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Concordance Between Patient and Family Reports of Family Functioning in Bipolar I Disorder and Major Depressive Disorder

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Abstract

Despite the extensive literature on family functioning and mood disorders, less is known about concordance between patient- and family-reported family functioning. To address this question, adults with bipolar I disorder (BD; $n = 92$), major depressive disorder (MDD; $n = 121$), and their family members ($n = 135$ and 201 , respectively) were recruited from hospital sources. All patients and their family members completed the Family Assessment Device (Epstein et al., 1983). Intraclass correlation coefficients revealed that, in contrast to the moderate degree of concordance in the MDD sample, degree of concordance between patient- and family-reported family functioning was significantly weaker in BD. Subsequent analysis revealed that this discordance was driven by the reports of the child and young adolescent family members of the patients with BD. Results highlight the importance of collateral reports in the assessment of family functioning, especially among families of patients with BD, in research and treatment.

Keywords

bipolar disorder; major depressive disorder; family functioning

There is a substantial body of literature linking mood disorders to impairments in family functioning, typically regarded as how effectively family members communicate and problem-solve to achieve individual and collective needs (Ryan et al., 2005). Indeed, families of patients with bipolar disorder (BD) and major depressive disorder (MDD) score more poorly on ratings of family functioning when compared to nonclinical controls (Friedmann et al., 1997; Miller et al., 1986), and research has consistently demonstrated significant correlations between impaired family functioning and mood symptom severity (Koyama et al., 2004; Miklowitz et al., 1988). In addition to these cross-sectional findings, there is evidence that impaired family functioning predicts increased rates of depressive (Yan et al., 2004) and manic (Kim & Miklowitz, 2004) episode relapse over time, even up to six years following an index episode (Keitner et al., 1997).

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Notably, prior studies have often combined patient and family member reports to create a composite of family functioning (e.g., Friedmann et al., 1997; Miller et al., 1986), whereas others have focused exclusively on patient-reported (Stefos et al., 1996) or family-reported (Kim & Miklowitz, 2004; Yan et al., 2004) functioning and their associations with mood disorder outcomes. Yet in the absence of existing data on the degree of concordance between patients and their family members on measures of family functioning, it is unclear whether reports from patients and their family members necessarily reflect the same overall level of family functioning, or whether combined reports somehow obscure important differences in perceptions of family functioning, should they exist.

Given cognitive (Beevers & Miller, 2004; Scott & Pope, 2003) and behavioral (Seidel et al., 2010; Strakowski et al., 2010) patterns associated with mood disorders, as well as overall impairment in family functioning (Friedmann et al., 1997; Weinstock et al., 2006), it is possible that patient and family member perceptions of the family environment differ in substantive ways. If present, such differences may have important implications for assessment, treatment, and understanding of the family context and its role in the course and outcome of BD and MDD. For example, if there is evidence that perceptions of family functioning differ remarkably between patients and family members, there may need to be an even greater emphasis on collateral assessment for research and treatment purposes. From a clinical perspective, differing perceptions of family functioning among patients and family members may inhibit progress of treatment if a clinician is targeting only one person's perception of family difficulties. There is also evidence that greater discrepancy between patient- and family-reported family functioning may predict poorer outcomes for those with mood disorders, such as increased risk of suicide attempt (McDermut et al., 2001). These data suggest that understanding concordance between patient and family reports of family functioning is critical, yet descriptive research reporting on overall degree of concordance in the mood disorders has been minimal.

In other clinical samples, a review of the available literature reveals evidence for weak correlations between patient- and family-reported family functioning in families of patients with schizophrenia (Canive et al., 1995; Koyama et al., 2004; Weisman et al., 2005), and poor agreement between patients with eating disorders and their parents on indices of family functioning (Bonne et al., 2003; Dancyger et al., 2005). For families of patients with alcohol use disorders, low-to-moderate levels of agreement between patient- and family-reported family functioning have been reported (McKay et al., 1993). However, others have reported no significant differences in reported family functioning between family members and patients with alcohol dependence in recovery (Osterman & Novak Grubic, 2000).

A literature search revealed only one study that has evaluated associations between patient- and family-reported functioning in a sample of patients with mood disorders. In this study, Koyama et al. (2004) reported weak-to-moderate correlations for outpatients with BD ($n = 18$) and MDD ($n = 28$) and their family members, across several dimensions of family functioning as assessed by the Family Assessment Device (Epstein et al., 1983). Although informative, such correlations do not adequately describe level of agreement between patients and their family members, as continuous measures could be perfectly correlated yet nevertheless discrepant (e.g., 1, 2, 3, 4 with 10, 20, 30, 40). Further, although Koyama et al. discussed differences in the strength of effect for BD and MDD in a qualitative fashion, they did not directly evaluate differences in the strength of the correlations by diagnostic group using quantitative methods. As there may be differential impact of depressive vs. manic episodes on the family environment (Ogilvie et al., 2005), evaluating the strength of concordance between patient- and family-reported family functioning as a function of diagnosis represents a critical next step in this line of research.

In an effort to further advance an understanding of family functioning in mood disorders, the aim of the current study was to evaluate the degree of concordance between patient- and family-reported functioning in a sample of patients with BD and MDD. Further, we evaluated whether degree of concordance differed significantly as a function of mood disorder diagnosis. The data to date in the mood disorders literature, although limited in scope and in the use of correlational approaches (Koyama et al., 2004), suggest that there may be weak-to-moderate levels of agreement between patient and family member reports of family functioning. Further, one might anticipate weaker concordance in patients with BD and their family members, given near zero order correlations in other clinical samples with severe mental illness (e.g., Weisman et al., 2005). However, given the near absence of research addressing this question within the mood disorders specifically, we did not adopt *a priori* hypotheses regarding directionality or strength of effects, but rather pursued the current study aims in an exploratory fashion.

Methods

Participants

Participants were adult patients aged 18-65 years old with bipolar I disorder (BD; $n = 92$) and MDD ($n = 121$), and their family members ($n = 135$ and 201 , respectively). All patients with MDD and the majority ($n = 84$) of patients with BD were recruited from inpatient and partial hospitalization programs at the Brown University-affiliated Butler Hospital to participate in clinical trials of combined pharmacological and psychosocial treatments (Miller et al., 2004, 2005). A small proportion of patients with BD ($n = 8$) was recruited for these trials from hospital outpatient settings.

Prior to study enrollment, patients were required to provide informed consent and to meet criteria for a diagnosis of either BD (current episode manic, depressed, or mixed) or MDD (current) according to the Structured Clinical Interview for *DSM-III-R* – Patient Version (SCID-P; Spitzer & Williams, 1987). Patients with MDD were required to score > 17 on the Modified Hamilton Rating Scale for Depression (Miller et al., 1985) or the Beck Depression Inventory (Beck et al., 1971). Patients with BD were required to score > 15 on the Bech-Rafaelson Mania Scale (Bech et al., 1979) and/or meet the depressive severity criteria described for MDD. Patients were also required to be living with or in regular (i.e., 10 hr per week) contact with a relative or significant other, who also provided informed consent (or assent) to participate (Miller et al., 2004, 2005). Across both studies, patients were excluded if they met *DSM-III-R* criteria for a schizophrenia or schizoaffective disorder, current alcohol or drug dependence, or if they had a medical condition severe enough to contraindicate the use of psychotropic medication. Additional inclusion and exclusion criteria are described in detail elsewhere (Miller et al., 2004, 2005).

Demographic and clinical characteristics of study patients are summarized in Table 1. Because it would not be clinically meaningful to compare symptom severity ratings between a predominantly manic versus depressed sample, global assessment of functioning (GAF) scores and total number of psychiatric hospitalizations are provided in Table 1 as measures of current and lifetime illness severity, respectively.

Participating family members ranged in age from 11 – 83 years ($M = 35.74$, $SD = 16.42$). Patients with BD had an average of 1.47 ($SD = 0.67$; range = 1 – 3) participating family members. Of the 92 BD cases, 62 (67%) included a spouse or partner, 18 (20%) included at least one parent, 24 (26%) included at least one offspring, 3 (3%) included at least one sibling, and 9 (10%) included at least one person classified as “other.” Patients with MDD had an average of 1.65 ($SD = 0.86$; range = 1 – 4) participating family members. Of the 121 MDD cases, 87 (72%) included a spouse or partner, 19 (16%) included at least one parent,

48 (40%) included at least one offspring, 5 (4%) included at least one sibling, and 4 (4%) included at least one person classified as “other.”¹ The majority of participating family members – 93% and 99% of the BD and MDD samples, respectively– shared a residence with the patient.

Study Design

Identified through chart review of consecutive admissions, patients with BD and MDD were approached during hospitalization or treatment for a current mood episode to determine their willingness to participate in IRB-approved clinical trials of pharmacologic, individual, and family interventions (Miller et al., 2004, 2005). BD patients were enrolled between 1993 – 1997 and MDD patients were enrolled between 1991 – 1995. Prior to random assignment into treatment conditions, patients and their family members were assessed on a number of pretreatment measures, including self-report measures of family functioning. The McMaster Model of Family Functioning (MMFF; Ryan et al., 2005) was used as a framework for this investigation, as it is a multidimensional model of the family that allows for systematic evaluation of patterns of family functioning across multiple domains. All assessments were completed during the patients' hospitalization or at the time of study referral. These cross-sectional measures of pretreatment family functioning were used in the current study analyses.

Assessments

Diagnosis—All diagnostic ratings were conducted by clinical raters with bachelor's or master's degrees. The SCID-P (Spitzer & Williams, 1987) was administered to patients at baseline to assess Axis I diagnoses. Prior to administering the SCID-P, all raters were required to achieve at least 90% agreement with the supervisor's ratings. All diagnostic decisions were based on a review of the SCID-P between the rater and the doctoral-level project coordinator, and diagnostic decisions were based on consensus. After patients completed the SCID-P, raters used all available clinical information to assign each patient a GAF rating based on the anchor points provided in the *DSM-III-R*. To establish diagnostic reliability, 10 tapes were randomly selected from each study ($n = 20$), and rated by a doctoral-level researcher blind to diagnostic status or study participation. Inter-rater reliability was high for BD ($\kappa = 0.89$) and MDD ($\kappa = 0.90$) diagnoses, as well as for GAF ratings ($\text{ICC} = 0.90$).

Family Functioning—The Family Assessment Device (FAD; Epstein et al., 1983) is a 60-item questionnaire that was used to assess self-reported family functioning. The FAD has been clinically and empirically derived in adult and child and adolescent samples over several decades (Ryan et al., 2005), and contains six subscales that correspond to the MMFF: problem solving (a family's ability to resolve problems and the steps it takes to do so), communication (a family's ability to communicate clearly and directly), roles (a family's ability to allocate and accomplish tasks), affective responsiveness (a family's ability to respond to situations with appropriate quality and quantity of feeling), affective involvement (quality of interest, concern, and investment family members have in and for each other), behavior control (a family's standards and limits of behavior), and a final dimension of overall general functioning. Scores for each of the FAD subscales range from 1 to 4, with higher scores representing poorer family functioning. In the current study, Cronbach's alphas ranged from .70 - .89 and .72 - .87 for patient and family member reports, respectively.

¹Because patients had, on average, more than one participating family member, the sum of proportions provided exceeds 100. Moreover, because more than one person in a particular family member category could have participated in the study (e.g., two parents), the numbers reported do not equal the total number of family members who participated.

Separate patient and family member FAD scores were used as the primary measures of patient-reported and family-reported levels of family functioning. If two or more of the patients' family members participated in the research study, average FAD scores from those family members were used. This decision was made for two reasons. First, from a statistical perspective, patients and their participating family members would be considered “distinguishable” versus “exchangeable” raters of family functioning for the purpose of calculating concordance using the intraclass correlation coefficient (Gonzalez & Griffin, 2004, p. 322). Yet within non-patient family members, the numerous permutations of potential family member participants across cases were too large to proceed with distinguishing every possible rater. Second, from a theoretical perspective, the specific aim of this study was to evaluate concordance between patients and their family members, and not between non-patient family members themselves. Indeed, averaged non-patient family member scores have been used in prior research on the associations between family functioning and mood disorders using the FAD (Friedmann et al., 1997; McDermut et al., 2001; Weinstock et al., 2006) and are also consistent with the use of mid-family ratings (Rozin et al., 1984) that have been widely reported in developmental research. However, as a complement to this approach, we conducted additional analyses of specific family member groups (e.g., children, spouses, parents), in order to determine whether study effects differed as a function of particular family member types.

Statistical Analyses

Prior to examination of current study aims, we used t-test and chi-square analyses to examine potential baseline group differences across demographic and clinical characteristics. To determine whether there were any covariates that would need to be accounted for in the main study analyses, we then evaluated whether degree of concordance between patient- and family-reported family functioning for each FAD subscale varied as a function of any demographic and clinical difference variables. To do so, we calculated two-way random intraclass correlation coefficients (ICCs) and corresponding 95% confidence intervals (CIs). As specified by Lu and Shara (2007), significant group differences at the p .05 level were identified by non-overlapping CIs. To evaluate primary study aims, the same ICC procedure was used to measure concordance between patient- and family-reported functioning for each FAD subscale by diagnostic group. Finally, given that we averaged across non-patient family members, we conducted sensitivity analyses to evaluate whether concordance rates by diagnostic group varied as a function of family member type (e.g., children, spouses, parents).

Results

Baseline Characteristics

As reported in Table 1, there was a greater proportion of females among the patients with MDD versus BD. There were no other differences between groups on other demographic variables or in average number of participating family members per patient. There were significant differences between groups in overall illness severity, with a significantly higher percentage of psychotic features, lower average GAF, and greater number of lifetime psychiatric hospitalizations in the BD sample.

Consequently, we evaluated whether the degree of concordance between patient- and family-reported family functioning for each of the FAD subscales varied according gender, presence of psychotic features, GAF score, or number of lifetime hospitalizations. For the latter two variables, we used a median split to determine low and high severity groups. As evidenced by overlapping CIs between groups for each FAD subscale, there were no significant differences in concordance between patient- and family-reported family

functioning for female (ICCs = 0.26 – 0.52) versus male (ICCs = 0.10 – 0.52) patients, for patients with psychotic (ICCs = .05 – .35) versus no psychotic (ICCs = .12 – .44) features, for patients with low (ICCs = 0.18 – 0.58) versus high (ICCs = 0.15 – 0.62) GAF scores, or for patients with fewer (ICCs = 0.01 – 0.45) versus higher (ICCs = 0.01 – 0.49) lifetime hospitalizations. Thus, these variables were not evaluated further as covariates in the subsequent analyses.

Concordance Between Patient- and Family-Reported Family Functioning

For descriptive purposes, means, standard deviations, and correlations between patient- and family-reported FAD subscale scores are presented in Table 2. Notably, mean scores on the FAD subscales were largely at or above the recommended thresholds for unhealthy functioning for both patients and family members (Ryan et al., 2005).

As evidenced in Table 3, there was statistically significant agreement between patient- and family-reported functioning across all FAD subscales for the MDD group, with moderate effect sizes (ICCs = 0.31 – 0.52). In contrast, in the BD group, there were no significant associations between patient- and family-reported family functioning for any of the FAD subscales (ICCs = -0.19 – 0.16), with several negative ICCs suggesting “worse-than-random agreement” between patients and family (Kenny et al., 2006; Taylor, 2010, p.6).² With the exception of affective responsiveness and behavior control, degree of concordance for the MDD group was significantly greater than that for the BD group on all remaining FAD subscales (p s < .05), determined by non-overlapping 95% CIs. This overall pattern of findings was similar when analyses were repeated comparing the bipolar depressed sample only to the MDD sample, suggesting that these effects were not driven by the presence of mania alone.

Concordance as a Function of Family Member Type

We further considered the potential impact of family member role on study outcomes. First, we repeated study analyses after having excluded family member participants who were < 18 years of age. This decision resulted in the exclusion of 43 (21%) of the family members of patients with MDD and 18 (13%) of the family members of patients with BD. Results from these analyses are presented in Table 4. Whereas results from the MDD group remained consistent with the previous analysis, concordance between patient- and family-reported family functioning in the BD group improved remarkably (ICCs = 0.26 – 0.43), with the exception of affective involvement, for which concordance remained low (ICC = 0.01). Indeed, after having excluded family members < 18 years of age in the analysis, degree of concordance between patients with BD and their family members was generally moderate in strength and comparable to those with MDD, as evidenced by overlapping 95% CIs. Similarly, when analyses were repeated using only spouses (BD ICCs = 0.26 – 0.44; MDD ICCs = 0.27 – 0.51) or only parents (BD ICCs = 0.21 – 0.51; MDD ICCs = 0.33 – 0.62), all of whom were > 18 years-old, there were significant, moderate levels of concordance between patients and families in both diagnostic groups.

Given the data suggesting that the child/young adolescent ratings were driving the high discrepancies in the BD group, we further evaluated potential differences between child/

²There is some controversy in the literature as to whether an ICC can have a negative value. Recent arguments (e.g., Kenny et al., 2006; Taylor, 2010, p.10) suggest that such a value is possible, and may reflect “worse-than-random agreement” between raters. Given several negative correlations between patient- and family-reported family functioning in the BD group, an alternative would be to set the ICC estimates to 0 for these subscales (cf., Varnell, Murray, Janega, & Biltstein, 2004). However, there is no clear consensus regarding this approach (Varnell et al.), and such an approach would not yield confidence intervals for purposes of comparing between clinical groups. Regardless of the approach used, there remains rather weak level of agreement between patient- and family-reported functioning in the BD group, which stands in contrast to the moderately strong effects found for the MDD group.

adolescent and BD patient reports of overall severity of family functioning using paired t-tests. Results from these analyses revealed no significant differences across FAD subscales (all $ps = .10 - .75$), and mean scores were not consistently higher or lower in the patients with BD than in their child/adolescent family members.

Discussion

The aim of the current study was to advance an understanding of family functioning in mood disorders by evaluating the level of concordance between patient- and family-reported family functioning in a sample of patients with BD and MDD. By and large, the degree of concordance between patient- and family-reported family functioning was significantly weaker in the BD versus MDD samples, with effect sizes that approached zero or that indicated worse-than-random agreement between patients and family members. In contrast, there were moderate effects for associations between patient- and family-reported functioning in the MDD sample.

Influence of Family Member Type on Discordance in BD

Subsequent analysis revealed that the discordance between patient- and family-reported functioning in the BD sample appeared to be largely driven by the reports of the child/young adolescent family members of those with BD. Indeed, when participating family members under 18 years of age were excluded from analysis, the degree of concordance between patients with BD and their family members improved to levels comparable to those for patients with MDD, as evidenced by overlapping CIs. Repeating the analysis with only patients' spouses or parents yielded a similar pattern of effects, indicating otherwise moderate levels of agreement across most dimensions of family functioning in both diagnostic groups. These data suggest that having an adult family member with BD versus MDD might differentially impact reports of family functioning in children and young adolescents, but not reports of other adult family members. A careful look at the average family functioning scores in the child/young adolescent family members did not yield a pattern of findings such that the children and adolescent family members reported consistently better or worse functioning than the patients with BD. In contrast, what these data appear to indicate is that, irrespective of overall severity of rating, there is simply greater *disagreement* between children and adolescents and patients with BD on ratings of family functioning, and that the valence of such disagreement varies within, and not across, families.

Existing data from samples unselected for psychopathology (e.g., Ohannessian et al., 2000) reveal significant discrepancies between adult and child/young adolescent reports of family functioning. Inasmuch as the child/young adolescent family members of those with BD were discrepant in their reports of family functioning, one might argue that their data are actually consistent with patterns in families unaffected by mood disorders, whereas the level of relative *agreement* between patients with MDD and children/young adolescent family members may be more surprising. One possibility may be that the overall severity of family discord in the MDD sample was so great, that there was less room for disagreement among family members. Yet given the comparable severity of family discord in the families of patients with BD (cf., Weinstock et al., 2006), why would this argument not hold for patients with BD and their child/adolescent family members, as well?

One potential explanation for this effect may relate to the historical impact of BD on the family. Relative to MDD, there may be greater inconsistency in the family environment in the face of the impulsivity and unpredictability associated with the experience of mania, or mood cycling more generally (Ogilvie et al., 2005). Such inconsistency may have particular impact on children and young adolescents, resulting in discrepant perceptions of family

functioning relative to patients with BD and other adult family members. Also consistent with this argument is the persistence of the discrepancy between patient- and family-reported affective involvement in the BD sample, even after re-analysis by family member type. As a construct, affective involvement relates to overall cohesiveness of the family in that it captures the degree to which family members express an interest in each other, and the manner in which that interest is expressed (Ryan et al., 2005). In addition to overall poor affective involvement, as evidenced by mean ratings above the clinical cut-off, concordance between patients with BD and family members on this dimension approached zero, regardless of family member type. This pattern of findings may reflect significant disruptions in family cohesion in the BD subsample, which have also been reported in prior studies of family functioning in BD (Kuyler et al., 1980). In contrast to other adult family members (e.g., spouses of patients), it is plausible that poor cohesion in the family may differentially impact the children and young adolescent family members' perceptions of the family across other domains of family functioning, and their reports of such.

Given the particularly high heritability estimates of BD (Chang et al., 2003), another possible explanation for the pattern of effects described above may be the presence of psychopathology in the children and young adolescents of parents with BD, which may have also influenced discrepant reports of family functioning. Unfortunately, comprehensive data concerning family members' psychopathology were not available, so this hypothesis was unable to be examined further. Although plausible, this explanation is not likely to fully explain why this pattern of findings was detected only in the BD versus MDD subsample. For example, although BD offspring have been shown to be at elevated risk for mood, anxiety, and disruptive behavior disorders relative to control groups of offspring with parents without a mood disorder, other studies have reported no differences in psychopathology in bipolar compared to unipolar offspring, specifically (Chang et al., 2003).

Relative Concordance Between Patients and Adult Family Members

As previously alluded to, perhaps what is most striking about these data is that the degree of concordance between patients and *adult* family members generally fell within the medium effect size range for both MDD and BD. With the exception of affective involvement in BD, there was statistically significant agreement between patients and adult family members in both clinical groups, with overlapping CIs indicating no differential effects by diagnosis. Although the literature is limited on cross-informant agreement in samples selected for psychopathology (e.g., Bonne et al., 2003; Canive et al., 1995; Koyama et al., 2004; Weisman et al., 2005), studies typically suggest weak correlations between patient- and family-reported family functioning in families of patients affected by mental health difficulties. Given the level of impairment in family functioning in the current study sample, the level of agreement observed may simply reflect limited variability in reports of family functioning, as discussed previously. Reliance on simple correlation versus inter-rater agreement may have also obscured differences between published data and those reported in the current study. An additional source of discrepancy between current study findings and the available literature might be that few of these studies specified family member role in relation to the patient; as seen from our data, sensitivity analysis by family member type yielded a different pattern of effects than when non-patient family members were evaluated together. Consistent with the degree of impairment in family functioning and psychopathology in the current study sample, it is also possible that family members themselves suffered from significant psychopathology, which may have also influenced study findings (Miller et al., 2000). However, such data were not available for evaluation in the current study.

Strengths and Limitations

The current study complements the already large literature on family functioning in mood disorders by extending the focus to the evaluation of concordance between patient- and family-reported family functioning, which has been largely ignored in the mood disorders literature. Additional strengths of this study included the use of a well-defined sample of patients with MDD and BD and their family members, the use of a well-validated, multidimensional model of family functioning, and the use of the ICC (vs. simple correlation) to examine degree of concordance between patient and family member reports. It is recommended that future research address current study limitations, which included the use of a sample of participants with high mood symptom severity and the lack of a non-clinical control group. As such, it is unclear to what extent the level of concordance between patient- and family-reported family functioning generalizes to less severely ill patient samples, and how it compares to those with no history of mood disorder, or, more broadly, to families in the absence of psychopathology. The largely Caucasian sample further limits generalizability of study findings to those with more diverse racial and ethnic backgrounds. Generalizability of study results to other realms of family functioning that are not assessed by the FAD (e.g., expressed emotion; Kim & Miklowitz, 2004; Yan et al., 2004) also remains unclear. Given the dates of data collection, it is important to note that mood disorder diagnoses were based on *DSM-III-R* criteria. Although replication using *DSM-IV* will be important, this limitation is somewhat tempered by the fact that the diagnostic criteria for BD and MDD were relatively unchanged in the transition to *DSM-IV*. Finally, it should be noted that the current study sample was derived from clinical trials evaluating family interventions. Although the FAD ratings used in the analysis were assessed prior to the beginning of any study treatment, there may be differences between patients and families who agree to participate in clinical trials that involve family treatments and those who do not.

Conclusions and Future Directions

In conclusion, study data revealed poor agreement between patient- and family-reported functioning in BD in contrast to moderately strong agreement between family members and patients with MDD, which in turn appeared to be driven by reports of family functioning from the children and young adolescent family members of patients with BD. Results highlight the importance of collateral reports in the assessment of family functioning, especially among families of patients with BD, for both research and treatment. Study data also highlight perceived family difficulties in children of patients with BD, which combined with genetic load, may place them at particularly high risk for poor clinical outcomes (Chang et al., 2003). However, future research is necessary in order to determine if a consistent pattern of concordance between patient- and family-reported functioning will evolve across different samples of patients with MDD and BD, and if so, to evaluate potential sources of these diagnostic differences.

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References

- American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 3rd, rev. Washington, DC: Author; 1987.

- Bech P, Rafaelson OJ, Kramp P, Bowlig TG. The Mania Rating Scale: Scale construction and inter-observer agreement. *Neuropharmacology*. 1978; 17:430–431. [PubMed: 673161]
- Beck AT, Ward C, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. *Arch Gen Psychiat*. 1961; 4:561–571. [PubMed: 13688369]
- Beevers CG, Miller IW. Depression-related negative cognition: Mood-state and trait dependent properties. *Cog Ther Res*. 2004; 28:293–307.
- Bonne O, Lahat S, Kfir R, Berry EM, Katz M, Bachar E. Parent-daughter discrepancies in perception of family function in bulimia nervosa. *Psychiatry*. 2003; 66:244–254. [PubMed: 14587361]
- Canive JM, Sanz-Fuentenebro J, Vazquez C, Qualls C, Fuentenebro F, Tuason VB. Family environment predictors of outcome in schizophrenic patients in Spain: A nine-month follow-up study. *Acta Psychiatr Scand*. 1995; 92:371–377. [PubMed: 8619342]
- Chang K, Steiner H, Ketter T. Studies of offspring of parents with bipolar disorder. *Am J Med Genet*. 2003; 123C:26–35. [PubMed: 14601034]
- Dancyger I, Fornari V, Scionti L, Wisotsky W, Sunday S. Do daughters with eating disorders agree with their parents' perception of family functioning? *Compr Psychiat*. 2005; 46:135–139. [PubMed: 15723031]
- Epstein NB, Baldwin LM, Bishop DS. The McMaster Family Assessment Device. *J Marital Fam Ther*. 1983; 9:171–180.
- Friedmann MS, McDermut WH, Solomon DA, Ryan CE, Keitner GI, Miller IW. Family functioning and mental illness: A comparison of psychiatric and nonclinical families. *Fam Process*. 1997; 36:357–367. [PubMed: 9543657]
- Gonzalez, R.; Griffin, D. Measuring individuals in a social environment: Conceptualizing dyadic and group interaction. In: Sansone, C.; Morf, CC.; Panter, AT., editors. *The SAGE handbook of methods in social psychology*. Thousand Oaks, CA: Sage Publications, Inc; 2004. p. 313–334.
- Kabacoff RI, Miller IW, Bishop DS, Epstein NB, Keitner GI. A psychometric study of the McMaster Family Assessment Device in psychiatric, medical, and nonclinical samples. *J Fam Psychol*. 1990; 3:431–439.
- Keitner GI, Ryan CE, Miller IW, Zlotnick C. Psychosocial factors and the long-term course of major depression. *J Affect Disord*. 1997; 44:57–67. [PubMed: 9186803]
- Kenny, DA.; Kashy, DA.; Cook, W. *Dyadic Data Analysis*. New York: Guilford Press; 2006.
- Kim EY, Miklowitz DJ. Expressed emotion as a predictor of outcome among bipolar patients undergoing family therapy. *J Affect Disord*. 2004; 82:343–352. [PubMed: 15555685]
- Koyama A, Akiyama T, Miyake Y, Kurita H. Family functioning perceived by patients and their family members in three *Diagnostic and Statistical Manual-IV* diagnostic groups. *Psychiat Clin Neuros*. 2004; 58:495–500.
- Lu, L.; Shara, N. Reliability analysis: Calculate and compare intra-class correlation coefficients (ICC) in SAS. Paper presented at the annual meeting of the Northeast SAS Users Group; Baltimore, MD. 2007. Retrieved from: <http://www.nesug.org/proceedings/nesug07/sa/sa13.pdf>
- McDermut W, Miller IW, Solomon D, Ryan CE, Keitner GI. Family functioning and suicidality in depressed adults. *Compr Psychiat*. 2001; 42:96–104. [PubMed: 11244144]
- McKay JR, Maisto SA, Beattie MC, Longabaugh R, Noel NE. Differences between alcoholics and spouses in their perceptions of family functioning. *J Subst Abuse Treat*. 1993; 10:17–21. [PubMed: 8450569]
- Miklowitz DJ, Goldstein M, Nuechterlein K, Snyder K, Mintz J. Family factors and the course of bipolar affective disorder. *Arch Gen Psychiat*. 1988; 45:225–231. [PubMed: 3341878]
- Miller IW, Bishop D, Norman WH, Maddever H. The Modified Hamilton Rating Scale for Depression: Reliability and validity. *Psychiat Res*. 1985; 14:131–142.
- Miller IW, Kabacoff RI, Keitner GI, Epstein NB, Bishop DS. Family functioning in the families of psychiatric patients. *Compr Psychiat*. 1986; 27:302–312. [PubMed: 3731767]
- Miller IW, Keitner GI, Ryan CE, Solomon DA, Cardemil EV, Beevers CG. Treatment matching in the post-hospital care of depressed inpatients. *Am J Psychiat*. 2005; 162:2131–2138. [PubMed: 16263854]

- Miller IW, McDermet W, Gordon KC, Keitner GI, Ryan CE, Norman W. Personality and family functioning in families of depressed patients. *J Abnorm Psychol.* 2000; 109:539–545. [PubMed: 11016124]
- Miller IW, Solomon DA, Ryan CE, Keitner GI. Does adjunctive family therapy enhance recovery from bipolar I mood episodes? *J Affect Disord.* 2004; 82:431–436. [PubMed: 15555694]
- Ogilvie AD, Morant N, Goodwin GM. The burden on informal caregivers of people with bipolar disorder. *Bipolar Disord.* 2005; 7(suppl 1):25–32. [PubMed: 15762866]
- Ohannessian CM, Lerner JV, Lerner RM, von Eye A. Adolescent-parent discrepancies in in perceptions of family functioning and early adolescent self-competence. *Int J Behav Dev.* 2000; 24:362–372.
- Osterman F, Grubic VN. Family functioning of recovered alcohol-addicted patients: A comparative study. *J Subst Abuse Treat.* 2000; 19:475–479. [PubMed: 11166512]
- Rozin P, Fallon AE, Mandell R. Family resemblance in attitudes to foods. *Dev Psychol.* 1984; 20:309–314.
- Ryan, CE.; Epstein, NB.; Keitner, GI.; Miller, IW.; Bishop, DS. Evaluating and treating families: The McMaster approach. New York: Routledge; 2005.
- Scott J, Pope M. Cognitive styles in individuals with bipolar disorders. *Psychol Med.* 2003; 30:467–472. [PubMed: 10824667]
- Seidel EM, Habel U, Finkelmeyer A, Schneider F, Gur RC, Derntl B. Implicit and explicit behavioral tendencies in male and female depression. *Psychiat Res.* 2010; 177:124–130.
- Spitzer, RL.; Williams, JBW. Structured Clinical Interview for DSM-III-R, Patient Version. New York: Biometrics Research Department, New York State Psychiatric Research Institute; 1987.
- Stefos C, Bauwens F, Staner L, Pardo D, Mendlewicz J. Psychosocial predictors of major affective recurrences in bipolar disorder: A 4-year longitudinal study of patients on prophylactic treatment. *Acta Psychiatr Scand.* 1996; 93:420–426. [PubMed: 8831857]
- Strakowski SM, Fleck DE, DelBello MP, Adler CM, Shear PK, Kotwal R, Arndt S. Impulsivity across the course of bipolar disorder. *Bipolar Disord.* 2010; 12:285–297. [PubMed: 20565435]
- Taylor, PJ. Unpublished manuscript. University of Massachusetts; Boston: 2010. An introduction to intraclass correlation that resolves some common confusions. Retrieved from: http://faculty.umb.edu/peter_taylor/09b.pdf
- Varnell SP, Murray DM, Janega JB, Biltstein JL. Design and analysis of group-randomized trials: A review of recent practices. *Am J Public Health.* 2004; 94:393–399. [PubMed: 14998802]
- Weinstock LM, Keitner GI, Ryan CE, Solomon DA, Miller IW. Family functioning and mood disorders: A comparison between patients with major depressive disorder and bipolar I disorder. *J Consult Clin Psychol.* 2006; 74:1192–1202. [PubMed: 17154748]
- Weisman AG, Rosales G, Kymalainen J, Arnesto J. Ethnicity, family cohesion, religiosity and general emotional distress in patients with schizophrenia and their relatives. *J Nerv Ment Dis.* 2005; 193:359–368. [PubMed: 15920376]
- Yan LJ, Hammen C, Cohen AN, Daley SE, Henry RM. Expressed emotion versus relationship quality variables in the prediction of recurrence in bipolar patients. *J Affect Disord.* 2004; 83:199–206. [PubMed: 15555714]

Table 1
Demographic and clinical characteristics of study participants

	BD (<i>n</i> = 92)		MDD (<i>n</i> = 121)		<i>t</i>	<i>df</i>	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Age, years	39.57	11.30	37.97	11.83	1.00	1,212	.32
Education, years	13.33	2.47	13.28	2.69	0.13	1,212	.90
GAF	27.71	6.65	29.78	7.39	-2.11	1,211	.04
Lifetime hospitalizations	4.48	4.02	1.98	1.85	6.06	1,211	.00
No. of Participating Family Members	1.46	0.67	1.69	0.89	-1.83	1,211	.07

	BD (<i>n</i> = 92)		MDD (<i>n</i> = 121)		χ^2	<i>df</i>	<i>p</i>
	<i>n</i>	%	<i>n</i>	%			
Gender					7.50	1	.01
Female	52	57	90	74			
Male	40	43	31	26			
Race/Ethnicity					0.62	3	.73
Caucasian	86	94	113	93			
African American	3	3	5	4			
Latino/Latina	1	1	3	3			
Unreported	2	2	0	0			
Marital Status					1.23	2	.54
Married/Cohabiting	62	68	89	74			
Single, Never Married	14	15	17	14			
Divorced/Separated/Widowed	16	17	15	12			
Mood Episode					–	–	–
Manic	69	75	–	–			
Depressed	18	20	121	100			
Mixed	5	5	–	–			
Psychotic Features (yes)	63	69	15	12	70.80	1	.00

Note. GAF = Global Assessment of Functioning.

Table 2
Patient and family member reports of family functioning

FAD subscale	BD (n = 92)		MDD (n = 121)	
	<i>M(SD)</i>	<i>r</i>	<i>M(SD)</i>	<i>r</i>
Problem solving		-0.01		0.42 [*]
Patient	2.22 (0.51)		2.43 (0.56)	
Family	2.22 (0.44)		2.32 (0.45)	
Communication		-0.05		0.36 [*]
Patient	2.28 (0.44)		2.45 (0.52)	
Family	2.15 (0.38)		2.36 (0.41)	
Roles		-0.01		0.47 [*]
Patient	2.38 (0.40)		2.43 (0.46)	
Family	2.33 (0.39)		2.33 (0.40)	
Affective responsiveness		0.16		0.49 [*]
Patient	2.23 (0.60)		2.36 (0.65)	
Family	2.10 (0.55)		2.26 (0.53)	
Affective involvement		-0.20		0.32 [*]
Patient	2.25 (0.53)		2.25 (0.53)	
Family	2.09 (0.43)		2.13 (0.41)	
Behavior control		0.01		0.36 [*]
Patient	2.05 (0.42)		1.97 (0.44)	
Family	1.90 (0.37)		1.97 (0.33)	
General functioning		-0.01		0.53 [*]
Patient	2.10 (0.54)		2.30 (0.59)	
Family	2.05 (0.42)		2.18 (0.48)	

Note. FAD = Family Assessment Device.

^{*}
 $p < .001$.

Table 3
Intraclass Correlation Coefficients Between Patient- and Family-Reported Family Functioning

FAD Subscale	BD (n = 92)			MDD (n = 121)			CI Overlap?
	ICC	95% CI		ICC	95% CI		
		Lower	Upper		Lower	Upper	
Problem Solving	-0.01	-0.22	0.21	0.41**	0.25	0.55	No
Communication	-0.06	-0.28	0.16	0.35**	0.18	0.67	No
Roles	-0.01	-0.22	0.21	0.46**	0.31	0.29	No
Affective Responsiveness	0.16	-0.06	0.37	0.48**	0.33	0.61	Yes
Affective Involvement	-0.19	-0.39	0.03	0.31**	0.13	0.46	No
Behavior Control	0.01	-0.21	0.22	0.34**	0.17	0.49	Yes
General Functioning	-0.01	-0.22	0.21	0.52**	0.37	0.64	No

Note. FAD = Family Assessment Device. Bold and underlined subscales reflect significant differences between the bipolar and MDD subgroups determined by non-overlapping 95% confidence intervals ($p < .05$).

** $p < .01$.

Table 4
Intraclass Correlation Coefficients Between Patient- and Family-Reported Family Functioning - Excluding Children and Young Adolescents from Family Reports

FAD Subscale	BD (n = 92)		MDD (n = 121)			
	ICC	95% CI		ICC	95% CI	
		Lower	Upper		Lower	Upper
Problem Solving	0.27**	0.01	0.45	0.38**	0.21	0.52
Communication	0.34**	0.14	0.52	0.28**	0.10	0.44
Roles	0.28**	0.07	0.46	0.27**	0.01	0.44
Affective Responsiveness	0.43**	0.24	0.59	0.50**	0.35	0.63
Affective Involvement	0.01	-0.22	0.21	0.31**	0.13	0.47
Behavior Control	0.26**	0.05	0.45	0.16*	-0.02	0.34
General Functioning	0.43**	0.23	0.59	0.48**	0.33	0.61

Note. FAD = Family Assessment Device.

* $p < .05$.

** $p < .01$.