

# Risk and Protective Factors, Perceptions of Family Environment, Ethnicity, and Schizophrenia Symptoms

Kayla Gurak, MS and Amy Weisman de Mamani, PhD

**Abstract:** The family environment can play either a detrimental or a protective role in symptom severity for people with schizophrenia. The current study examined both patient and caregiver perspectives of the family environment in an ethnically diverse sample of 221 patients with schizophrenia. We hypothesized that environments characterized by high levels of perceived caregiver criticism, low perceived caregiver warmth, and low family cohesion (from both the patient and caregiver perspective) would predict greater symptom severity. As expected, results demonstrated that lower patient ratings of family cohesion and caregiver warmth were associated with greater symptom severity. However, once put into a hierarchical regression analysis, only patient ratings of family cohesion remained significant. Ethnic patterns were also examined and revealed that family cohesion may be particularly protective for ethnic minorities. Study implications are discussed.

**Key Words:** Caregiver warmth, family cohesion, patient perspective, symptom severity

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Schizophrenia is a severe and chronic mental illness that affects the entire family, with family members often becoming lifelong caregivers for patients. Because of strong familial involvement in the care of the diagnosed individual, the family environment has been studied extensively as an influential psychosocial factor that relates to prognosis. The majority of studies have examined family environmental constructs from an independent observer's perspective through use of clinical assessment tools such as expressed emotion (EE) generally being measured with the Camberwell Family Interview (CFI) or the Five-Minute Speech Sample. However, few studies have focused on how patients perceive family attitudes and how these perceptions influence patient outcomes. Some previous findings suggest that patient perceptions may actually be better predictors of patient outcomes such as symptom severity (Cutting and Docherty, 2000; Kopelowicz et al., 2002; Onwumere et al., 2009; Tompson et al., 1995; Weisman et al., 2006). Even fewer studies have examined both patient perspectives of their family environment and family member perspectives within the same study. The current study will do so with the aim of providing a more comprehensive assessment of protective and risk factors (from patient and family member perspectives) and their links to patient symptom severity.

## Perceptions of Protective and Risk Factors

For patients with schizophrenia, regular contact with high-EE family members (family members who are highly critical, hostile, and/or emotionally overinvolved) has been well established as a psychosocial risk factor known to contribute to worsening of patient symptoms and higher relapse rates (Cutting and Docherty, 2000; Linszen et al., 1997; Sczafca and Kuipers, 2001; Tompson et al., 1995; Van Humbeeck et al., 2002; Weisman et al., 2005). The extant literature has largely

focused on the criticism component of EE as it is widely recognized as a risk factor that exacerbates the illness (Hooley and Parker, 2006; Weisman et al., 2006). Because criticism is viewed as the most important component of EE, previous studies that have examined patient perceptions of EE have primarily focused on perceived criticism (PC) from the patient's perspective. The relationship between higher PC and greater symptom severity has been demonstrated in schizophrenia as well as other mental disorders. For example, Barrowclough et al. (2003) found a significant relationship between patient ratings of more criticism from relatives and increased positive symptoms (mediated by a negative self-evaluation). Similarly, Onwumere et al. (2009) found that PC was associated with higher ratings on the general psychopathology subscale of the Positive and Negative Syndrome Scale, independent of CFI ratings. Once again, these results indicate that patient perspectives may be better predictors of symptom severity when compared with scores on clinical assessment measures. Collectively, previous findings suggest that patient perceptions of greater levels of PC are associated with poorer outcomes for patients such as increases in symptom severity and, ultimately, rehospitalization.

Understandably, the majority of family environment studies have focused on risk factors that exacerbate the illness (e.g., criticism). However, positive family characteristics such as warmth and family cohesion (FC) may have a protective effect that aids in symptom recovery (González-Pinto et al., 2011; López et al., 2004). Family cohesion is a family environmental construct that directly assesses patient perceptions of family unity through a self-report measure. Perceptions of low FC have been found to be significantly associated with increased symptom severity across various disorders, including schizophrenia. For example, Weisman et al. (2005) found that Hispanic/Latino (H/L) and African American patients who reported greater levels of FC had fewer psychiatric symptoms and reported feeling less distress. Similar findings exist with regard to the construct of warmth. For example, Bertrando et al. (1992) found that in a sample of Italian patients with schizophrenia relapse rates were lower when the patients came from families that were rated as higher on warmth. Interestingly, even if the family was rated as high EE, high warmth still served as a protective factor against relapse.

Scant literature has examined protective factors despite the value and insight they may offer. While previous studies have obtained patient and family member perceptions of FC, to the best of our knowledge, patient (and caregiver) perceptions of warmth have yet to be examined. Instead, previously reviewed studies have used independent observer ratings of warmth from the CFI. Based on previous literature demonstrating the discrepancies between clinical assessment ratings and patient perceptions of their family environment (e.g., Medina-Pradas et al. [2013] found no correlation between patient perceptions of caregiver criticism and caregiver EE ratings from the CFI), we may be missing valuable information by not obtaining the patient's perspective on the protective factor of warmth. Furthermore, in order to determine which risk and protective factors have the most impact on patient symptom severity, it seems important to obtain multiple perspectives on the family environment and examine them simultaneously within studies as these variables do not occur in isolation. In fact, discrepancies in perceptions of the family environment between patients and their caregivers are quite common (King and Dixon, 1995). Several studies have demonstrated discrepancies in patient and family member perspectives of

University of Miami, Coral Gables, FL.

Send reprint requests to Kayla Gurak, MS, Department of Psychology, University of Miami, 5665 Ponce de Leon Blvd, Coral Gables, FL. E-mail: kayla.gurak@gmail.com.

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the family environment. For example, Cañivé et al. (1995) found that patient, father, and mother ratings on the Family Environment Scale (FES) were poorly correlated with each other. Weisman et al. (2005) similarly found that patient and family member ratings of the family environment (specifically FC) did not correspond. Therefore, directly examining patient and family member perspectives of their family environment within 1 study is crucial in determining which provides better prediction of psychopathology.

## Ethnic Differences

Little research has examined the role that ethnicity plays in family environmental constructs (López et al., 2004). Yet previous findings suggest that there may be a cultural disconnect in “outsider” or independent observer ratings compared with patient perceptions of the same interactions (Guada et al., 2011; Tompson et al., 1995; Weisman et al., 2006). Prior literature also suggests that some constructs may function differently or may be of more or less importance for individuals from different cultural backgrounds (Kopelowicz et al., 2002; Herman et al., 2007; Rosenfarb et al., 2006; Tompson et al., 1995; Weisman et al., 2005). In fact, some studies have found differential results by ethnicity demonstrating the importance of these constructs, particularly for ethnic minority patients. For example, in a previous study conducted by Weisman et al. (2005), results demonstrated that higher levels of FC were significantly associated with less emotional distress for H/L and African American patients with schizophrenia. Interestingly, these results were not found in white patients. In a sample of adolescents with depression, Herman et al. (2007) similarly found that for African American adolescents low FC was significantly associated with increased depression symptoms. However, in line with Weisman et al. (2005), this relationship was not significant for white adolescents. The aforementioned studies are just 2 examples that seem to suggest that it makes sense not only to obtain patient and family member perspectives on their family environments but also to examine these constructs within a cultural context.

## The Current Study

The current study examines several family environmental risk and protective factors from family member and patient perspectives. More specifically, patient perceptions of primary caregiver’s criticalness and primary caregiver’s warmth and both patient and primary caregiver’s perceptions of overall FC are examined. The current study also addresses previous study limitations by examining these constructs in a large ethnically diverse sample with the ability to assess for differential patterns based on one’s ethnicity. It is hoped that findings from this study will offer a more complete picture of influential family environmental factors that play a role in patient symptom severity. The overall goal is to better predict factors that lead to increased symptom severity so that we may provide more effective treatment to patients by focusing our efforts on reducing risk factors within their homes and cultivating protective factors. The results will be examined first with the full sample and then stratified by ethnicity. This will allow us to carefully examine the strength and directionality of relationships in each ethnic group.

## Hypotheses

It was expected that higher patient ratings of PC, lower patient perceptions of warmth, and lower ratings of FC (from both the patient and the family member perspective) would be associated with more severe psychiatric symptoms (Arshad et al., 2011; Barrowclough et al., 2003; González-Pinto et al., 2011; Hooley and Teasdale, 1989; Lebell et al., 1993; López et al., 1999; López et al., 2004; Medina-Pradas et al., 2011; Medina-Pradas et al., 2013; Tompson et al., 1995; Weisman et al., 2005). We also assessed a comprehensive model

for predicting symptom severity that included both protective and risk factors in the same analysis. This allowed us to assess each variable’s unique role in predicting symptom severity, when other important, related variables were controlled. Because this analysis was largely exploratory, no specific hypotheses were offered.

We also stratified results by patient ethnicity in order to determine if different patterns of associations were present. Stratification allowed us to examine the strength and directionality of relationships, as well as compare results across ethnicities. Based on prior research, we hypothesized that when results were stratified by ethnicity protective factors would carry more weight for ethnic minority patients (Herman et al., 2007; López et al., 2004; Weisman et al., 2005), and the risk factor of perceived caregiver criticism would carry more weight for white patients (Barrowclough et al., 2003; Onwumere et al., 2009).

## METHODS

### Subjects

The current study is part of a larger treatment study examining how a family-focused, Culturally Informed Treatment for Schizophrenia (CIT-S) and other psychosocial factors relate to patient and caregiver functioning in individuals diagnosed with schizophrenia and their family members (see Weisman, 2005; Weisman de Mamani et al., 2014 for a more detailed description of the larger project). Results from this intervention study demonstrated that when compared to a psychoeducation-only control condition, patients assigned to the CIT-S condition had significantly lower psychiatric symptom severity at treatment termination (while controlling for baseline symptoms; Weisman de Mamani et al., 2014). Furthermore, caregivers in the CIT-S condition also demonstrated reduced levels of caregiver burden at treatment termination in comparison to those in the control condition (Weisman de Mamani and Suro, 2015). Patients without family members were invited to participate in a multifamily group version of the study, which we are currently evaluating. However, only baseline data prior to any intervention were examined for the current study. Participants were recruited for a schizophrenia treatment intervention study from advertisements displayed in local hospitals, newspapers, and in the cars of Miami’s above-ground rail system, the Metrorail. Individuals interested in participating in the study responded to our advertisements by calling our telephone number and completing a short eligibility phone screen with one of our research associates. Patients who appeared to meet criteria for schizophrenia were then invited to schedule an in-person assessment at our clinic. Patients who did not have any family members who were willing or available to participate in the family treatment intervention trial were channeled into the multifamily group portion of the intervention trial. The group intervention covered the same material covered in the CIT-S treatment condition, simply in a multifamily group format.

The sample consisted of 221 patients with schizophrenia or schizoaffective disorder (69.2% male, 30.8% female) with a mean age of 40.97 (SD = 11.45) years. Patients self-identified their ethnicity as white (15.8%), African American (41.2%), H/L (36.7%), or other (2.3%). Nine patients had missing data for ethnicity (4.1%). Patients also identified their education level with 3.2% of the sample completing less than grade 8, 2.7% completing grade 8, 19.9% completing some high school, 26.7% graduating from high school, 34.8% completing some college, 8.1% completing a college degree, and 1.4% completing an advanced degree; 3.2% of the sample had missing data for education level. Assessments were conducted in the participant’s preferred language (either English or Spanish), with 91.9% of patients choosing to complete their assessment in English and 8.1% completing the assessment in Spanish. At the time of the assessment, patient diagnosis of either schizophrenia or schizoaffective disorder was confirmed through

use of the Structured Clinical Interview for *DSM-IV (Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition)*, Patient Edition (SCID-I/P, version 2.0), Psychotic Symptoms module (First et al., 2002). Exclusion criteria for patients included being acutely psychotic at the time of the assessment (as rated by the Brief Psychiatric Rating Scale [BPRS] items scored >5) and unable to provide informed consent, not meeting criteria for schizophrenia or schizoaffective disorder, being suicidal at the time of the assessment, having a recent suicide attempt (within the last year), or having been involuntarily hospitalized within the past 3 months. Patients who had been recently incarcerated for violent crimes were also ineligible to participate in the current study.

Patients could have multiple family members participate with them in the study. However, the current study used only data from the family member who was reported to be the patient's primary caregiver. Eligibility to participate in the current study as a caregiver was dependent on patient eligibility (see above). Primary caregivers were defined as the relative who reported spending the most time with the patient. Primary caregivers who participated in the study were required to be in contact with the patient for a minimum of 1 or more hours per week over the past 3 months. However, 34.2% of our sample indicated that patients either lived with their primary caregivers or spent more than 100 hours per week together. Of the 221 patients in this sample, 114 of them also had primary caregivers participate with them. The remaining patients (n = 107) did not. The sample of caregivers (n = 114) had a mean age of 48.70 (SD = 13.47) years, and 43.9% were male, and 56.1% were female. Primary caregivers self-identified their ethnicity as white (21.1%), African American (31.6%), H/L (46.5%), or other (0.9%). Primary caregivers had their assessments conducted in their preferred language (either English or Spanish), with 77.2% choosing to complete their assessment in English and 22.8% completing the assessment in Spanish. With regard to their relationship to the patient, primary caregivers in this study identified as mother (28.9%), father (8.8%), significant other (29.8%), sister (4.4%), brother (5.3%), daughter (3.5%), son (3.5%), friend (10.5%), uncle (0.9%), niece (0.9%), grandmother (0.9%), or cousin (2.6%). While a large portion of primary caregivers were significant others (29.8%), the majority were mothers and fathers (37.7%).

### Translation of Measures

All measures were translated from English to Spanish using an editorial review board approach consisting of members from diverse backgrounds including Cuba, Colombia, Nicaragua, Costa Rica, Mexico, and Puerto Rico. This approach is considered to be a more effective translation method when compared with translation-back translation as the editorial review board takes into consideration within-group language variations (Geisinger, 1994). The measures were first translated by a native Spanish speaker into Spanish. This translator then met with the editorial review board in which each member independently reviewed the Spanish version and compared it with the English version. Next, members of the board discussed any discrepancies and attempted to come to an agreement about the most generic and most easily understood wording. The board then met a second time to once again independently compare the English and Spanish versions of the measures and discuss any remaining discrepancies until a consensus was reached on all items.

### Measures

#### Demographics

Participants completed a demographics questionnaire in which they provided information such as age, sex, race/ethnicity, years of education, and hours of social contact (i.e., in-person interactions, communication via telephone, e-mail, etc.) between patient and relative/caregiver.

### Eligibility for Current Study

The SCID-I/P (version 2.0) Psychotic Symptoms module (First et al., 2002) was used to determine if a patient met lifetime criteria for a diagnosis of either schizophrenia or schizoaffective disorder. The SCID-I/P has demonstrated high interrater reliability for both symptoms and diagnoses (Ventura et al., 1998). Interrater reliability for the current study was determined by having the principal investigator (Amy Weisman de Mamani) and all other interviewers watch 6 videotapes of SCID-I/P interviews and provide their independent determinations of patient diagnoses. Interrater agreement for the current study using Cohen  $\kappa$  is 1.0.

### Perceptions of EE (Primary Caregiver Warmth and Criticism)

The Perceptions of EE Scale was designed by Weisman et al. (2006) and used in a previous study. This 2-item instrument includes the following 2 questions: (1) In describing your relative, would you say (relative's name) is not at all warm, somewhat warm, or very warm? (2) In describing your relative, would you say (relative's name) is not at all critical, somewhat critical, or very critical? Patients must choose 1 of the 3 options provided and are encouraged to choose the response that best describes their primary caregiver. These items were coded such that higher scores are indicative of more warmth and more criticism (answers ranging from 1 to 3).

### Family Cohesion

Patient and caregiver perceptions of family unity were measured through the cohesion subscale of the FES (Moos and Moos, 1981). Participants were read the following prompt: "The following are statements about families. Circle T if the statement is true or mostly true for most members of your family. Circle F if the statement is false or mostly false for most members of your family. Answer questions based on the LAST 3 months or since your last assessment." This subscale consists of 9 true/false statements designed to assess the degree to which patients feel their family provides help, support, and commitment to each other (Weisman et al., 2005). For example, "Family members really help and support one another." The FES is an easy-to-administer and score self-report measure that obtains family members' perceptions of their family environment. Furthermore, the psychometric properties of the FES have been demonstrated in English, Spanish, and Chinese and across ethnicities including Chinese, H/L, and African Americans (McEachern and Kenny, 2002; Phillips et al., 1998; Weisman and López, 1996). A total score on the FES cohesion subscale was calculated by summing the participants' scores on each T/F item. Because some of the items are reverse coded, these items were reversed so that higher total scores were indicative of perceptions of more cohesion. This scale is reported to have demonstrated adequate to good internal reliability (Cronbach  $\alpha$  0.63–0.78) (Moos and Moos, 1981; Weisman et al., 2005). Internal reliability for the overall study sample (patients and caregivers combined), using Cronbach  $\alpha$ , was 0.794 (patients only = 0.832 [English = 0.832, Spanish = 0.724]; caregivers only = 0.641 [English = 0.652, Spanish = 0.577]).

### Symptom Severity

Current severity of patient symptoms was measured through use of the BPRS (Lukoff et al., 1986; Overall and Gorham, 1962). A total BPRS score was obtained by summing patient scores on all 24 items. Higher scores were indicative of greater symptom severity. Each of the 24 items is assessed using a 7-point anchor rating, with 1 indicating "not present" to 7 indicating "extremely severe." It should be noted that in the current study patients who were acutely psychotic (i.e., scoring a 6 or 7 on any of the critical items) were ineligible to participate. The BPRS is reported to have good reliability and has been reported as

having intraclass coefficients ranging from 0.74 to 1.00 on scale items (Weisman et al., 2005). The principal investigator (Amy Weisman de Mamani) completed a UCLA BPRS training and quality assurance program and has demonstrated reliability with the course creator, Dr Joseph Ventura. Dr Weisman de Mamani trained all graduate student interviewers. Interviewers then coded 6 training videotapes selected by Dr Joseph Ventura. Intraclass correlations between interviewers and consensus ratings of Dr Ventura ranged from 0.79 to 0.98 for total BPRS scores.

**Data Analyses**

All analyses were conducted using SPSS Statistics software, version 21 (IBM, Armonk, NY). Variables of interest were calculated such that higher scores were reflective of greater levels of the construct being measured (e.g., more warmth, more FC, greater symptom severity). Normality was assessed, and all variables were examined for any outliers. The relationships between primary study variables (patient perceptions of caregiver warmth, patient perceptions of caregiver criticism, patient perceptions of FC, and caregiver perceptions of FC) and select demographic variables (age, sex, education, primary language, hours of social contact between patient and relative) were examined as potential covariates. If determined to be significant, covariates were controlled for in the primary analyses.

The primary analyses were aimed at assessing family environmental risk and protective factors that may predict patient symptom severity. A series of zero-order correlations were conducted between all primary variables that were continuous, and a correlation matrix was prepared. Results from this matrix allowed us to test whether higher patient ratings of PC, lower patient perceptions of warmth, and lower ratings of FC (from both the patient and the family member perspective) were associated with more severe psychiatric symptoms (when no other variables were being controlled). Results from the correlation matrix were used to identify significant predictors of symptom severity that could be further examined in a simultaneous regression analysis to evaluate a more comprehensive model of both risk and protective factors of symptom severity. All continuous independent variables were centered prior to regression analyses (Aiken and West, 1991; McClelland and Judd, 1993). We also used this matrix to assess for the possibility of excessively high levels of multicollinearity among predictor variables. If predictor variables had an absolute Pearson *r* value of 0.7 or greater, the variable with the higher correlation with patient symptom severity would be retained in the analyses, and the other variable would be dropped. While thresholds used in previous studies range from a more restrictive 0.4 to a less restrictive 0.85, a cutoff of 0.7 is the most commonly selected threshold (Dormann et al., 2013). If significant covariates were identified,

hierarchical regression analyses were used, and covariates were added in step 1 of the model and predictor variables in step 2. *R*<sup>2</sup> was first examined to determine the percent of symptom severity that could be accounted for by the linear combination of variables. Standardized  $\beta$  weights of each predictor were also examined to evaluate the relative contribution of each predictor while partialing out the effects of the others.

**RESULTS**

**Preliminary Analyses**

**Missing Data**

Missing data were present for all study variables but appeared to be missing at random with no indication of systematic response biases. Little’s Missing Completely at Random test was nonsignificant and supports the presence of Missing Completely at Random data,  $\chi^2(151) = 169.650, p = 0.142$ . A listwise deletion approach was used for all analyses.

**Study Variables**

All variables were assessed for normality and outliers. According to Curran et al. (1996), nonnormality issues arise when univariate values are 2.0 or larger for skewness and 7.0 or larger for kurtosis. All study variables’ skewness and kurtosis values were within normal limits, and no transformations were required. In fact, most values were within a conservative -1 to +1 range (see Table 1 for specific values).

**Demographic Variables**

Information for all demographic variables, such as sex, ethnicity, education, caregiver relationship to patient, primary language, and amount of weekly social contact between caregiver and patient, can be found in Subjects. A correlation matrix was created to assess the relationships between continuous variables and identify any potential covariates (Table 2). Education was found to be significantly correlated with BPRS scores such that patients with lower education were found to have higher BPRS scores, indicating greater symptom severity ( $r = -0.163, p = 0.019$ ).

Independent-sample *t* tests were conducted to examine the relationships between dichotomous categorical variables (sex of patient, sex of caregiver, primary language) and continuous study variables. It was found that patients whose primary language was Spanish had significantly higher FC FES scores ( $M = 16.14; SD = 2.03$ ) when compared with patients whose primary language was English ( $M = 14.26; SD = 2.87$ ), equal variances not assumed,  $t(17.162) = -3.226, p < 0.001$ . Patients with a primary language of Spanish also had

**TABLE 1.** Descriptive Statistics for Continuous Variables

Variable	n <sup>a</sup>	Mean	SD	Skewness	Kurtosis	Possible Range	Observed Range
Patient age	216	40.97	11.45	-0.167	-0.872	18–100+	18–65
Caregiver age	112	48.70	13.47	-0.141	-0.320	14–100+	16–81
IPfes	200	14.40	2.855	-0.454	-1.166	9–18	9–18
CGfes	107	15.26	2.065	-0.548	-0.483	9–18	10–18
FES discrepancy	96	2.15	2.08	1.209	0.879	0–9	0–8
IPwarm	192	2.55	.6202	-1.064	0.085	1–3	1–3
IPcrit	192	2.03	.7755	-0.045	-1.331	1–3	1–3
BPRS	211	55.57	13.15	-0.233	0.267	24–168	24–87

IPfes indicates patient FES total score; CGfes, caregiver FES total score; FES discrepancy, discrepancy between patient and caregiver FES scores; IPwarm, patient perception of caregiver warmth; IPcrit, patient perception of caregiver criticism; BPRS, patient total BPRS scores.

<sup>a</sup>Differences in sample sizes vary by variable because of missing data.

**TABLE 2.** Correlation Matrix Between Study Variables

Variable	1	2	3	4	5	6	7	8	9
1. IPwarm	1								
2. IPcrit	-0.342*	1							
3. IPfes	0.395*	-0.191*	1						
4. CGfes	0.059	0.005	0.256**	1					
5. IPage	-0.010	-0.029	-0.070	-0.078	1				
6. CGage	-0.170	0.199	0.047	0.048	-0.048	1			
7. IPedu	-0.085	-0.012	0.074	-0.023	-0.072	0.058	1		
8. Hours	0.173	0.078	-0.103	0.022	-0.133	-0.041	-0.193	1	
9. BPRS	-0.149**	0.096	-0.297*	-0.101	0.096	-0.017	-0.163**	0.051	1

IPwarm indicates patient perception of caregiver warmth; IPcrit, patient perception of caregiver criticism; IPfes, patient FES total score; CGfes, caregiver FES total score; IPage, patient age; CGage, caregiver age; IPedu, patient education; Hours, weekly number of hours of social contact between patient and caregiver; BPRS, patient total BPRS scores.

\**p* < 0.05.

\*\**p* < 0.01.

significantly lower levels of education (*M* = 3.22; *SD* = 1.31), as compared with English-speaking patients (*M* = 4.30; *SD* = 1.13), *t* (212) = 3.823, *p* < 0.001. Patient language and level of education were both considered significant covariates and were controlled for in subsequent primary analyses. Ethnicity was not examined as a covariate because results are later stratified by ethnicity.

**Primary Analyses**

**Results From Correlation Matrix**

Our first study hypothesis predicted that higher patient ratings of PC, lower patient perceptions of warmth, and lower ratings of FC (from both the patient and the family member perspective) would be associated with more severe psychiatric symptoms. Results from zero-order correlations partially supported this hypothesis as lower patient ratings of perceived caregiver warmth were associated with greater patient symptom severity scores on the BPRS (*r* = -0.149, *p* = 0.042), and lower patient ratings of FC were also associated with higher BPRS scores (*r* = -0.297, *p* < 0.001). Patient perceived caregiver criticism and lower ratings of FC (from the family member perspective) were not significantly associated with symptom severity. See Table 2 for correlation matrix.

**Regression Analysis With Significant Predictors From Correlation Matrix**

Multicollinearity among predictor variables was assessed and determined to not be problematic as the largest correlation was 0.395. Therefore, no variables were dropped from the analysis. Because significant covariates were identified, hierarchical regression was used for this analysis. In order to determine how well symptom severity was predicted by primary study variables over and above the covariates, patient education and patient primary language were added in block 1 of the model, and the centered predictor variables were added in block 2 (patient ratings of caregiver warmth and patient FC scores). Results indicated that the covariates of patient education and language accounted for approximately 6.4% of the variability in patient symptom severity, *R*<sup>2</sup> = 0.064, *F* (2, 173) = 5.936, *p* = 0.003. Only the partial correlation between symptom severity and education was significant, *t* (173) = 3.409, *β* = 0.253, partial *r* = 0.251, *p* = 0.001. The linear combination of the predictor variables and the relationship with symptom severity was significant over and above the covariates and explained an additional 9.0% of the variability in patient symptom severity, *R*<sup>2</sup> = 0.154, *R*<sup>2</sup> change = 0.090, *F* (2,171) = 9.100, *p* < 0.001. Education was once again

significant, *t* (171) = 3.264, *β* = 0.232, partial *r* = 0.242, *p* = 0.001. Patient FC scores were also a significant predictor, *t* (171) = -3.669, *β* = -0.285, partial *r* = -0.270, *p* = 0.001. Because patient ratings of FC were found to be a significant predictor of symptom severity, our first study hypothesis was partially supported by hierarchical regression results.

**Results Stratified by Ethnicity**

Because previous literature suggests the link between family environment and symptom severity may vary by ethnicity, we re-ran results stratified by ethnicity. Only white (*n* = 35), African American (*n* = 91), and H/L (*n* = 81) patients were included in the analyses. The means and SDs for all continuous study variables are presented in Tables 3 to 7. Overall sample mean and SD are listed followed by results stratified by ethnicity. Following Herman et al. (2007), López et al. (2004), and Weisman et al. (2005), we hypothesized that protective factors would carry more weight for ethnic minority patients. We also hypothesized that the risk factor of patient perceived caregiver criticism would carry more weight for white patients (following Barrowclough et al., 2003, and Onwumere et al., 2009). This hypothesis was partially supported as FC remained significant for H/L (*F* (3, 57) = 3.678, *p* = 0.017, *β* = -0.374, *p* = 0.006) and African American patients (*F* (3, 74) = -2.529, *p* = 0.064, *β* = -0.306, *p* = 0.016). Interestingly, this pattern did not hold for white patients, as neither the overall model nor any predictors were significant (*F* (3, 25) = 0.119, *p* = 0.948, FC *β* = -0.059, *p* = 0.796, warmth *β* = 0.133, *p* = 0.593, criticism *β* = 0.093, *p* = 0.707).

**DISCUSSION**

The overarching objective of the current study was to examine risk and protective factors of the family environment utilizing a combination of patient and caregiver perspectives. Because the variables

**TABLE 3.** Means of FES FC Subscale Total Scores (Patients Only *n* = 200)

	Mean	SD
Overall sample	14.40	2.86
By ethnicity		
White ( <i>n</i> = 34)	14.68	2.67
African American ( <i>n</i> = 84)	14.24	2.94
H/L ( <i>n</i> = 73)	14.48	2.85

**TABLE 4.** Means of FES FC Subscale Total Scores (Caregivers Only n = 107)

	Mean	SD
Overall sample	15.26	2.07
By ethnicity		
White (n = 23)	15.35	1.85
African American (n = 36)	14.97	2.14
H/L (n = 52)	15.37	2.11

examined do not act in isolation, the current study aimed to determine which variables have the most impact on patient symptom severity when examined collectively. An additional aim of the present study was to assess whether patterns varied by ethnicity. Our study hypotheses were partially supported. Patient perceptions of greater caregiver warmth and patient perceptions of higher levels of FC were associated with lower levels of patient symptom severity. However, contrary to expectations, the constructs of patient perceived caregiver criticism and caregiver perceptions of FC were not significantly associated with patient symptom severity.

Results from our analyses seem to suggest that the presence of protective factors in the home may have a greater impact on patient symptom severity than the presence (or perception) of risk factors. Alternatively, even if risk factors are present in the family environment, protective factors may buffer against their detrimental influence. Our findings are in line with previous studies that demonstrate that protective factors such as family warmth and positive statements are associated with lower symptom severity, better social functioning, and lower relapse rates (Bertrando et al., 1992; Ivanović et al., 1994; López et al., 2004; Medina-Pradas et al., 2013; O'Brien et al., 2006). Findings from the current study also illustrate the weight that patient perception measures may carry when compared with other family member perspectives. Interestingly, our results are in line with Weisman et al., 2005, in which the authors found (in an unrelated sample) that patient and family member ratings of FC did not correspond. Thus, our findings indicate that while assessing all family members' perspectives may be important, seeking the patient perspective (particularly for protective factors) may be most useful in terms of predicting patient symptom severity.

When examining results stratified by ethnicity, study hypotheses were partially supported in that the protective factor of FC was significantly associated with symptom severity in ethnic minority patients. Interestingly, none of the primary study variables were associated with symptom severity in our white subsample. Given that the majority of our sample was composed of H/L and African American patients, this could indicate that ethnic minority patients may have driven the majority of findings and that FC may carry more weight for these patients. However, it is interesting to note that these differential patterns replicate results from a previous study with an entirely different sample (see Weisman et al., 2005). It is also noteworthy that patients with a primary

**TABLE 5.** Means of Patient-Perceived Warmth of Caregiver (n = 192)

	Mean	SD
Overall sample	2.55	.620
By ethnicity		
White (n = 32)	2.44	.564
African American (n = 83)	2.65	.614
H/L (n = 69)	2.51	.633

**TABLE 6.** Means of Patient PC of Caregiver (n = 192)

	Mean	SD
Overall sample	2.03	.7755
By ethnicity		
White (n = 32)	1.81	.780
African American (n = 84)	2.00	.760
H/L (n = 69)	2.13	.803

language of Spanish had lower levels of education yet had significantly higher FC scores when compared with patients with a primary language of English. Findings seem to suggest the importance of FC for ethnic minority patients, especially H/L patients.

**Limitations, Future Directions, Conclusions**

There were several limitations in the present study. First, this sample was composed of cross-sectional data, which prevents us from being able to speak to any longitudinal influences or directions of the associations such as how the relationships observed here could potentially impact patient relapse rates across time. In addition, it is possible that patients with more severe symptoms on the BPRS (e.g., suspiciousness) may perceive their family members as less supportive because of the nature of the symptoms. It is also possible that patients' symptoms of paranoia could negatively impact their perception of FC. Similarly, we excluded patients who were acutely psychotic; thus, study findings may not apply to this population. Second, our sample was composed primarily of ethnic minority patients (~83%) with a comparatively smaller subsample of white patients. Therefore, the results for whites may be unreliable. However, they appear to replicate previous results giving us more confidence in the finding. Finally, our reliance on self-report measures, including single-item measures of patient perceived warmth and criticism, is another limitation of the study. Corroborating these findings with objective measures will be important in future research. In other words, we believe that an evaluation that includes both objective and subjective measures will provide the most comprehensive assessment.

In the future, information from the present study could be used to tailor assessments and treatments for patients with schizophrenia. For instance, although a few researchers have expressed concerns that patients may not be able to provide accurate assessments (e.g., Kohler et al., 2010; Poole et al., 1997), utilizing self-report measures to obtain the patient's perspective on their family environment could offer valuable information regarding the likelihood of current and future relapses. Knowing that patients hold negative perceptions of certain aspects of the family environment (i.e., lower perceptions of warmth and/or cohesion) could raise an early red flag for clinicians, given its association with symptoms. Thus, when patient perceptions indicate that something is amiss, clinicians may choose to directly target familial functioning and perceptions of FC prior to addressing other issues (e.g.,

**TABLE 7.** Means of Patient Total BPRS Scores (n = 211)

	Mean	SD
Overall sample	55.57	13.15
By ethnicity		
White (n = 33)	55.18	12.48
African American (n = 89)	56.16	11.98
H/L (n = 78)	54.40	14.42

education about the illness, social skills). Fortunately, the measures used in this study to assess patient perceptions are quick and easy to use, require minimal training, and can offer crucial insight into the family environment.

## DISCLOSURE

The authors declare no conflict of interest.

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