethnicity and psychiatric symptoms. Thus, CD will be examined as a mediator between ethnicity and symptoms.

In conclusion, family member CD appears to be an important variable in contributing to the onset and severity of schizophrenia. Research reviewed above indicates that it may act as both a genetic marker and an environmental stressor (both in terms of creating stress in the family as well as impacting ability to think logically). It is hypothesized that the link between CD and psychiatric symptoms may be partially explained by the stressful family environment it creates as the result of unclear communication. Thus, EE and Family Cohesion are proposed to partially mediate the relationship between CD and psychiatric symptoms.

Based on cultural differences found in the course of schizophrenia, as well as possible ethnic differences in communication deviance, several cultural hypotheses will also be tested. First, ethnic differences in CD will be examined. If differences are found, individualism/collectivism will be examined as a mediator of the relationship between ethnicity and CD. Finally, if ethnic differences are found in the level of psychiatric symptoms, CD will be examined as a mediator of the relationship between ethnicity and symptoms.

Expressed Emotion

This study will examine whether Expressed Emotion (EE) is a mediator between the expected relationship of CD and psychiatric functioning. EE can be defined as a

measure of hostile, critical, or emotionally overinvolved attitudes expressed by a person

towards an ill family member (Hooley, 2007). Unlike CD, EE has not shown an

association with a family history of schizophrenia spectrum disorders (Subotnik et al.,

2002). Instead, High EE has been consistently found to predict psychiatric relapse rates

in 40 countries across the world (Butzlaff & Hooley, 1998; Hooley, 2007). More

specifically, patients discharged to homes with High EE relatives demonstrate a median

relapse rate of 48% compared to the 21% rate found with patients living with Low EE

relatives over a 9 to 12 month period (Kavanagh, 1992). Furthermore, these findings are

not due to differences in baseline severity of symptoms or premorbid functioning

(Brown, Birley, & Wing, 1972; Hooley, 2007). Additionally, changes in EE status have

been found to relate to changes in functioning, as Rund and colleagues (1995) found that

families who changed from High EE status to Low EE status during a treatment program

also had patients whose Global Assessment Scale scores improved. Aside from

predicting relapse, EE has also been shown to relate to more severe symptoms at the

same time point. For example, Vidal and colleagues (2008) found that High EE was

related to more positive symptoms. Glynn and colleagues (1990) found similar results

using cross-sectional data, in that High-EE was related to higher positive symptoms,

anxious depression, and overall level of symptoms. As mentioned above, EE does not

seem to be related to baseline symptoms during the first hospitalization of a patient's

illness. However, based on the results of Vidal et al. (2008) and Glynn et al. (1990),

which were with patients who had been hospitalized multiple times, it appears that EE is

related to more positive symptoms and depression/anxiety for the same time point.

To explain the connection between EE and poor outcome, Hooley and Gotlib (2000) propose a model in which interactions with High EE relatives are stressful for the patient. This experience of stress triggers a release of cortisol, and the cortisol then stimulates dopaminergic and glutamatergic neurotransmitter systems, which then contribute to psychiatric relapse. Similarly, they propose that Low EE environments may soothe patients and suppress the activation of the hypothalamic-pituitary-adrenal (HPA) axis, which is a primary component of the physiological stress response and is thought to be the basis for a neural diathesis-stress model of schizophrenia (Walker & Diforio, 1997).

In support of the above model, patients with High EE relatives report feeling more stressed and anxious when interacting with their relatives. Patients' sensitivity to criticism is related to their reports of stress, which supports the idea that it is High EE that is causing stress for the patient rather than an unknown third variable (Cutting, Aakre, & Docherty, 2006). Additionally, research has shown that patients demonstrate a physiological stress reaction to High EE, such as skin-conductance levels, which can make patients more vulnerable to relapse (Sturgeon, Turpin, Kuipers, Berkowitz, & Leff, 1984). One study actually found a temporal relationship between stressful statements made by relatives (e.g., criticism, guilt induction, and intrusiveness), and increase in cardiovascular activity by patients with schizophrenia and bipolar disorder (Altorfer, Käsermann, & Hirsbrunner, 1998). Beyond an increase in stress, patients interacting with High EE-Critical relatives also seem to justify and deny responsibility for actions, which may lead to less active care of psychiatric needs (Hahlweg et al., 1989).

Rather than solely an absence of High EE, Low EE may actually serve as a protective factor. For example, Hahlweg and colleagues (1989) found that Low EE relatives did not only have a lower rate of negative attitudes and characteristics, but that they also had higher rates of supportive and positive statements. As mentioned previously, patients exposed to High EE relatives show an increase in physiological stress reactions. Some research shows that patients exposed to their Low EE relatives actually show a calming effect, with a decrease in physiological measures such as diastolic blood pressure and skin conductance (Tarrier, Vaughn, Lader, & Leff, 1979; Tarrier, Barrowclough, Porceddu, & Watts, 1988). One study looking at the personality characteristics of relatives of patients with schizophrenia found that Low EE relatives are also more flexible, tolerant, and empathic than High EE relatives (Hooley & Hiller, 2000). Thus, Low EE is not just the absence of negative attitudes or absence of stress, but may actually be indicative of a truly positive environment.

Cultural Findings with EE

Expressed Emotion has been of particular interest in cross-cultural research, as some studies have shown that families from more traditional societies (e.g., Spain and India) have lower rates of High EE attitudes than those from more individualistic societies (e.g., United States and England) (Kavanagh, 1992; Karno et al., 1987). Within the U.S., multiple studies have found that Whites have much higher rates of High EE than Latinos/ Hispanics (Weisman de Mamani et al., 2007; Kopelowicz et al., 2002, López et al., 2009). Kymalainen et al. (2006) found that Whites and African-Americans had higher rates of High EE (and CD) than Latinos. Differences were found using both the Camberwell Family Interview (CFI) as well as the Five Minute Speech Sample (FMSS).

This relationship appears to be particularly true for the critical and hostile indices, more so than EOI or warmth (López et al., 2009). Kopelowicz and colleagues (2002) concluded that this ethnic difference does not appear to be due to social desirability, as an independently coded speech sample measure of EE (FMSS) did not differ from patients' or relatives' measures of perceived criticism or hostility. Weisman, Rosales, Kymalainen, and Armesto (2006) also found that perceptions of relatives' criticism were concordant with level of criticisms coded from a speech sample for Whites and Latinos. Interestingly, there was no relationship between perceptions of criticism and codings of expressed criticism for African-Americans. The authors suggest that behaviors that are typically considered critical by traditional methods of rating EE may not be seen as negative behaviors by African-American patients, who may experience interactions with heightened emotion as a sign of caring and engagement, rather than as stressful and critical. With these findings in mind, it should not be surprising that EE is not as consistent of a predictor of relapse for African-Americans than for Whites. For example, Rosenfarb, Bellack, and Aziz (2006) found that for Whites, the expected association occurred in that low criticism and intrusive behaviors was predictive of better outcomes. Conversely, *higher* levels of criticism and intrusive behaviors were associated with better outcomes for African-Americans. Once again, the authors hypothesized that behaviors typically rated as critical and intrusive may not be experienced as such by African-American patients. Consistent with the above findings, Tompson et al. (1995) found that perceptions of criticism and ratings of criticism were consistent for Whites but not for African-Americans. However, for the African-American patients, *perceptions* of criticism were important and were a better predictor of relapse than ratings of EE. Thus,

it appears that criticism is still predictive of worsening of symptoms for this ethnic group, but it may be the experience of criticism rather than an outsider's view of criticism that is important.

There is conflicting evidence for the predictive utility of EE for Latinos, as some studies have found that High EE predicts psychiatric relapse, and others have not. For example, Karno and colleagues (1987) found that High EE did predict relapse (even better than medication adherence) for a relatively unacculturated sample with Mexican-American samples. Kopelowicz and colleagues (2006) also found that high-EE predicted relapse with a sample of Mexican-Americans. However, Kopelowicz and colleagues (2002) found that while High EE was a strong predictor of relapse for Anglos, it did not predict relapse for Mexican-Americans. López and colleagues (2004) reanalyzed the data from the Karno et al. (1987) study with Mexican-Americans and a study by Vaughn, Sorensen Snyder, Jones, Freeman, and Falloon (1984) which found a relationship between EE and relapse for Anglo-Americans. López and colleagues (2004) found that criticism was the main factor predicting relapse for Anglo-Americans, but not for Mexican-Americans. Instead, lack of warmth predicted relapse for Mexican-Americans, but not Anglo-Americans. Kopelowicz and colleagues (2002) used a measure of EE that did not include a measure of warmth, which may account for why they did not find a relationship between EE and relapse. Based on this group of results, it appears that different aspects of expressed emotion are important for different ethnicities. For Anglo-Americans, levels of criticism seem to be the most important predictor of relapse. For Hispanic-Americans, warmth is an important predictor of relapse. For African-Americans, it is unknown if warmth is important, but *perceptions* of criticism are an

important predictor of relapse. Based on the above findings, the current study will utilize four measures of EE constructs: overall rating of EE from the FMSS, total criticisms as rated from the FMSS, a measure of perceptions of criticism, and a measure of perceptions of family member warmth.

In the current study we will examine if the relationship between CD and psychiatric symptoms is partially mediated by EE and constructs related to EE (perceived warmth and criticism). Additionally, ethnic differences in the relationship between EE constructs and psychiatric symptoms will be examined. In replication of previous studies discussed above, it is expected that overall EE status will be a significant predictor of symptoms for Whites and Hispanics, number of criticisms will be a significant predictor of symptoms for Whites, perceived criticism will be a significant predictor of symptoms for Whites and African Americans, and perceived warmth will be a significant predictor of symptoms for Hispanics. If ethnic differences are detected, findings will be applied to the larger mediation model. Specifically, ethnicity will be examined as a moderator of the EE mediators between CD and psychiatric symptoms.

Family Cohesion

This study will also examine whether family cohesion partially mediates the relationship between CD and psychiatric functioning. Like EE, family cohesion is another measure of the family environment, though it has not been studied as extensively in schizophrenia as EE. Family cohesion can be defined as one's perception of his or her family as supportive, cooperative, and interconnected (Harris & Molock, 2000). Previous research has demonstrated that viewing one's family as cohesive is positively related to mental health (Harris & Molock, 2000; Farrell, Barnes, & Banerjee, 1995; Rivera et al.,

2008), especially for Hispanic and African-American families (Weisman et al., 2005). Family cohesion also has a positive relationship with family functioning (Farrell & Barnes, 1993).

Specific to schizophrenia, Weisman and colleagues (2005) found that family cohesion was related to better general emotional well-being (less depression, anxiety, and stress) for both patients and their family members and fewer psychiatric symptoms for patients. Stronger family cohesion also predicts increased patient adjustment (at both 3 month and 12 month follow-ups), as defined by family member ratings of a host of variables including interpersonal and social domains, depression, substance use, work, household management, and confusion (Spiegel & Wissler, 1986). King and Dixon (1995) found that family cohesion as rated by the father predicted patient functioning in the domain of being a contributing member of the household 9 months later. In this study, mother's ratings of family cohesion did not predict outcome (4 domains of social adjustment). However, this study first controlled for psychiatric symptoms, rather than using symptoms as an outcome measure. Thus, family cohesion was only able to explain one outcome (father's ratings of patient's contribution as a household member) above and beyond the severity of symptoms. It is unclear from this study if there is a relationship between family cohesion and psychiatric symptoms, or if there would be a relationship between family cohesion and other types of outcomes before symptoms were put in the model.

In a study with married male veterans recently released from inpatient hospitalization, Spiegel and Wissler (1983) compared patients (with a wide range of diagnoses, including schizophrenia) who were "high functioning" to those who were

"low functioning," as determined by psychiatric symptoms and community adjustment. The researchers also interviewed the patients' wives. Family cohesion varied by group, as patients and wives from the low functioning group reported lower family cohesion than higher functioning participants.

King and Dixon (1996) found that family cohesion had a positive indirect relationship with social adjustment in several domains (general, household, and external) for patients with schizophrenia. This study also categorized patients based on predominant symptom type (e.g., high proportion of positive compared to negative symptoms), and families with high family cohesion were less likely to have a high positive-symptom profile. Although these families (with high family cohesion) were more likely to have a more negative-symptom profile, this study found that a negative-symptom profile was related to better functioning. Thus, although family cohesion was related to a higher proportion of negative symptoms compared to positive symptoms, this ultimately was a good thing when looking at outcome variables such as social adjustment. Also, the fact that the patients in this group had a lower proportion of positive symptoms may mean that they were in an overall less symptomatic phase of their illness. However, this study only looked at proportion of positive versus negative symptoms, rather than total symptoms, so it is unclear if patients in any one category were overall less symptomatic.

Similarly, in a study conducted in Spain, fathers' ratings of high family cohesion also predicted increased negative symptoms over a 9-month follow-up period (Cañivé et al., 1995). This study used three outcome variables: increase in negative symptoms, rehospitalization, and psychotic relapse (defined by increase in positive symptoms).

Mothers' ratings and patients' ratings of family cohesion did not predict any of the three negative outcomes, and father's ratings only predicted an increase in negative symptoms. Again, total symptoms were not examined, and positive symptoms were only used to create a dichotomous outcome of psychotic relapse or no psychotic relapse. Thus, it is possible, but unknown, if family cohesion could predict a decrease in overall symptoms. The current study will measure total symptoms on a continuous scale to help answer these questions.

Family cohesion also predicts outcome for other disorders commonly comorbid with schizophrenia, such as alcohol dependence (Finney, Moos, & Mewborn, 1980). A study conducted with children found that clinical families (defined as a family with a child with conduct disorder or an emotional disorder) reported lower family cohesion than control families (defined as a family with a child without a suspected disorder). Furthermore, maternal ratings of family cohesion predicted social competence for both children with emotional disorders and children from control families. Maternal ratings of family cohesion at baseline also predicted clinical improvement for children with emotional disorders 9 months later (Vostanis & Nicholls, 1995). Thus, family cohesion appears to be associated with positive clinical outcomes for disorders outside of schizophrenia as well.

Cultural Findings with Family Cohesion

Perceptions of family cohesion may be more important for well-being in minority groups, as people from more traditional cultures tend to have a more interdependent view of themselves as they relate to their family (Weisman et al., 2005; Markus & Kitayama, 1991; Weisman de Mamani et al., 2009). Latino and Hispanic Americans compared to

Anglo-American families emphasize the importance of family involvement in the care of an ill family member, with an emphasis on supporting the ill relative and reducing the amount of expectations or stress while the relative is ill (Weisman, 1997). Thus, the supportive and inter-connectedness of the family (i.e., family cohesion) has been proposed to be one variable that mediates the cross-cultural findings that patients from more traditional societies have a less severe presentation of schizophrenia (World Health Organization, 1992).

As mentioned previously, Weisman and colleagues (2005) found that greater family cohesion was related to lower general emotional distress for patients with schizophrenia. This was true for Anglo-American, Hispanic-American, and African-American patients with schizophrenia. However, for family members, family cohesion only related to general emotional distress for Hispanics and African-Americans, not Anglos (though no base rate differences in family cohesion were found among ethnic groups in this study). In the Weisman et al. (2005) study, family cohesion was also related to fewer psychiatric symptoms in patients and no ethnic interactions were reported. In the current study, we hypothesize that family cohesion will mediate the relationship between CD and psychiatric symptoms for all ethnic groups.

Based on the findings above, family cohesion appears to be important in the study of mental illness, including schizophrenia. Although the relationship between CD and family cohesion has not been examined, it is predicted that family cohesion will act as a mediator of the relationship between CD and symptoms based on the conceptual relationship between these variables. Difficulty sharing a topic of conversation is part of the definition of CD. If family members are having difficulty communicating and

understanding each other's point of view, it appears logical that that family cohesion will suffer. Based on the literature reviewed above, feeling disconnected from family members, and thus experiencing low family cohesion, is then hypothesized to lead to poorer psychiatric functioning. This study will be the first to examine the relationship between CD and family cohesion.

CD, EE, and Family Cohesion

To reiterate, the current study will test a model in which EE and family cohesion mediate the relationship between family member CD and psychiatric symptoms for patients with schizophrenia. There is evidence that EE and CD are related to each other. Kymalainen and colleagues (2006) found a modest positive relationship between high levels of CD and EE. Docherty (1995a) found that measures of thought and communication disorders (i.e., greater disorganization and poorer linguistic reference performance) were more prevalent in High EE families.   Miklowitz and colleagues (1986) found that family members rated as High EE were more likely to demonstrate High CD than those rated as Low EE. When broken down into subtypes of EE, they found that the relationship held for families rated as High EOI (Emotionally Over-involved), but not for those rated as critical. However, Kymalainen et al. (2006) found the opposite was true. In this study, CD was more strongly related to high levels of criticism, but not to EOI or hostility. Miklowitz and colleagues (1986) utilized three independent samples from the U.S. and Great Britain, and Kymalainen et al. (2006) used a mixed sample of white, Latino, and black participants, showing some cross-cultural validity in the association between CD and EE. The Miklowitz et al. (1986) study also found that the relationship between High EE and High CD was consistent across type of

family member (though parents had higher overall CD compared to nonparental

relatives), gender of relative, and chronicity of the illness.

It is important to note that while CD and EE are related, there is only partial

overlap. For example, in the Kymalainen et al. (2006) study, the correlation between CD

and EE was .25. The rating instructions for CD and EE are also very different both

conceptually and technically, with EE coding focusing on the content and tone of

communication, and CD coding focusing on the clarity in which ideas are communicated.

Thus, CD and EE are by no means the same construct. Rather, Miklowitz et al. (1986)

concluded that demonstrating one type of aberrant form of communication increases the

chances of demonstrating another form of detrimental communication. However, it is

unclear if one type of communication leads to the other, or if they simply happen to co-

occur.

Miklowitz and colleagues (1986) hypothesized that "key family members who

express High EE attitudes… may be prone to express these attitudes in an unclear,

ambiguous manner. The impact on the patient may be one of confusion and distress,

because it may be unclear to him or her as to what emotional statement the relative is

trying to convey" (p. 65). It is possible that CD and measures of the family environment,

such as EE, may have a bidirectional relationship (i.e., CD may increase EE and EE may

also increase CD). However, the preponderance of evidence points to a largely

unidirectional relationship whereby CD leads to EE which leads to psychiatric symptoms.

For example, Docherty, Hall, and Gordinier (1998) utilized an experimental design in

which they asked parents to talk about topics eliciting negative emotions (discuss "bad

memories" or "stressful times"). The researchers found that parents' CD did not increase

when discussing negative emotions. Thus, it does not appear that simply discussing topics with high negative affect (which can simulate High-EE climates) leads to high CD in parents.

Similarly, as mentioned in the *Communication Deviance* section, Lewis and colleagues (1981) made some interesting observations when families completed an interaction task in which they were required to speak about a specific topic and also talk about their feelings with each other. The researchers found that families rated as high CD were more likely to lose focus of the conversation when discussing the specific topic as well as when expressing emotions. This observation indicates a consistency of communication deviance across topics. However, the researchers also noted themes in the "emotional climate" of the families with high CD: they seemed tense and uneasy, they avoided eye contact, had rigid facial expressions, and feelings were rarely discussed openly or directly. High CD families did not talk about their own feelings or inquire about the feelings of the other family member. Conversely, families rated as Low CD seemed to be more relaxed and open with communication. With regard to EE, it may be that because High CD families were unable to express emotions effectively, they might resort to critical and hostile methods as negative emotions build up. Additionally, Low CD families may feel more at ease when communicating and may discuss their feelings on a regular basis in a more low-key fashion, which does not result in subsequent criticisms and hostility. Since difficulty maintaining a clear topic of conversation was difficult for High-CD families whether or not emotions were being discussed, this provides evidence of a more unidirectional relationship between CD and EE.

Researchers (e.g., Kymalainen & Weisman de Mamani, 2008) have proposed that CD may actually be a precipitating factor for High EE. This is drawn from the idea that family members with High CD may have more difficulty expressing their thoughts, which may lead to frustration and family members may then resort to more hostile and critical methods to express themselves. Thus, CD may not directly impact symptoms, but instead may contribute to a family environment that takes its toll on psychiatric functioning. However, CD does appear to have a negative impact independent of EE, as the combination of the two constructs appears to be more detrimental than either alone. For example, one study found that the combination of both high CD and a measure similar to high EE (Affective Style, AS) can predict the development of a schizophrenia-spectrum illness, 5 years later, better than either construct alone (Doane et al., 1981). In fact, in their sample of 37 families, it was only cases with both high CD and negative AS that later developed a schizophrenia-spectrum disorder. Similarly, Goldstein (1985) found that at 15 year follow-up, offspring who developed a schizophrenia-spectrum disorder had family members high in CD, negative affective style, and High EE at the initial interview prior to diagnosis. Additionally, Rund and colleagues (1995) found that CD was a better predictor of outcome (change in Global Assessment Scale scores from beginning to end of 2 year psychoeducational treatment) than EE status, though predictive validity was equal when outliers were removed. Although several studies have looked at the correlation between EE and CD, none have looked at EE as a potential mediator of the relationship between CD and psychiatric symptoms. However, the combination of the two constructs appears to have more of a detrimental impact than either variable alone (Doane et al., 1981). If EE is a mediator between CD and psychiatric

functioning, it is likely only a partial mediator (as CD likely still has an independent effect). Thus, other variables likely account for some of the variance.

Similarly, family cohesion may also play a mediating role. As mentioned previously, high family cohesion is related to fewer psychiatric symptoms for patients with schizophrenia (Weisman et al., 2005). Furthermore, family cohesion and expressed emotion do not correlate (King & Dixon, 1996), giving reason to believe that these variables are independent from each other and could both add to a bigger picture of family functioning. The relationship between CD and family cohesion has not been studied directly. However, there are several reasons to believe that the two constructs are related. For example, as discussed in the *Communication Deviance section*, Herman and Jones (1976) examined the relationship between CD and interpersonal acknowledgement (in which one person responds to the other directly or in a relevant manner, thus acknowledging the other person's experiences). The researchers found that families rated as High CD, compared to those rated as low CD, made more non-acknowledging responses (e.g., ignoring the responses of the other person) and less acknowledging responses (e.g., showing interest in understanding the other person's perspective) during an interactive Rorschach task. It is likely that acknowledgement statements help family members to feel understood and connected, and as a result lead to high perceived family cohesion. Likewise, it is probable that nonacknowledgement statements lead to feeling disconnected from and ignored by relatives. This is similar to the finding discussed above, in which High CD families did not inquire about the feelings of other family members. This is also likely to contribute to decreased feelings of unity and cohesion within the family.

Similarly, also mentioned previously, Velligan and colleagues (1988) found that High CD was related to increased overall family distress and maladaptive alliances between family members. Specifically, for High CD families, the alliance between parents was generally weak and the general family structure was considered maladaptive, meaning that mothers and fathers did not interact with the child in a similar way. From this study, it can be conjectured that difficulty communicating and sharing a focus of attention (CD) is related to a weakening of the marital relationship, increased stress within the family, and discordant behaviors with interactions with the child. This study did not measure family cohesion directly, but it is logical to assume that overall family distress and maladaptive alliances within the family creates a picture of a disconnected family unit that does not view themselves as a unified team. The resulting distress and lack of support would likely lead to increased psychiatric symptoms.

To reiterate, based on the arguments above, the current study proposes to test a model wherein the nature and content of a family member's communication (EE) and the sense of family unity (family cohesion) are hypothesized to partially mediate the relationship between CD and psychiatric symptoms. We expect EE and family cohesion to only partially mediate the relationship between CD and psychiatric symptoms, because, as stated previously, CD is likely to impact the ability of the patient to think in a logical, coherent manner and may play a causal role in the development of thought disorder. Thus, it is hypothesized that CD will still maintain a direct link to psychiatric symptoms.

This topic has important implications when it comes to the development of more effective psychoeducational interventions for families coping with schizophrenia. Some

studies have already shown that expressed emotion can be reduced through psychoeducational family therapy that incorporates communication training and problem solving. Additionally, Miklowitz (1994) found that families who changed from High EE to Low EE also showed lower relapse rates across 9-month, 1-year, and 2-year follow-ups, demonstrating the impact change in EE status can have on psychiatric functioning. No studies to date have found that CD can be changed through therapeutic intervention. However, teaching families to change EE status may partially break the link between CD and illness. Thus, if we do find that EE is a mediator between CD and psychiatric symptoms, families who are high in CD may particularly benefit from targeted family therapy for High EE. The same can be true for family cohesion. If we find family cohesion mediates the relationship between CD and symptoms, future research should examine whether trying to bolster a sense of family cohesion may in effect "override" the effects of CD on psychiatric symptoms.

Preliminary research indicates that CD is not easily influenced by family therapy for schizophrenia. For example, using a very small sample size (12 families total, with CD data only available on 6 families) Rund and colleagues (1995) found that 58% (seven of the 12) were able to change from High EE to Low EE status over the course of a two-year psychoeducational program, but only 17% (one of the six with CD data available) reduced their levels of CD. This study did not target CD directly, and the sample size was very small, so results are difficult to generalize. Nugter et al. (1997a) found that CD did not change over the course of 1 year, regardless if the family received family therapy or not. However, no treatments to date have been designed to specifically target

individual aspects of CD, even if they do address other aspects of communication, leaving room for the rich possibility that some aspects of CD are malleable.

Even if CD is not highly amenable to change, knowing if EE serves as a mediator between CD and symptoms could lead to important interventions for families with high CD, as prior research indicates EE is amenable to modification (Honig, 1997). Perhaps targeting High EE attitudes could be even more important for families with High CD, as perhaps Low EE could serve a protective role to break the relationship between CD and symptoms. Similarly, if family cohesion acts as a mediator between CD and symptoms, bolstering a sense of family cohesion can serve as a protective factor to break the link between CD and illness severity. Specific treatment techniques aimed to increase a sense of family collectivism have already been developed (Weisman, Duarte, Koneru, & Wasserman, 2006). In short, the current study proposes to lay the foundation for a more comprehensive understanding of the interplay among family communication patterns, family cohesion, and psychiatric functioning in patients with schizophrenia.

There are interesting and often conflicting cultural caveats for each of the variables of interest. For example: EE ratings are not always consistent with African-American's perceptions of EE, the High-EE component of criticism may be of more importance for Anglo-Americans, the EE construct of warmth may be of more importance for Hispanic-Americans, and Anglo-Americans may have higher levels of CD than Hispanic-Americans. Due to the findings reviewed above, ethnicity will be examined as a moderator in the overall mediational models involving EE, and multiple measures of EE/EE related constructs will be utilized. Additionally, as reviewed previously, independence/ interdependence will be examined as a mediator between
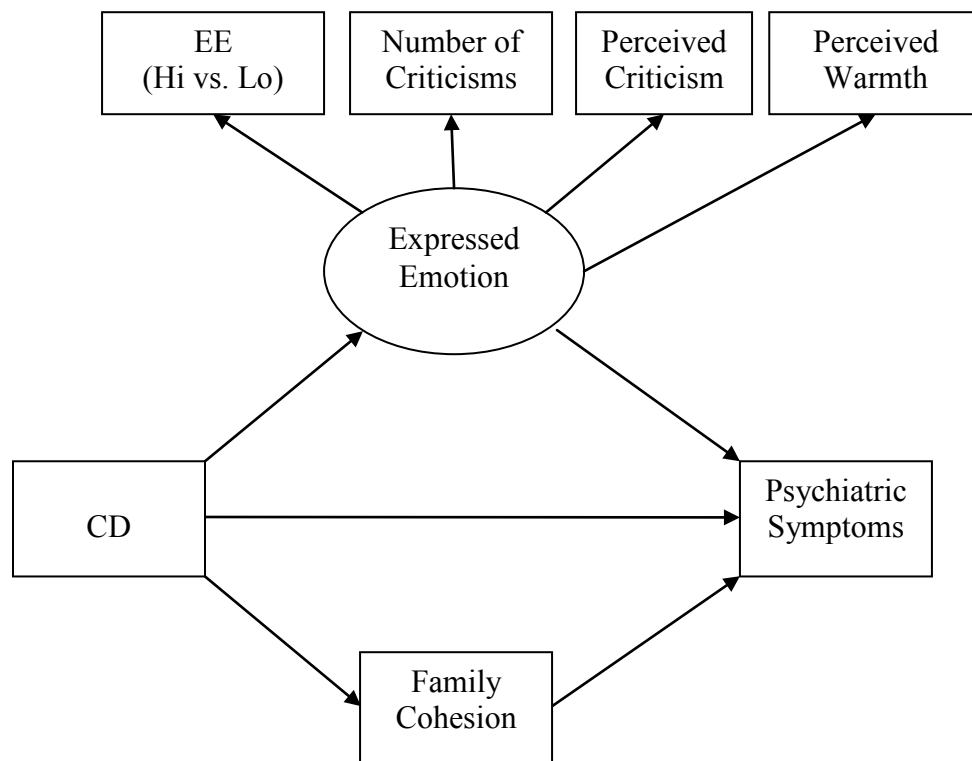
ethnicity and levels of CD and CD will be examined as a mediator between ethnicity and symptoms.

Summary of Hypotheses

Based on the literature reviewed above, the following hypotheses will be tested in this study:

Primary Hypothesis:

In a multiple mediation model, Expressed Emotion and family cohesion will both partially mediate the relationship between CD and psychiatric symptoms. Specifically, greater CD is expected to be associated with greater severity of psychiatric symptoms, and this relationship is also expected to be partially mediated by family cohesion (lower family cohesion is expected to be associated with both greater CD and greater symptom severity) and Expressed Emotion (High EE is expected to be associated with both higher CD and greater symptom severity). A latent variable will be created for Expressed Emotion, using the following EE constructs: Overall EE status from FMSS, number of criticisms from FMSS, perceived criticism, and perceived warmth. It is important to examine different aspects of EE, as some studies have found that different measures of EE are sometimes better predictors (e.g., Tompson et al., 1995). Thus, the degree to which each aspect of EE contributes to the latent variable will allow for further insights into which components of EE are important in the relationship between CD and Symptoms. No research to date has examined these aspects of EE in relation to CD. Thus, it is unclear which components will be most important in the proposed meditational model. The overall model is depicted visually below:

EE
(Hi vs. Lo)

Number of
Criticisms

Perceived
Criticism

Perceived
Warmth

Expressed
Emotion

CD

Psychiatric
Symptoms

Family
Cohesion

Secondary Hypothesis 1:

Previous research has demonstrated that there are ethnic differences in the

predictive power of EE components in relation to symptoms (López et al., 2004;

Kopelowicz et al., 2002; Tompson et al., 1995). Preliminary analyses will be conducted

to first replicate previous findings in the relationship between EE components and

symptoms. It is expected that overall EE status will be a significant predictor of

symptoms for Whites and Hispanics, number of criticisms will be a significant predictor

of symptoms for Whites, perceived criticism will be a significant predictor of symptoms

for Whites and African Americans, and perceived warmth will be a significant predictor

of symptoms for Hispanics.

If ethnic differences are found in the relationship between EE constructs and

symptoms, these findings will be applied to the larger mediation model in which the

relationship between CD and symptoms will be mediated through EE constructs. A moderated mediation model will be examined, in which the 4 EE mediator constructs will be moderated by ethnicity. These relationships have not been examined in relation to CD.

Secondary Hypothesis 2:

First, ethnic differences in CD will be examined. It is proposed that Whites and African-Americans will have higher levels of CD than Latinos. If differences are found, individualism/collectivism will be examined as a mediator of the relationship between ethnicity and CD. This hypothesis is based on conflicting findings regarding ethnic differences in levels of CD (Kymalainen et al., 2006; Doane et al., 1989). Looking at more specific cultural variables (i.e., independence and interdependence) may help explain why some studies have found that Anglos and African-Americans have higher levels of CD than Hispanics, and others have not. It is hypothesized that ethnicity will predict CD, but that this relationship will be mediated by independence/interdependence with the following expected relationships: ethnicity will predict independence/ interdependence (with Anglos having high independence and low interdependence, Hispanics having high interdependence and low independence, and African-Americans being high on both constructs) and independence/interdependence will then predict CD level (low CD will be related to higher interdependence and lower independence).

Secondary Hypothesis 3:

Finally, if ethnic differences are found in the level of psychiatric symptoms, CD will be examined as a mediator of the relationship between ethnicity and symptoms. Although there are inconsistent results across studies, at least one study has found that

Anglos and African-Americans have higher levels of CD than Hispanics (Kymalainen et al., 2006). This pattern reflects findings that patients from more collectivistic cultures have a better course of illness than more individualistic cultures (World Health Organization, 1992). Thus, it is hypothesized that higher levels of CD in Anglos and African-Americans will help explain higher levels of psychiatric symptoms that are sometimes found in these subgroups compared to Hispanics.

Chapter 2: Method

Participants

Ninety-five percent of the participants (N = 81 families) were drawn from a larger, ongoing schizophrenia family treatment-outcome study (See Weisman, Duarte, Koneru, & Wasserman, 2006 for a description of the larger study). Only baseline data from this larger study was utilized. Five percent of the participants (N = 4 families) completed baseline data only but were not interested in entering family therapy. In total, 85 patients (59 men, 26 women) diagnosed with schizophrenia or schizoaffective disorder and one of their close relatives were evaluated (34 men, 51 women). Family members included 29 mothers, 9 fathers, 22 significant others, 3 sisters, 3 brothers, 2 daughters, 3 sons, 9 close friends, 1 uncle, 1 niece, 1 grandmother, and 2 cousins. Mean age was 50.31, SD = 13.42 for family members, and M = 37.08, SD = 12.89 for patients. Sixteen patients and 21 family members identified as White, 22 patients and 22 family members identified as African American, 46 patients and 41 family members identified as Hispanic, and 1 patient and 1 family member identified as Other. Family member ethnicity was used when analyzing results based on ethnicity. The participants who identified as "Other" were excluded from results examining ethnic differences. Although multiple family members could participate in the larger parent study, data from only one family member was used in the current study. Patients were asked which family member they spend the most time with, and the data from that family member was used for the purposes of this study.

Translation of Measures

All assessments are offered in English and Spanish and were translated from English using the editorial board approach. This method addresses within-group language variations and is more effective than the translation-back translation approach (Geisinger, 1994). First, measures were translated by a native Spanish speaker of Cuban descent. An editorial board then met with the original translator to discuss the translations. The board was comprised of native Spanish speakers of Nicaraguan, Cuban, Columbian, Costa Rican, Puerto Rican, and Mexican descent. The Primary Investigator of the previously mentioned larger study (Amy Weisman de Mamani) was also on the board as she is a non-native Spanish speaker with extensive professional and personal experience in U.S. cities where Spanish is commonly spoken (Miami, Los Angeles) and Spanish speaking countries (e.g., Cuba, Mexico, Spain). The board members independently compared the Spanish translations with the original English versions and then discussed any issues with the original translator in order to create the most language-generic translations. The process was then repeated in which each member of the board individually examined the revised measures and then met to discuss and agree upon final revisions.

Measures

Diagnosis. The Structured Clinical Interview for the DSM-IV Axis I Disorders, Version 2.0, patient edition (SCID-I/P; First, Spitzer, Gibbon, & Williams, 1996) is a semi-structured interview used for determining diagnosis with patients with Axis I disorders. The psychotic symptoms section is used in this study to determine diagnoses of schizophrenia/schizoaffective disorder. The SCID-I/P is has shown high inter-rater

reliability for symptoms and diagnosis (Ventura, Liberman, & Green, 1998). To assess inter-rater reliability in the current study, all interviewers as well as the parent study Principle Investigator (Amy Weisman de Mamani) watched at least eight videotaped interviews and independently rated each question and determined an overall diagnosis. New interviewers were required to reach an interrater agreement of .80 using Cohen's Kappa. If a rater did not achieve sufficient reliability on the first 8 tapes, they continued to rate tapes until they attained a Cohen's Kappa of .80. For this study, 5 of the 6 interviewers achieved a Kappa of 1.0 on the first 8 tapes. The other interviewer watched an additional two tapes, for a total of 10, and achieved a Cohen's Kappa of .80.

Symptoms. Severity of psychiatric symptoms was rated using the Brief Psychiatric Rating Scale (BPRS; Ventura et al., 1993). The BPRS is a semi-structured interview with 24 questions evaluating symptoms such as depression, suspiciousness, hallucinations, unusual thought content, and bizarre behavior. All questions are on a 7-point Likert-type scale ranging from 1 (not present) to 7 (extremely severe). A total score was calculated by summing patients' scores for all items, with a higher score indicating more severe symptoms. The BPRS has demonstrated reliability in both white and minority groups, and can be used in both English and Spanish (Caram, Agraz, Ramos, & Garcia, 2001; Nuechterlein et al., 1992). To establish interrater reliability, all interviewers were first trained by the P.I. (Dr. Amy Weisman de Mamani) who was trained by and showed previous reliability with the creator of the scale, Dr. Joseph Ventura. Interviewers then watched 6 videotaped BPRS training interviews selected by Dr. Ventura. Intraclass correlation coefficients between the study interviewers and Dr. Ventura's consensus ratings ranged from .85 to .98 for total scores. In general, and as is

common in studies using this scale (e.g., Ventura, Green, Shaner, & Liberman, 1993;

Schutzwohl et al., 2003) coefficients were higher for items based on verbal responses (M

= .91, SD = .05) and lower for items based on interviewer observations (M = .65, SD =

.27). Restriction of range in the observation only scores appeared to contribute to lower

coefficients, as there was less variability for these items than other items.

Expressed Emotion. The Five Minute Speech Sample (FMSS) was used to

measure expressed emotion (Magaña et al., 1986). For this measure, family members

spoke for five minutes about the identified patient, with regard to what kind of person the

patient is and how they get along together. Audio recordings were later categorized as

High EE or Low EE based on the initial statement, number of criticisms and statements

of dissatisfaction, number of positive remarks, quality of relationship, emotional displays,

self-sacrificing or overprotective statements, statement of attitudes, and excessive detail.

Four coders became reliable on the FMSS scoring system by a trained FMSS coder.

First, coders thoroughly reviewed rating criteria and the trained FMSS coder co-rated 10

training audiotapes with the trainees. The four coders then individually rated 10

additional audiotapes to assess her reliability with the trained coder. One coder rated 14

additional tapes to demonstrate reliability. The kappa coefficient between the research

assistants and the trained coder ranged from .80 to 1.0 for rating high versus low EE, .86

to 1.0 for rating the critical component (high critical versus borderline or low critical),

and .62 to 1.0 for rating the EOI component (high EOI versus borderline or low EOI).

Number of criticisms, one of the components of rating EE, will also be examined

separate from overall EE status.

Perceptions of Criticism and Warmth. The Perceptions of Criticism and Warmth Scale (Weisman, Rosales, Kymalainen, & Armesto, 2006). This scale consists of two items answered on a three-point scale, asking how warm and how critical the family member is based on the patient's perspective. Higher ratings indicate greater degree of criticism or warmth.

Communication Deviance. The FMSS was also used to measure communication deviance using an adapted version of Velligan's Communication Deviance Coding Manual (1985; Velligan, Goldstein, Nuechterlein, Miklowitz, & Ranlett, 1990) developed by Kymalainen and colleagues (2006). Each tape was coded with the following 8 subcategories: 1) abandonment, abruptly ceased, or uncorrected remarks; 2) unintelligible remarks; 3) contradictions, denials, or retractions; 4) ambiguous referents; 5) extraneous questions and remarks; 6) tangential, inappropriate responses or remarks; 7) odd word usage/odd sentence construction; and 8) reiteration. A frequency score was recorded for each of the 8 codes and a total CD score was calculated by summing the 8 frequency scores. To establish interrater reliability, all interviewers demonstrated reliability with Radha Carlson. Interviewers were trained using 10 transcripts. Coders then rated 10 audio-recorded speech samples. Intraclass correlation coefficients between Radha Carlson's ratings and the two coders ranged from .85 to .94 for total scores

Family Cohesion. The Family Cohesion Subscale of The Family Environment Scale (FES) was used to measure family cohesion (Moos & Moos, 1986). The subscale utilizes a True/False format and consists of 9 questions tapping the domains of help, commitment, and support between family members. The FES subscale has previously shown reasonable reliability and validity (Moos, 1990). A total score was calculated by

summing the number of "True" responses, after reverse-scoring three items. A higher

total denotes stronger family cohesion. Patient ratings of family cohesion were used in

analyses. The family cohesion subscale of the FES demonstrated good internal reliability

for patients in the current study ($\alpha = .76$).

Independence/Interdependence. The Self Construal Scale (SCS; Singelis, 1994)

was used to measure independence/interdependence. This scale consists of 24 questions

answered on a 7-point likert-type scale ranging from 1 (Strong Disagree) to 7 (Strongly

Agree). The SCS has two subscales (Independence and Interdependence) and are

calculated by summing 12 distinct questions for each subscale, with higher scores

indicating stronger levels of independence or interdependence. The two subscales have

previously demonstrated adequate reliability and validity (Singelis, 1994). Internal

reliability for the SCS in the current study was adequate for both the Interdependence

subscale ($\alpha = .81$) and the Independence subscale ($\alpha = .76$).

Demographic Variables. A self-report questionnaire was used to gather

demographic information such as age, gender, race/ethnicity, and primary language. This

questionnaire also included a question that asked "How much formal education do you

have" and provided 7 options ranging from "1 = Advanced Degree – M.A., M.D., Ph.D."

to "7 = Below grade 8." Thus, a higher score represents lower education level.

Procedure

All aspects of assessments were offered in both English and Spanish, depending

on the preference of the participant. Baseline assessments were conducted with all

participants through interview format. The SCID and BPRS were administered to

patients only, and all other measures were conducted with both the patients and the

family members. Additional measures not used in this study were also administered during this time as part of the previously mentioned larger study.

Chapter 3: Results

See Table 1 for means and standard deviations of the main study variables. Regarding EE frequency, 72.9 % of the sample was rated as Low EE (N = 62), and 72.9% of the sample also had 0 criticisms. Before analyses were conducted, the following demographic variables were examined to see if they were significantly related to psychiatric symptoms: gender of patient, age of patient, and patient education (see Table 2). Age and Education predicted symptoms (older age and less education were related to greater symptoms), so these two variables were controlled for anytime symptoms were in the model. Normality of data was also evaluated. Variables were considered non-normal if they had absolute values of 4 or more for kurtosis and 2 or more for skewness (Kline, 1998). Number of criticisms was the only variable that had unacceptable skewness and kurtosis (see Table 1). After examining the distribution of the variable, it was decided to treat it as a dichotomous variable (criticisms present or absent) rather than a continuous one, as nearly all participants (94%) had either one or zero criticisms. The distinction between zero versus one or more criticisms is also clinically significant, as this is one of the possible thresholds for rating a sample as High EE using the empirically-derived coding criteria for the FMSS (Magaña et al., 1986). Transcripts were created for approximately 40% of the sample (randomly selected, N = 33, 39% of total sample) to see if amount of speech was related to CD scores, as has been the case in previous studies (e.g., Velligan et al., 1995 using a sample of 28 patient-mother pairs). Number of lines of speech was not significantly related to CD ($r = .03$, $p = .85$), so transcripts were not created for the rest of the samples, and amount of speech was not controlled for in the analyses.

The current study utilized a homogenous sample of family members and significant others. Previous studies have largely utilized one type of relative, and so the differences in CD levels were examined to see if relative type should be controlled for or examined further. There were no differences in CD between first-degree relatives, other biological relatives, and non-biological relatives based on a One-Way ANOVA, F (2, 82) = .50, p = .61.

The Statistical Package for Social Sciences (SPSS) database Version 16.0 was used for preliminary analyses. Mplus Version 6 was used for analyses involving structural equation modeling. Multiple imputation was used to impute missing data points before analyses were conducted.

Primary Hypothesis:

The primary hypothesis of this dissertation is that in a multiple mediation model, Expressed Emotion and family cohesion will both partially mediate the relationship between CD and psychiatric symptoms. To test this hypothesis, the maximum likelihood method for Structural Equation Modeling (SEM) was used to estimate path coefficients, loadings of indicators on the latent variable, and standard errors for significance tests. In order to examine the indirect effects, steps for multiple mediation were followed using the guidelines for SEM from Preacher and Hayes (2008) with the final model. As suggested by Preacher and Hayes (2008), bootstrapping was used to test the total and specific indirect effects from CD to Symptoms, as bootstrapping is preferred over the traditional causal steps approach, as well as the product-of-coefficients approach. This is because bootstrapping is better able to estimate indirect effects, as it uses a resampling technique that provides higher power than the Sobel test, and does not require normality

of the sampling distribution. According to Preacher and Hayes (2008), researchers should examine total indirect effects from the predictor to the outcome variable, as well as specific indirect effects through each of the mediators, as any one of these estimates can be meaningful and significant even if the other paths are not significant. Thus, even if individual paths are not significant, examining the total indirect effect is still important. Estimates are created from 5,000 bootstrap samples.

When the model depicted in Figure 1 was run, the residual covariance matrix was found to be not positive definite, which typically occurs when there is multicollinearity. Upon investigation, it was found that two of the EE variables (High versus Low rating from the FMSS and the dichotomized version of the Number of Criticisms variable) were highly related. Low EE coincided with 0 criticisms, and High EE coincided with 1 or more criticisms for 87 percent of the sample. Thus, it was decided to remove the Number of Criticisms variable, as the more traditional measure of EE (High versus Low as rated from the FMSS) is more theoretically important in this model.

See Figure 2 for the revised path model. None of the estimates for the direct pathways were significant (CD to EE, β = .01; CD to FC, β= -.07; EE to Symptoms, β = .51; FC to Symptoms, β = -.17; CD to symptoms, β = -.07; all p > .05). Additionally, some of the fit indices for overall model fit were not within the acceptable range (χ^2 (15) = 17.853, p = .27, CFI = .66, TLI = .43, RMSEA = .05). Thus, a third revised model was examined, in which the latent variable was eliminated and only the traditional measure of EE (High versus Low) was used instead.

Refer to Figure 3 for the path model depicting the structural equation model for Expressed Emotion and Family Cohesion mediating the relationship between

Communication Deviance and Symptoms. Patient age and education were included as control variables for symptoms. As can be seen in Figure 3, none of the estimates for the direct pathways were significant (CD to EE, β = .05; CD to FC, β= -.07; EE to Symptoms, β = -.11; FC to Symptoms, β = -.17; CD to symptoms, β = -.06; all p > .05). The overall model produced perfect fit indices [χ^2 (5) = 3.57, p = .61, CFI = 1.00, TLI > 1.00, RMSEA = .00]. However, Muthen (2008) has warned that small sample sizes, low correlations among observed variables, and a nearly saturated model can artificially create high fit indices. Thus, it appears that the above fit indices are misleading, given the values of the path estimates.

To examine total and specific indirect effects, the model was run again using bootstrapping. The individual pathways remained unchanged using this method. None of the three indirect effects were significant, as each of the confidence intervals included zero (CD to symptoms through EE, 95% CI = -.06 to .05, p > .05; CD to symptoms through FC, 95% CI = -.04 to .08, p > .05; total indirect effect from CD to symptoms through both mediators, 95% CI = -.07 to .08, p > .05).

None of the paths in the above SEM model were significant. However, when looking at first-order correlations, there was a significant negative relationship between family cohesion and psychiatric symptoms. Thus, higher family cohesion was related to fewer psychiatric symptoms (r = -.22, p < .05). No other correlations between main study variables were significant (see Table 3).

Secondary Hypothesis 1:

Ethnic variations in the mediating role of the EE constructs were analyzed next. Contrary to expectations, preliminary analyses using correlations revealed that none of

the four EE constructs (EE, perceived criticism, criticisms, and perceived warmth) were related to psychiatric symptoms for Whites or African-Americans. Due to the absence of significant results in this initial step, further analyses with Whites and African-Americans were not conducted with the larger mediation model.

For Hispanics, perceived warmth was the only construct that was significantly correlated with psychiatric symptoms. The correlation was in the expected direction, in that greater perceived warmth was related to fewer psychiatric symptoms for Hispanics (r = -.38, p = .01). See Table 5. A simple mediation model was conducted using regression for the Hispanic subgroup to see if perceived warmth acted as a mediator between CD and psychiatric symptoms. As can be seen in Figure 4, there was not a significant relationship between CD and symptoms, or between CD and perceived warmth. Thus, although greater perceived warmth was related to fewer psychiatric symptoms for Hispanics, perceived warmth was not a mediator between CD and symptoms. A moderated mediation model was thus not warranted.

Secondary Hypothesis 2:

Preliminary analyses also prevented the complete testing of secondary hypothesis 2 (that independence/interdependence would mediate the relationship between ethnicity and CD). Against expectations, Whites and African-Americans did not have higher levels of CD than did Latinos. In fact, a One-Way ANOVA revealed no differences in CD between the three ethnic groups, F (2, 81) = .46, p = .63. Further analyses also did not find ethnic differences in independence/interdependence, (2, 81) F = 1.41, p = .25, as well as no correlation between CD and independence (r = -.01, p = .96) or CD and

interdependence ($r = .08$, $p = .49$). Thus, there was no support for examining a model with individualism/collectivism as a mediator of a relationship between ethnicity and CD.

Secondary Hypothesis 3:

Similar to the previous hypotheses, initial analyses did not support moving forward with secondary hypothesis 3 (that CD would mediate the relationship between ethnicity and symptoms). This mediational analysis was not conducted, as there were no ethnic differences in symptoms based on a One-Way ANOVA, $F (2, 81) = 1.56$, $p = .22$, as well as no relationship between ethnicity and CD (as tested in the previous hypothesis).

Chapter 4: Discussion

The primary purpose of this study was to examine mediators of the relationship between Communication Deviance and Psychiatric Symptoms in individuals with schizophrenia/schizoaffective disorder and their family members. Specifically, it was hypothesized that Expressed Emotion and Family Cohesion would mediate this relationship. The current study did not find evidence for a direct relationship between CD and Symptoms, and also did not find evidence for EE and Family Cohesion to be mediators. This was true when using the traditional measure of EE, as well as utilizing a latent variable created from multiple EE constructs.

There are several possible explanations for the above, largely null, findings. First, although other studies have found a relationship between CD and Psychiatric Symptoms in a cross-sectional sample (Docherty et al., 1999), the current sample differs in many important ways. Primarily, our participants may represent a different cohort of patients than other studies. Ninety-five percent of the participants from the current study were derived from a larger study examining the efficacy of a family therapy for schizophrenia (only four families entered the study intending to complete a baseline assessment only). It is possible that families who seek family therapy do so in part because of their investment in family relationships and desire to understand and communicate openly with other family members. Thus, it is possible that the families in the current study may already be more cohesive and demonstrate better communication skills than families participating in other types of studies. This would be consistent with previous findings that family members with low CD are more likely to have relaxed and open communication (Lewis et al., 1981) and show interest in understanding another person's

perspective (Herman & Jones, 1976) than family members with high CD. For these reasons, the families in the sample of the current study may have had lower base rates or a restricted range of communication deviance.

Another explanation for the above findings could be the measures used. No known studies have examined the relationship between CD and Psychiatric Symptoms using the FMSS measure of CD. Thus, it may be that relationships appear once longer measures are used, but are not apparent using this form of measurement which may be less sensitive to the detection of CD. The study by Docherty and colleagues (1999), which did find a relationship between CD and symptoms, measured CD using a speech sample that was double the length of the FMSS. It should also be noted that there was an obvious restriction of range in the ratings of CD in the current sample, which limits the ability to find relationships between variables.

Although there are multiple studies that have found a relationship between CD and EE (e.g., Kymalainen et al., 2006; Docherty, 1995a; Miklowitz et al., 1986), there are some studies that found results similar to the ones in the current study. For example, Nugter and colleagues (1997) did not find a consistent relationship between EE and CD (N = 39 patients). Velligan and colleagues (1990) also did not find a relationship between EE and CD (N = 37 patients). Thus, there may be other variables that need to be considered to help explain why EE and CD may be related in some situations, and may not be in others. Perhaps there are protective factors that are present in the current sample that prevent disordered communication from negatively impacting patient psychiatric symptoms. For example, patients in the current sample agreed to participate in a research study involving family therapy for schizophrenia. Perhaps the patients in

the current sample have a higher level of insight and acknowledgement that they have an illness, and a greater motivation for treatment, than the general schizophrenia population, which could help lead to better outcomes even in the face of disordered communication.

When looking at individual relationships between the main study variables, higher family cohesion was related to lower psychiatric symptoms. This is consistent with a previous study that also found that family cohesion was related to fewer psychiatric symptoms in patients (Weisman, 2005). However, the strength of this correlation found in the current study was relatively weak, and thus any observable relationship was not significant when other variables were included. Thus, family cohesion appears to be related to psychiatric symptoms, but this relationship was not robust when examining larger models.

Demographic variables (gender of patient, age of patient, and patient education) were considered for covariates in primary analyses. Patient age and education were both related to psychiatric symptoms, in that older age and less education was associated with more severe symptoms. Education could be related to symptom severity for multiple reasons. First, lower educational attainment could be a sign of impairments caused by an earlier onset of the illness (e.g., someone who had their first psychotic break at age 17 would have more difficulty completing college than someone whose first break occurred at age 24). This hypothesis is supported by research suggesting greater functional impairments for individuals with early onset compared to adult onset (Lay, Blanz, Hartmann, & Schmidt, 2000). Years of education is also related to patient insight, which is an important variable when considering symptomatology and treatment compliance (Macpherson, Jerrom, & Hughes, 1996). Similar findings can be applied to the

relationship between age and symptom severity that was evident in the current study. Older age is likely indicative of a longer illness duration, which is related to negative outcomes for a host of variables, including neuropsychological impairments (Cuesta, Peralta, & Zarzuela, 1998).

The current study also examined a number of variations in the proposed model. One variation first attempted to replicate findings that different EE constructs relate to psychiatric symptoms for different ethnic groups. It was expected that overall EE status would be a significant predictor of symptoms for Whites and Hispanics, number of criticisms would be a significant predictor of symptoms for Whites, perceived criticism would be a significant predictor of symptoms for Whites and African Americans, and perceived warmth would be a significant predictor of symptoms for Hispanics. Out of all analyses, the only finding that was significant was that perceived warmth was related to psychiatric symptoms for Hispanics. This finding is consistent with prior research showing a relationship between lack of warmth and psychiatric relapse for Hispanics but not Whites (López et al., 2004). However, given the large number of analyses conducted, the current finding may represent a Type I error. Perceived warmth was not a significant mediator between CD and psychiatric symptoms for Hispanics, and no further analyses were conducted with these variables based on the lack of preliminary findings.

Ethnic differences in CD levels were also examined in the current study. Kymalainen et al. (2006) found that Whites and African-Americans had higher levels of CD than Latinos, using the same measure of CD that was used in the current study. The current study was not able to replicate these results.   It was hypothesized that ethnic differences in CD would be explained by independence and interdependence. However,

as there were no ethnic differences in CD levels, the mediating effect of independence/ interdependence was not examined. Our results are consistent with another study that found no differences in CD levels between Latinos and Anglos (Doane et al., 1989), suggesting that there may not be a consistent ethnic differences in CD.

Finally, the ability of CD to explain ethnic differences in psychiatric symptoms was also explored. However, the current study did not find ethnic differences in the severity of psychiatric symptoms. Thus, the mediating role of CD between ethnicity and psychiatric symptoms was not evaluated. Although many studies have found ethnic difference in schizophrenia symptoms (World Health Organization, 1992; Strakowski et al., 1996), our findings are consistent with some cross-ethnic studies. For example, Barrio and colleagues (2003) did not find any significant differences in overall symptoms for African-Americans, Latinos, and Anglos. However, they did find some ethnic differences when looking at individual symptoms (e.g., African-Americans reported more hallucinatory behavior than Anglos). Thus, it is possible that the lack of ethnic differences in symptoms in the current study could be due to the use of total symptoms rather than symptom subtypes.

Another possible explanation for the current study's lack of association between variables is the fact that this study looked at these relationships cross-sectionally. Although some studies have found a relationship between EE and symptoms (Vidal et al., 2008; Glynn et al., 1990), and CD and symptoms (Docherty et al., 1999) during one time-point, the majority of studies have examined the ability of EE and CD to predict relapse at a later date. Thus, it is possible that a longitudinal version of the proposed model would reveal significant relationships.

The current study is marked by several limitations. Our sample size is less than ideal for complex statistical analyses. However, given the magnitude of results examined in this study using both complex (Structural Equation Modeling) and more traditional statistics (correlations), it is unlikely that non-significant findings are due to sample size alone. Our measure of Communication Deviance was derived from a Five Minute Speech Sample, which may have underestimated the true amount of CD present in the speech of family members due to the limited amount of time and constraints of the topics discussed. Future research may be interested in utilizing longer speech samples which would provide more opportunities to detect instances of communication deviances and thus increase the range of CD levels. While the internal reliability and inter-rater reliability for the measures used in this study were generally high, the reliability of the EOI subcomponent of EE (kappa of .62) was only marginally acceptable. This is considered a study limitation. However, it is important to note that the reliabilities of the EE components that were actually entered into the final model (High versus Low EE and Criticism) were all found to be acceptable (kappa of .80 and above).

One unique quality of the current study is our use of a variety of different family members, ranging from close friends to parents. In some ways, this is a strength as a wider variety of patients and family members were able to participate, which likely gives a more representative sample than if the study was constrained to only one type of patient-relative pair (e.g., parents, spouses). However, having a range of family members can also be viewed as a limitation, as greater heterogeneity in participants generally introduces greater variability in the measured constructs, which can make it more difficult to find clear relationships between variables. Preliminary analyses demonstrated

that there was no difference in CD levels between different types of family members, but this heterogeneous sample may have "muddied" the results, accounting for why our results differ from other studies. We also only rated CD and EE for the family member that the patient identified as the person with whom they spent the most time. This method was chosen as it was thought that this family member would have the most influence on patient functioning. However, it is likely that patients choose to spend more time with family members that they get along with well and less time with family members who are critical and with whom it is difficult to communicate. Thus, the current method may have led patients to inadvertently self-select the family member who was most likely to demonstrate low CD, low EE, and high family cohesion. The results of the current study could thus be skewed and may not fully reflect other processes that are occurring in the family. Future studies should measure these variables in multiple family members to see if patients gravitate towards family members who are "healthier" for them. Additionally, future research should examine whether the relationship between family communication variables and psychiatric symptoms is more clearly present when examining certain types of family members (e.g., the family member viewed as having the most authority or decision-making power in the family). It is possible that the methods of the current study led to examining these variables using the family member that the patient feels the most allied with, rather than the family member that truly has the most influence on the patient.

There are a number of directions to take future research. The data collected in the current study was gathered in the context of a larger study examining family therapy for schizophrenia. Being able to examine communication patterns during real interactions

between family members (i.e., in therapy sessions rather than during staged interactions or single speech samples) would likely reveal a much more accurate picture of the family's communication patterns. These communication patterns could impact therapy in a number of ways, including potentially interfering with therapy gains. The family therapy in question includes modules on problem solving, communication, and family cohesion- all areas which could potentially be greatly impacted by the family's ability to communicate effectively with each other and the therapist. Perhaps previous studies have found a relationship between CD and psychiatric relapse due to the family's difficulty communicating with not just the patient, but also with treatment providers. Thus, examining the relationship between communication deviance and other variables could be important. Examples include the effects of CD on treatment gain, rapport with the therapist, and difficulties communicating with treatment providers and the subsequent effects on treatment compliance.

As alluded to earlier, another important area for future research is examination of the relationship between CD and different symptom subtypes. Schizophrenia symptoms can be divided into three major clusters of symptoms: positive symptoms, negative symptoms, and disorganized symptoms including thought disorder (Beck, Rector, Stolar, & Grant, 2009; Grube, Bilder, & Goldman, 1998). It is important to look at different symptom groups as they often represent different phases of the illness and predict different types of functioning. The current study only utilized a measure of total symptoms, and found no relationship between CD and symptoms. It may be that CD relates more strongly to certain subtypes of psychiatric symptoms. For example, communication deviance indicates a subtle type of disorganized communication that may

be more conceptually similar to thought disorder symptoms. Thought disorder symptoms divided into "negative formal thought disorder," consisting of symptoms such as thought blocking, poverty of speech, and poverty of content, and "positive formal thought disorder," consisting of symptoms such as idiosyncratic language, loose associations, and word approximations (Beck et al., 2009). Positive formal thought disorder is more conceptually similar to communication deviance. Thus, future research may want to examine the relationship between CD and severity of thought disorder in patients with schizophrenia, with an emphasis on positive thought disorder symptoms. Symptom subtypes may also be important in examining the overall mediation models utilized in this study. For example, if family cohesion is found to be a mediator for only negative symptoms, then perhaps family cohesion should be targeted more intensely for patients with a more negative-symptom profile. Another reason to examine symptom subtypes is the fact that, as mentioned earlier, at least one study did not find ethnic differences in overall symptoms, but did find differences when looking at individual symptoms (Barrio et al., 2003). Utilizing symptoms subtypes may allow future researchers to detect nuances in ethnic variations that were not evident with the measures utilized in the current study.

Examining the different subtypes of communication deviance will also be an important area for future research. There are potentially important treatment implications based on examining subtypes of CD, as some styles may be more detrimental than others. Miklowitz and Stackman (1992) proposed that the perceptual-cognitive subtypes of CD may be more related to genetic vulnerability, versus the linguistic-reasoning subtypes of CD are more psychosocial in nature. Examining the linguistic-reasoning subtypes of CD

will likely be more important in terms of delineating the role of CD in relation to current symptom functioning, as this subtype is more likely to act as a stressor between the patient and family members. It is possible that the current study did not find a relationship between current symptoms and CD because it utilized a total CD measure. Conducting more sophisticated analyses with a larger sample size may reveal that certain CD subtypes and certain symptom subtypes are truly responsible for the relationship between CD and symptoms that are seen in some studies but not in others. Unfortunately, the sample size of the current study did not have enough power to examine CD subtypes and symptom subtype.

In conclusion, the current study examined the relationship between communication deviance, expressed emotion, family cohesion, and psychiatric symptoms for individuals with schizophrenia and their family members. A mediational model in which expressed emotion and family cohesion partially mediate the relationship between CD and symptoms was not supported. Ethnic differences in symptoms and CD were also not found. Future research should examine CD and symptom subtypes to help clarify whether a relationship between CD and symptoms exists more strongly during certain phases of the illness or in the presence of certain types of communication deviance. The lack of relationships between family environment variables and psychiatric symptoms in the current study may also be indicative of unknown protective factors present in the current sample, as data was gathered in the context of a larger study examining a family therapy for schizophrenia. Examination of unique strengths of this group compared to other samples could lead to important insights into the ways in which family members can positively influence a loved one with schizophrenia.

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Figure 1. Path model depicting the relationships between Communication Deviance, Expressed Emotion (latent variable with 4 indicators), Family Cohesion, Psychiatric Symptoms, and control variables.
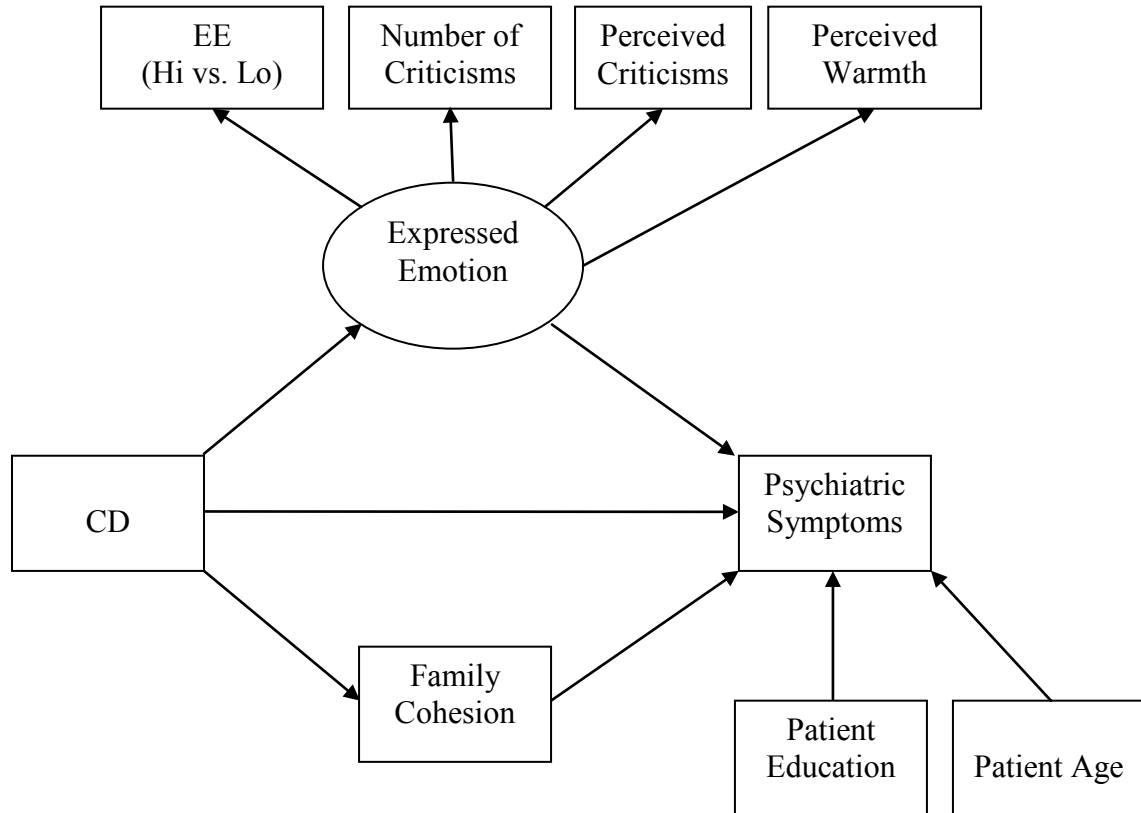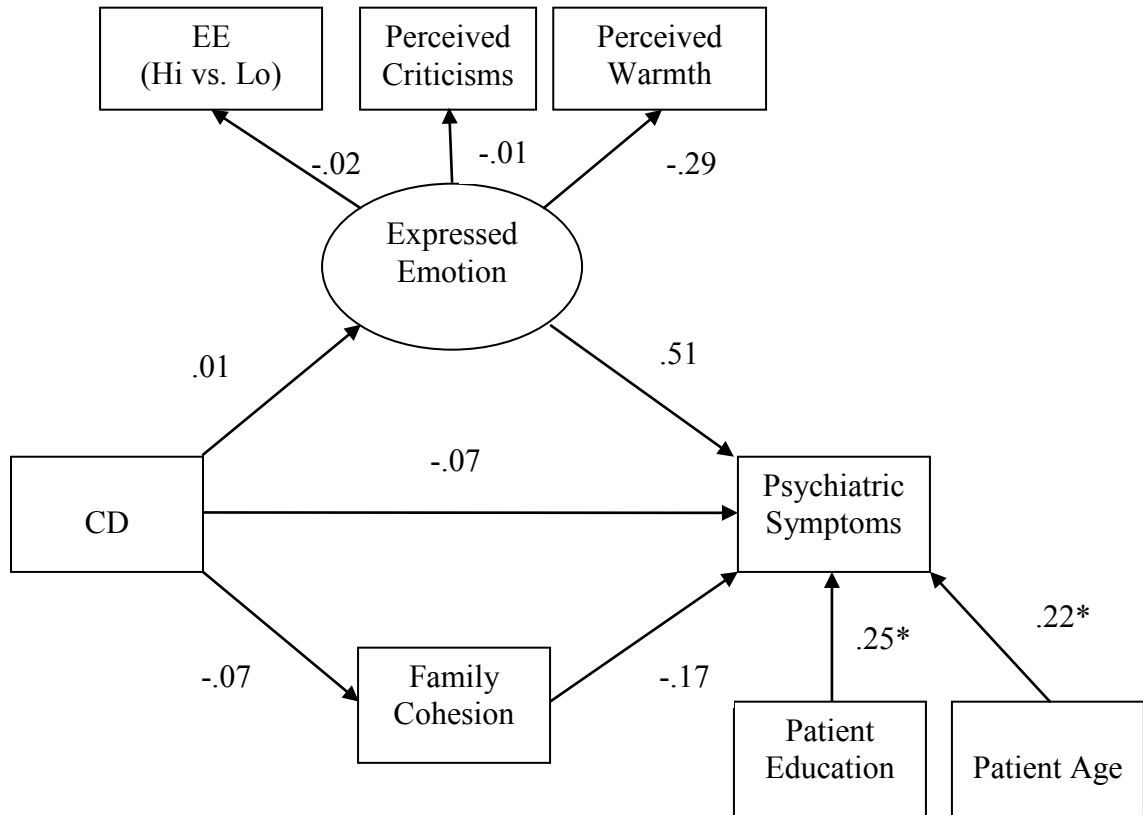
Figure 2. Path model depicting the relationships between Communication Deviance, Expressed Emotion (latent variable with 3 indicators), Family Cohesion, Psychiatric Symptoms, and control variables.

Note: * indicates *p* < .05

Figure 3. Path model depicting the relationships between Communication Deviance, Expressed Emotion, Family Cohesion, Psychiatric Symptoms, and control variables.
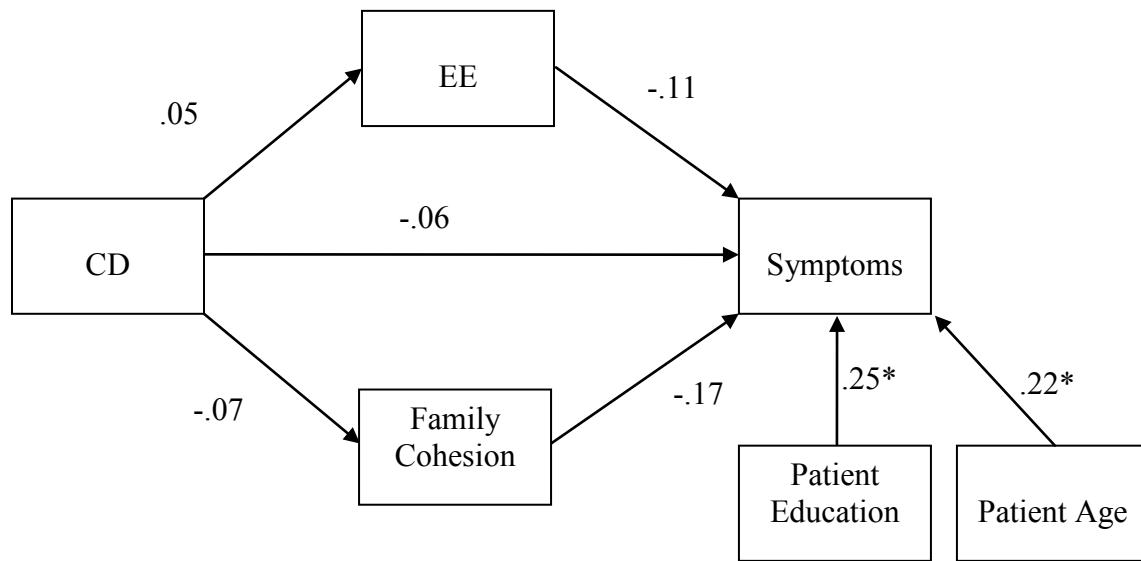
Note: * indicates *p* < .05

Figure 4. CD predicting symptoms with Perceived Warmth as a mediator, while controlling for patient education and patient age, for Hispanics.
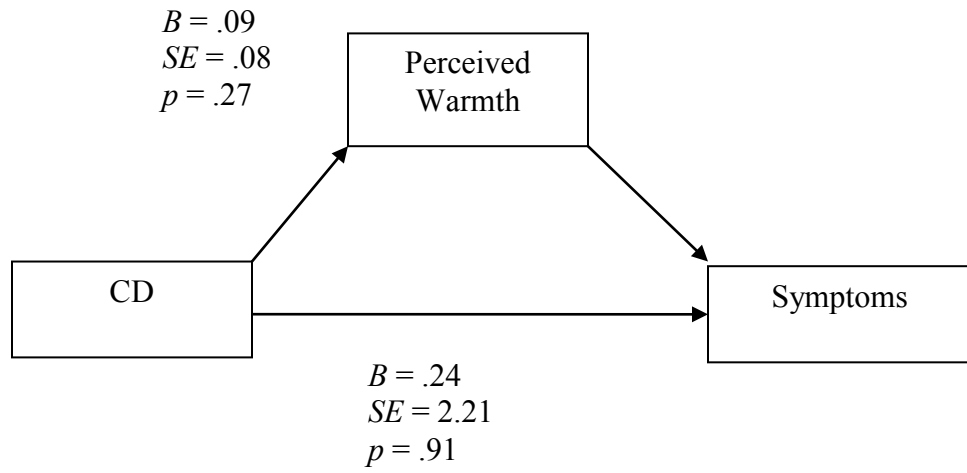

B = .09
SE = .08
p = .27

Perceived Warmth

CD

Symptoms

B = .24
SE = 2.21
p = .91

Table 1

Means, Standard Deviations, Skewness, and Kurtosis of Primary Variables

Variable	Mean	Standard Deviation	Skewness	Kurtosis
FES- Family Cohesion	5.92	2.45	-.64	-.48
BPRS	55.10	13.32	.05	-.67
CD	.77	.98	1.11	.44
SCS-Independence	5.34	1.04	-.70	.64
SCS-Interdependence	4.90	1.17	-.86	1.27
Number of Criticisms	.25	.62	2.62*	6.47*
Perceived Criticism	2.09	.81	-.21	-1.46
Perceived Warmth	2.56	.53	-.76	-.40

Note: * indicates value is above acceptable cutoff for skewness or kurtosis

Table 2

Correlations between Potential Control Variables and BPRS

Variable	r	p	
Gender of Patient	.08	.47	
Age of Patient	.23	.03	
Education of Patient	.25	.02	

Note: Education was measured in a way that a higher rating indicates lower level of education

Table 3

Correlations between Main Study Variables

Variable	BPRS	CD	FES
CD	-.01		
FES	-.22*	-.10	
EE	-.10	.04	-.07

Note: * indicates *p < .05*

Table 4

Correlations between Expressed Emotion Variables

Variable	Perceived Criticism	Perceived Warmth	Criticisms (Present or Absent)
EE (Hi vs Lo)	.01	-.14	.66*
Criticisms (Present or Absent)	-.03	-.09	
Perceived Warmth	-.18		

Note: * indicates *p < .05*

Table 5

Correlations between Expressed Emotion Variables and Symptoms, by Ethnicity.

Symptoms	EE	Perceived Criticism	Perceived Warmth	Criticisms (Present or Absent)
Whites	.05	-.03	.20	.31
African Americans	-.24	-.34	<.01	-.26
Hispanics	-.09	.11	-.38*	-.04

Note: * indicates *p < .05*