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Interpersonal Functioning in Pediatric Bipolar Disorder

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This article reviews studies of interpersonal functioning, social cognition, and life stress in children and adolescents with bipolar disorder (BD). Peer and family relationships of youth with BD are impaired in comparison to healthy controls and youth with attention-deficit hyperactivity disorder (ADHD). Social-cognitive deficits, such as impaired facial affect recognition, may underlie these interpersonal difficulties. Affect among youth with BD is particularly dysregulated in interpersonal situations and is often characterized by elevated anger and frustration. Preliminary evidence suggests that life stress is associated with course. Further research in this area must consider the role of comorbidity and family environment in determining psychosocial outcomes. Studies should aim to incorporate naturalistic and developmentally appropriate measures of social functioning and examine the impact of psychosocial interventions in modifying social dysfunction.

Key words: **adolescent, bipolar disorder, child, family, peer, risk factors.** ***[Clin Psychol Sci Prac 18: 342–356, 2011]***

Adults with bipolar disorder (BD) have significant impairment in social functioning relative to healthy adults, including poorer marital outcomes (Coryell et al., 1993; Merikangas et al., 2007), low perceived social support and fewer social interactions (Beyer et al., 2003), low-quality friendships (Coryell et al., 1998), and elevated levels of conflict within peer, family, and work relationships (Morriss et al., 2007). Less is known about the interpersonal functioning of youth with BD, but an early onset of illness may be associated with even more severe and persistent implications for social functioning. Because the formations of peer and romantic relationships are key tasks of childhood and adolescence, social impairment during these periods may deprive youth of important social learning opportunities, thereby increasing the likelihood of chronic interpersonal difficulties later in life (Cicchetti, 2010).

Studies examining quality of life among children and adolescents with BD have found substantial impairment across interpersonal domains, including relationships with peers, siblings, and parents (Biederman et al., 2005; Freeman et al., 2009; Geller et al., 2000; Lewinsohn, Klein, & Seeley, 1995; Quackenbush, Kutcher, Robertson, Boulos, & Chaban, 1996; Rademacher, Delbello, Adler, Stanford, & Strakowski, 2007; Wilens et al., 2003). Although psychosocial impairments worsen during mood episodes, youth continue to show mild to moderate impairment on interview-based measures even between mood episodes (Goldstein et al., 2009). Furthermore, recovery in social functioning may be independent of syndromic and symptomatic recovery (DelBello, Hanseman, Adler, Fleck, & Strakowski, 2007). Impairments in

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social functioning have been observed as early as preschool age, suggesting that social dysfunction is a problem even among the youngest of bipolar patients (Luby, Tandon, & Nicol, 2007; Wilens et al., 2003).

The aim of this article is to review what is known about interpersonal functioning in youth with BD. We survey research from the pediatric BD literature to (a) clarify the extent of problems in peer and family relationships among children and adolescents with BD relative to comparison groups, (b) explore the cognitive, affective, and behavioral variables that contribute to interpersonal dysfunction, and (c) examine the bidirectional relationships between life stress, interpersonal dysfunction, and manic or depressive mood states. Finally, we discuss psychosocial interventions that target interpersonal functioning among bipolar youth. We conclude by offering recommendations for future research and clinical practice. In evaluating this literature, we highlight the substantial gaps in knowledge related to the social behaviors and day-to-day functioning of youth with BD and suggest designs for contributing new knowledge in this area.

Throughout this review, we will focus on BD in youth ages 18 years and younger. We refer readers interested in learning more about these processes in adult populations to a recent review by Miklowitz and Johnson (2009). Because existing research on social functioning in pediatric BD typically does not distinguish between children and adolescents, we broadly refer to ''youth'' unless otherwise specified. There are known differences between child- and adolescent-onset BD in terms of chronicity, cycling patterns, comorbidity, and functional outcomes (Meyer & Carlson, 2010). We caution readers that there are likely to be differences between these groups given the risks associated with childhood-onset of the disorder as well as developmentally informed differences in interpersonal functioning. Similarly, existing research generally does not distinguish between diagnostic subgroups (BD-I, BD-II, and BD not otherwise specified, or NOS), despite the potential differences in symptom severity and course between these groups. We will be referring broadly to youth with any of these three diagnoses, except when more detailed comparisons are available.

PEER RELATIONSHIPS

The majority of studies of youth with BD do not examine peer relationships. A study conducted by Geller et al. (2000) compared psychosocial functioning between prepubertal and early adolescent youth with narrowly defined pediatric BD, youth with attention-deficit hyperactivity disorder (ADHD), and healthy control youth. In this study, youth with BD were more likely than youth in either of the other two categories to report having few or no friends and to be rated by interviewers as having poor social skills relative to their peers. Youth with BD were also more likely than community controls to report that they were the targets of frequent teasing by peers. Similarly, in a study using parent report on the Child Behavior Checklist (CBCL), children and early adolescents with BD were described as having lower social competence, more aggression, and higher levels of social withdrawal than same-aged peers with ADHD (Geller, Warner, Williams, & Zimerman, 1998). Thus, across many dimensions of peer functioning, youth with BD appear more impaired than their same-aged peers with ADHD. This finding is particularly striking given that youth with ADHD are themselves known to exhibit substantial levels of impairment in their peer relationships (Hoza et al., 2005).

Youth with BD also have problems in the peer domain when compared to other children and adolescents seeking psychiatric or medical treatment. One study of youth and caregivers seeking treatment at a community mental health center or academic medical center found that youth with BD had lower parent-rated quality of life in the friendship domain than did youth with unipolar depression and youth with chronic health conditions such as asthma, arthritis, and oxygen dependency (Freeman et al., 2009). These findings suggest that many youth with BD are facing severe struggles in their attempts to make and keep friends.

It appears that problems with peers may be related to the onset of BD itself rather than reflecting trait-like characteristics of the youth. Retrospective studies using parent, self-, and school reports to examine the premorbid psychosocial functioning of adolescents with BD-I have found that most youth had average to excellent peer relationships prior to the onset of their

illness (Kutcher, Robertson, & Bird, 1998), but within a few years of illness onset, peer relations and extracurricular involvement are substantially impaired (Quackenbush et al., 1996). When examined in high-risk samples, child and adolescent offspring of bipolar parents who themselves have BD show more impaired social functioning on the CBCL than at-risk offspring who have not developed BD (Dienes, Chang, Blasey, Adleman, & Steiner, 2002).

These findings suggest that illness onset is associated with worsening of peer functioning, although it is not yet clear how peer functioning changes during mood episodes or across developmental periods. This gap in knowledge is particularly striking given the normative development of a strong peer orientation across early development (Nelson, Leibenluft, McClure, & Pine, 2005). When studies do address the interpersonal functioning of youth with BD, many fail to distinguish between family and peer relationships, despite the varying importance of these social contexts in different developmental periods.

FAMILY FUNCTIONING

In contrast to peer relationships, the family functioning of bipolar youth has been given significant empirical attention. The results of family studies are widely in agreement that both parent–child and sibling relationships are compromised by BD in youth, and the family contexts of youth with BD are likely to be chaotic and conflictual. Parents of adolescents with BD rate family cohesion, adaptability, and overall family functioning at levels well below national norms, even when youth are receiving pharmacological treatment (Rademacher *et al.*, 2007; Sullivan & Miklowitz, 2010). Parent-reported quality of life in the family domain is lower for youth with BD than it is for youth with chronic medical illnesses, unipolar depression, or other behavioral disorders (Freeman et al., 2009). Mothers of euthymic bipolar youth ages 8–17 report lower levels of warmth, affection, and intimacy in their relationships with their children than do mothers of control youth, along with higher levels of conflict and forceful punishment (Schenkel, West, Harral, Patel, & Pavuluri, 2008). Sibling relationships are also described as ''poor'' more frequently among youth with BD than healthy controls (Geller et al., 2000), although the exact nature of these inter-sibling difficulties has not been specified. Somewhat surprisingly, parent-reported family cohesion is even lower among children with BD-NOS than it is among children with BD-I or BD-II, suggesting that low cohesion is not simply correlated with children's symptom severity (Esposito-Smythers et al., 2006).

Importantly, it cannot be assumed that all of the difficulties observed in the families of bipolar youth are attributable to the presence of offspring BD. Many bipolar youth have a parent with a history of BD or depression. The presence of a parental mood disorder is associated with increased strain in the parent–child relationship, decreased family cohesion, and increased family conflict (Chang, Blasey, Ketter, & Steiner, 2001; Esposito-Smythers et al., 2006; Romero, DelBello, Soutullo, Stanford, & Strakowski, 2005; Schenkel, West, et al., 2008). The co-occurrence of multiple disorders within a family system makes it difficult to isolate the effects of the offspring's symptoms on the larger family environment.

The high rates of comorbid diagnoses among youth with BD also raise the question of whether these other conditions are partially responsible for family disturbances. Comorbid ADHD has a negative impact on parent–child relationships in families of youth with BD (Schenkel, West, et al., 2008). However, even compared to youth with ADHD, those with BD report less warmth, more frequent hostility, and fewer shared activities with their parents (Geller et al., 2000). Comorbidity with externalizing disorders is also associated with parent and youth reports of higher family conflict and lower cohesion, whereas comorbid internalizing disorders are associated with youth reports of greater family conflict (Esposito-Smythers et al., 2006). Parental psychopathology and youth comorbidity may interact, such that the negative effects of maternal depression on family cohesion are stronger in families where the bipolar youth also has a comorbid externalizing disorder (Esposito-Smythers et al., 2006). Further research is needed to clarify the mechanisms through which parental and youth disorders influence the family environment and to identify factors that may promote resilience in families where both a parent and a child have affective disorders.

The relationships between family functioning and youth psychiatric status are likely to be bidirectional.

Greater severity of both manic and depressed symptoms in the affected youth is associated with higher levels of family conflict and lower levels of family cohesion (Esposito-Smythers et al., 2006; Sullivan & Miklowitz, 2010). In turn, these impairments in family functioning may lead to poorer psychiatric outcomes for youth. Lower maternal warmth, as reported by both children with BD and their mothers, predicts a faster relapse following recovery from a manic episode in preadolescent and early adolescent youth (Geller, Tillman, Craney, & Bolhofner, 2004). Family processes can also serve as a protective factor, with children and adolescents raised in a two-parent family showing significantly faster time to recovery following a manic episode (Geller et al., 2002).

Treatment outcomes may also be impaired among youth in chaotic family environments. For example, impaired family problem solving, as measured by the Family Assessment Device (Miller, Epstein, Bishop, & Keitner, 1985), is associated with lower levels of improvement in depressive symptoms in youth ages 5–17 following two months of pharmacotherapy (Townsend, Demeter, Youngstrom, Drotar, & Findling, 2007). Similarly, adolescents whose parents show high levels of expressed emotion, a construct characterized by high levels of criticism or emotional overinvolvement when discussing the affected child, show more persistent mood symptoms over two years, even when undergoing family therapy and pharmacological treatment (Miklowitz, Biuckians, & Richards, 2006). Clearly, the family environment is an important context for determining risk and resilience among individuals with an early onset of BD.

SOCIAL COGNITION

Clarifying the nature of interpersonal impairments in bipolar youth requires clarifying the role of *social cognition* in these disorders, a broad term used to describe several processes integral to social behavior. The most widely used model of social cognition (Crick & Dodge, 1994) identifies six steps in this process, which can be broken down into three general categories: the perception and interpretation of social stimuli, clarification of interpersonal goals, and development and implementation of behavioral responses (see Figure 1). The model suggests that to engage in a social behavior (e.g., greet a new friend, initiate an argument with a rival), individuals must first be able to direct attention to the social environment, integrate relevant information, and appropriately interpret social cues. In response to this environmental information, individuals must then select a goal or an intended outcome, such as forming a friendship or retaliating for a perceived offense. Finally, individuals must draw on memories and social knowledge to select a behavioral response that will meet their goals and successfully enact that response. Importantly, immediate levels of arousal as well as enduring styles of emotional reactivity are believed to influence each step of social information processing (Lemerise & Arsenio, 2000). Thus, there are multiple opportunities for the core symptoms of BD to influence social cognition. We examine what is known about each of these elements of social cognition among youth with BD.

Encoding and Interpretation of Social Cues

There are clear deficits in the encoding and interpretation of social cues among youth with BD. Bipolar

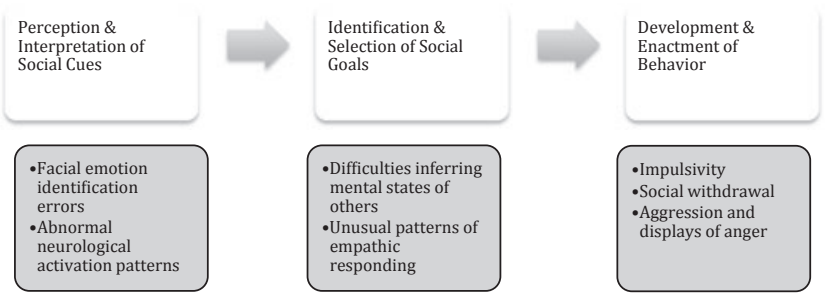

Figure 1. Schematic of social cognition processes that may be altered in pediatric bipolar disorder.

children and adolescents, as well as children of parents with BD, make more errors than age-matched controls in identifying facial expressions of emotions (Brotman, Guyer, et al., 2008; Guyer et al., 2007; McClure, Pope, Hoberman, Pine, & Leibenluft, 2003; McClure et al., 2005; Schenkel, Pavuluri, Herbener, Harral, & Sweeney, 2007). Youth with BD and offspring of parents with BD also require more visual information than do healthy controls to identify emotional expressions in experimental paradigms in which pictures of faces slowly morph from a neutral expression to an emotional expression (Brotman, Skup, et al., 2008; Rich, Grimley, et al., 2008). These results can be affected by the mood state of the participant as well as the emotion displayed in the facial stimuli, but at least some studies suggest that processing errors can be observed in euthymic patients across a variety of facial expressions (e.g., Brotman, Guyer, et al., 2008; Brotman, Skup, et al., 2008; Guyer et al., 2007; Schenkel et al., 2007).

There is preliminary evidence that difficulties with encoding and interpretation of facial cues are associated with measures of neurological functioning in BD. Several studies suggest that youth with BD show abnormal functioning in neural regions related to emotion regulation, such as the amygdala and prefrontal cortex (Cerullo, Adler, DelBello, & Strakowski, 2009; Passarotti & Pavuluri, 2008), as well as regions related to processing of facial emotions, such as the fusiform gyrus (Radua et al., 2010). Furthermore, the efficiency of communication between these regions, as indexed by connectivity of white matter tracks, may also be compromised (Passarotti & Pavuluri, 2008).

Abnormalities in the functioning of these brain areas may account for the difficulties with encoding and interpretation of facial stimuli among youth with BD. For example, one study (Rich et al., 2006) demonstrated that youth with BD perceived greater hostility in neutral faces than healthy controls and had greater activation in the left amygdala, nucleus accumbens, putamen, and ventral prefrontal cortex when rating the emotional state of neutral faces. Patients' hostility ratings were correlated with activation of the left amygdala. This same group (Rich, Fromm, et al., 2008) has shown that youth with BD have lower functional connectivity than healthy controls between the left amygdala, the right posterior cingulate, and the right fusiform gyrus/parahippocampal gyrus. These areas have been implicated in the visual processing of facial emotions and emotional stimuli, as well as the interpretation and response to social signals. Pavuluri, Marlow-O'Conner, Harral, and Sweeney (2007) have also found evidence of differential activation among pediatric BD patients in comparison to healthy controls in brain regions responsible for visual processing and emotion regulation in response to angry faces. These neurological mechanisms may underlie impairments in the early stages of social cognition among youth with BD.

Little is known about the perception and interpretation of social cues beyond these facial affect recognition paradigms. For example, it is not clear whether youth with BD show similar deficits in interpreting other social cues, such as voice tone and prosody or other channels of nonverbal body language. It is possible that individuals with BD may compensate for facial interpretation deficits by relying more strongly on other forms of communication or on social context cues to interpret the emotional states of others. Research with tools such as the Profile of Nonverbal Sensitivity (Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979), in which subjects are asked to use tone and body language to judge the meaning conveyed in garbled speech, would help to address this possibility.

Another important question is how these deficits in emotion processing affect the subsequent stages of social cognition and actual social behaviors. Studies examining the relationship between emotion labeling deficits and social functioning in schizophrenia have yielded mixed results (Kee, Green, Mintz, & Brekke, 2003; Mathews & Barch, 2010). The one study investigating this topic in BD found that subjects' ability to identify facial expression in a morphing paradigm was not associated with clinician ratings of the youths' functioning with family or peers, although it was associated with a parent-completed measure of social reciprocity (Rich, Grimley, et al., 2008). Future research should examine the connections between encoding of various social cues—including facial expressions, vocal cues, and nonverbal communication—and youths' social behavior in the laboratory and their everyday social environment.

Identification and Selection of Social Goals

Once the social environment has been encoded and meaningful interpretations have been made, individuals must decide what their intended goals are in response to these social cues. For example, individuals may aim to use social interactions to benefit their own internal state (such as decreasing their frustration) or to change a social situation (like starting a new friendship). Alternatively, individuals may select social goals that focus on the perceived cognitions or emotions of other people (such as making a sad friend feel better or a mad parent less angry). The processes by which social goals are selected are not as well studied among BD youth as the other steps of social cognition. However, there is reason to suspect that youth with BD are less likely to show an orientation toward the feelings of others when they select their social goals.

The process of social goal selection among youth with BD is likely to be influenced by deficits in theory of mind, the ability to intuit the mental states of others. These deficits may limit their ability to consider the emotional and cognitive states of interaction partners when setting social goals. Bipolar children and adolescents in an active mood episode (either depressed, manic, or hypomanic) perform more poorly than age-matched controls on tasks that require understanding the false beliefs and hidden social intentions of characters in a story (Schenkel, Marlow-O'Connor, Moss, Sweeney, & Pavuluri, 2008). If a child with BD does not know that an interactional partner has a different set of beliefs, for example, then he or she is also unlikely to be motivated to correct those beliefs. It is not currently known whether these deficits in the ability to ''mentalize'' the emotional and cognitive states of others are also observed in live interactions with others rather than hypothetical situations, a possibility that warrants further exploration.

Similarly, the selection of social goals (namely, whether to focus on behaviors that help regulate one's own distress vs. changing the mental or emotional states of others) may be shaped by the high level of personal distress individuals with BD feel in response to the distress of others. An early theory of BD suggested that children of bipolar parents were excessively reactive to the distress of others in a way that impaired the development of appropriate social interactions (Zahn-Waxler, Cummings, McKnew, & Radke-Yarrow, 1984). Although this possibility has not been studied among youth who have developed BD, Cusi, MacQueen, and McKinnon (2009) found that adults with BD, regardless of current mood state, report higher levels of distress than healthy adults in response to the negative experiences of others, and that this increased distress was associated with poorer social functioning. It is unclear whether these results suggest a higher than normal level of empathy, meaning that patients with BD are more able to accurately share in the emotions of others, or whether the reactions of the BD patients suggest an exaggerated emotional response that is inappropriate to the situation and may shift focus toward regulating one's own distress.

Whether or not youth with BD demonstrate similar patterns of responding to others in distress is not currently known. Experimental investigations using paradigms such as the Empathic Accuracy Task (Zaki, Bolger, & Ochsner, 2008), in which participants try to track the level of distress an individual was experiencing while discussing an important personal event, would be helpful in clarifying the response of youth with BD to emotional displays by others.

Development and Enactment of Social Behaviors

Once an interpersonal situation has been interpreted and a goal has been selected, the youth must be able to identify and enact behavioral plans to meet that goal. There has been one study that examined the ability of adolescents with BD to develop social responses in response to hypothetical situations. Goldstein, Miklowitz, and Mullen (2006) found that bipolar adolescents in a minimally symptomatic state did not show any deficits in comparison to healthy controls in their ability to generate solutions to social problems presented in vignettes. Independent evaluators also rated the behavior of adolescents with BD as equally skillful as those of healthy controls on dimensions such as eye contact, smiling, and interpersonal effectiveness. Thus, at least during minimally symptomatic states, bipolar adolescents are able to generate and enact appropriate social behaviors in structured laboratory settings.

However, results from this same study indicated that youth with BD do not implement adaptive social

behavior in their everyday life. The same adolescents and their parents reported worse functioning in daily social interactions than did healthy controls and parents, including higher levels of inappropriately assertive behavior, more impulsive behavior, greater feelings of jealousy, and more social withdrawal. Other studies have found similar evidence of less adaptive social behavior among children and adolescents with BD, including more frequent and intense anger in interpersonal situations (Rucklidge, 2006), less adept use of pragmatic language (McClure et al., 2005), and poorer parent-rated social skills (Geller et al., 2000). In sum, it appears that youth with BD have deficits in the enactment of appropriate social behaviors in naturalistic settings despite having an adequate ability to generate a list of possible social choices in a laboratory environment. Possibly, when youth become emotionally dysregulated, they become less able to identify or perform adaptive social behaviors.

Previous research has found that some children with low sociometric status are able to process social information adequately when slow, reflective processes are elicited but are unable to do so during conditions of automatic processing that resemble real-world situations (Rabiner, Lenhart, & Lochman, 1990). Youth with BD report more frustration during laboratory-based tasks than do healthy youth (Rich et al., 2007), suggesting that they may be more susceptible to strong emotions that could interfere with deliberative cognitive processing and enactment of appropriate social behaviors. Whether or not this is the case among bipolar youth will require more detailed study of the social behaviors of adolescents across a variety of naturalistic contexts.

In sum, research conducted over the past decade suggests that youth with BD show deviations from the normative path of social-cognitive development shown by their peers. There is particularly strong evidence that youth with BD show difficulty in accurately interpreting facial emotion cues, although the behavioral implications of these deficits are not yet clear. It is also likely that youth with BD, despite having some working knowledge of socially appropriate behaviors, have difficulty enacting these adaptive behaviors in their everyday lives. Further research is needed to identify the particular maladaptive behaviors displayed by these youth, the impact of mood states on social behavior, and the factors that prevent the implementation of more appropriate alternative social strategies. The results of such research are likely to have significant implications for the development of intervention strategies for bipolar youth, as discussed below.

LIFE STRESS

Life stress plays a significant role in the course of BD among adults. Although results are not entirely consistent across studies, it appears that negative life events predict depressive episodes, while social rhythm-disrupting or goal-attainment life events (e.g., getting a job promotion) are associated with mania (e.g., Johnson et al., 2008; Malkoff-Schwartz et al., 1998; Meyer, Johnson, & Winters, 2001). Less is known about the impact of stressful life events on pediatric BD, potentially because of the greater difficulty in assessing discrete periods of euthymia, depression, and mania in younger populations (Biederman et al., 2000). In particular, the clinical presentation of bipolar youth can increase the difficulty of determining whether ''independent'' life stressors (i.e., life events that the child could not have caused) cause an increase in symptoms or whether existing symptoms lead to higher levels of ''dependent'' life stress.

One approach has been to study youth who do not yet have a mood disorder but who are at increased risk because of having a parent with BD. In one such study, life events were found to be predictive of the onset of any mood disorder, although this association decreased over time (Hillegers et al., 2004). In a study of mostly unaffected offspring of bipolar parents (Wals et al., 2005), dependent life events were associated with the onset of both manic and depressive episodes. However, this association was fully accounted for by baseline anxious and depressive symptoms, suggesting that early signs of mood disturbance may lead to stress-generating behaviors that promote the onset of a full-blown mood episode.

This idea of stress generation (Hammen, 1991) as a mechanism of illness onset and recurrence has been well studied in unipolar depression but less so in BD. Several checklist-based studies of life events found higher rates of dependent life stressors among youth with BD in comparison to youth with ADHD or healthy controls,

but the cross-sectional nature of these studies makes it difficult to determine the directionality between stressors and illness states (Petti et al., 2004; Rucklidge, 2006; Tillman et al., 2003). A retrospective study conducted with bipolar and healthy undergraduates did not find support for higher levels of dependent or total life events during childhood and adolescence in the bipolar group (Grandin, Alloy, & Abramson, 2007), although a prospective study of the same sample showed higher levels of dependent life events among the bipolar group while in college (Bender, Alloy, Sylvia, Urosevic, & Abramson, 2010). Further longitudinal research with careful dating of episode onset, symptom levels, and life stressors is needed to clarify the role of stress generation in the illness course of youth with BD.

Experiences of life stress, either independent of or dependent on youth behavior, may also influence persistence of symptoms among youth in a mood episode. Among adolescents, chronic interpersonal stress in family and romantic relationships was associated with less decrease in depressive symptoms over time among youth receiving treatment (Kim, Miklowitz, Biuckians, & Mullen, 2007). At present, little is known about how life stress may interfere with recovery and psychosocial outcomes among youth with BD, but this appears to be a fruitful avenue for future research.

Another question that remains to be clarified in this domain is whether the life stress experienced by youth with BD is interpersonal in nature. Few studies have characterized life stressors in this population according to whether or not they occur within interpersonal relationships, despite findings from the adolescent depression literature suggesting that interpersonally based stressors are uniquely related to the onset and recurrence of the disorder (Hammen, 2003). The only study examining this question in adolescents with BD (Kim et al., 2007) found that chronic stress in the interpersonal domain (romantic, peer, and family relationships) was associated with higher mood symptom severity over a one-year period, while other domains of chronic stress, such as academics and health problems, were not related to mood outcomes. The extent to which interpersonal forms of stress exert a distinct effect on the course of child and adolescent BD warrants further explanation.

EARLY TRAUMA

It is clear that severe stressors experienced early in life affect the course of BD, and that the majority of these stressors, including physical abuse, sexual abuse, and parental neglect, are interpersonal in nature. In comparison to healthy controls, adolescents with BD are more likely to report a history of early trauma (Rucklidge, 2006). Several retrospective studies conducted with bipolar adults have found that moderate to severe childhood stressors, including physical and sexual abuse, are associated with earlier illness onset as well as a worse long-term course of illness (Dienes, Hammen, Henry, Cohen, & Daley, 2006; Grandin et al., 2007; Leverich et al., 2002). One theory suggests that early trauma may exert its effect by changing brain levels of brain-derived neurotrophic factor (BDNF). Decreases in BDNF can in turn alter emotion-regulating brain structures, increase sensitization to future stressors, and increase overall susceptibility to the onset of bipolar illness (Post & Miklowitz, 2010).

INTERVENTIONS TO IMPROVE INTERPERSONAL FUNCTIONING

The end-goal of most studies of social-cognitive functioning in early-onset BD is to generate conclusions that can be translated into more effective psychosocial interventions. Adjunctive psychotherapeutic treatments are important methods of preventing or delaying relapse and recurrence, as well as reducing nonadherence to pharmacological treatment. Importantly, psychosocial treatments also have the potential to improve psychosocial functioning by addressing deficits in social cognition, teaching adaptive social behavior, and reducing chronic stress in family relationships. Given that symptom reduction alone is unlikely to be a sufficient condition for improvement in social functioning (DelBello et al., 2007), it is imperative that psychosocial treatments for bipolar youth incorporate a focus on the identification and amelioration of social difficulties.

The efficacy of psychotherapy for improving symptomatic and functional outcomes among bipolar adults has been well established (Miklowitz & Scott, 2009). A recent large-scale multisite trial found that family-focused, interpersonal and social rhythm, and cognitive-behavioral therapy all improved relationship functioning and life satisfaction among adults with BD, even when their effects on depressive symptoms were

controlled (Miklowitz et al., 2007). However, no studies have examined the mechanisms, such as changes in cognition or stress generation, through which these psychotherapies promote changes in psychosocial functioning (Miklowitz, 2008).

Significantly less is known about the efficacy of psychotherapy in the treatment of youth with BD, perhaps because identification of a bipolar diagnosis in pediatric populations is a relatively recent development. A small number of randomized clinical trials have demonstrated the effectiveness of family-focused treatment for adolescents with BD (Miklowitz et al., 2008) and multifamily psychoeducational groups for preadolescents with depression or bipolar spectrum disorders (Fristad, Verducci, Walters, & Young, 2009). Open trials have also suggested that dialectical behavior therapy (Goldstein, Axelson, Birmaher, & Brend, 2007), interpersonal and social rhythm therapy (Hlastala, Kotler, McClellan, & McCauley, 2010), individual cognitive-behavioral therapy (Feeny, Danielson, Schwartz, Youngstrom, & Findling, 2006), and family-focused cognitive-behavioral therapy (West, Henry, & Pavuluri, 2007) are associated with symptomatic improvement among children and/or adolescents with BD. Each of these approaches contains strategies to improve social functioning, such as cognitive restructuring, interpersonal problem solving, and communication skills training. Explicit instruction in these domains may improve the ability of youth to accurately assess social cues and to develop and enact adaptive social behaviors. However, whether such changes in social functioning actually occur has not been assessed. Future treatment trials should measure youth functioning in family and peer relationships as a domain of treatment outcome, especially given the importance of interpersonal relationships in determining life satisfaction.

The effectiveness of psychotherapeutic treatments for youth with BD may also vary according to qualities of the social environment prior to treatment. Given the reliance of children and adolescents on their parents for adequate care and support, the family environment may be a particularly potent determinant of treatment outcome. Children whose parents have not accepted the need for treatment are likely to be less compliant with treatments such as medications or lifestyle adaptations. Similarly, family-level risk factors, such as poor family problem solving, may moderate the effects of pharmacological treatments for youth with BD (Townsend et al., 2007). Treatments may work best when modifying such family risk variables. For example, changes in parents' beliefs about the need for treatment mediated the effects of multifamily groups on treatment utilization and symptom outcomes in one wait-list trial (Mendenhall, Fristad, & Early, 2009). Similarly, family-focused therapy for adolescents had its greatest effects on families that began treatment with a high level of expressed emotion (Miklowitz et al., 2009).

It is likely that parents with BD face many of the same challenges to social functioning as do their children, including poor affect recognition, and difficulty implementing appropriate behavior during periods of emotional dysregulation. Treatments targeting these problems in the affected offspring may have benefit for parents as well, helping both parents and children to deescalate conflict and improve interpersonal problem solving. Measurement of the pretreatment family variables and other social factors may help identify the conditions under which particular therapeutic approaches are most beneficial to youth with BD and their families.

FUTURE DIRECTIONS

This review suggests that social role functioning is significantly impaired in pediatric-onset BD. In turn, this social impairment has important implications for the course of the disorder and quality of life, as well as its psychosocial treatment. Despite consistent documentation of global impairments in interpersonal functioning among pediatric BD patients, and evidence that social rhythms and life stress can impact recovery and relapse outcomes (Kim et al., 2007; Shen, Alloy, Abramson, & Sylvia, 2008), little is known about the social-cognitive processes underlying these interpersonal difficulties. We suggest that more research is needed that extends beyond the course and management of affective symptoms to include variables that influence quality of life for youth with BD, such as peer and family relationships (MacQueen, Young, & Joffe, 2001) (Table 1).

There is a need for greater specification of the interpersonal deficits in youth with BD. What exactly do these youth do in their peer and family relationships to

Table 1. Key conclusions

- Social role functioning is significantly impaired in pediatric-onset bipolar disorder.
- Impairments are observed in family and peer relationships.
- Social dysfunction and mood dysregulation are related but separable processes.
- Psychosocial interventions need to address youths' difficulties in the perception of social cues, selection of social goals, and the enactment of social behavior.

cause conflict and deterioration of social support following the onset of their illness? Several different possibilities emerge, ranging from physical and social aggression to withdrawal or excessive reassurance seeking. Although parents report high levels of aggression perpetrated by youth with BD, most studies have not clarified whether such aggression also occurs with peers. Furthermore, it is not clear whether that aggression is physical (e.g., hitting, pushing) or relational (e.g., spreading rumors, excluding individuals from group activities), patterns that have distinct consequences for social relationships (Crick, 1996). It will also be important to determine whether the motivation for aggression and other maladaptive social behaviors is proactive (seeking a reward) or reactive (in response to emotional distress or perceived provocation).

It is not yet known whether the problematic behaviors that may be causing distress within family contexts are the same behaviors that lead to peer rejection or stressful life events. Clarifying the causes and contexts of problematic social behaviors across interpersonal domains will be essential for designing appropriate interventions. Experience sampling studies, in which children report on their social behavior in real time throughout the day, as well as studies incorporating peer and family member reports of social behavior may clarify the generalizability of these social problems across contexts.

It is important to understand how the dysfunctional processes of social cognition observed in the laboratory map onto problematic behaviors in patients' everyday lives. Unfortunately, existing research has not addressed this important question. We offer one potential model of how deficits in social cognition in pediatric BD could influence interpersonal adjustment across a variety of relationships. Difficulties in accurately identifying the emotional expressions of others may contribute to a more general misreading of social situations, such as perceiving a rejecting peer to be friendly or a well-intentioned family member to be hostile. As a result, youth with BD may select inappropriate social goals, such as trying to make friends with someone who is not likely to be receptive or reacting angrily to a perceived provocation. Furthermore, the ability to skillfully implement strategies to act out their goals, which is likely to be worsened in situations of high emotionality, is compromised. This mismatch between the social messages communicated by peers and families and the behavioral responses of BD youth are likely to engender rejection or frustration by their interactional partners. In turn, these negative social experiences may further confirm negative schema in the BD youth, such as hostile attributional biases or a belief that one is not liked by others, and thereby increase the likelihood that future social cues will be misperceived. The transaction between deficits in social cognition and impairments in family functioning may also contribute to the onset of BD in at-risk youth, as well as their social functioning after the onset of the disorder (Muralidharan, Yoo, Ritschel, Simeonova, & Craighead, 2010). Future research should aim to examine such hypothetical models of causality and thereby bridge the gap between laboratory-based studies of social cognition and real-world interpersonal problems.

The possibility that social behavior is negatively impacted by the broader cognitive deficits shown by youth with BD should also be investigated. For example, youth with BD have significant impairment in verbal memory, verbal fluency, and executive functioning that could impact their ability to function in social environments (Joseph, Frazier, Youngstrom, & Soares, 2008). Studies including appropriate comparison groups of youth with other psychological disorders are needed to examine the specificity of these patterns of cognitive and social dysfunctions to pediatric BD.

Research examining social functioning in pediatric BD must contend with the many challenges intrinsic to studying this population, including ongoing debates about appropriate diagnostic criteria, the effects of current mood and medication status, high rates of comorbidity with other socially impairing disorders such as ADHD, and the developmental context of childhood and adolescence. Despite ongoing controversies about

the diagnostic boundaries of early-onset BD, it is clear that pediatric BD has a significant impact on quality of life and psychosocial functioning (Carlson et al., 2009). A major limitation to the broader body of literature on pediatric BD is a failure to disentangle the effects of diagnostic status from the effects of current mood states (Goldstein et al., 2006). Separation of these effects is particularly important when studying social functioning, as the diagnostic criteria for manic and depressive episodes imply that different forms of social behavior are likely to be observed in each of these states. In adults with BD, dysfunction in family life and friendships is more related to subsyndromal depressive than manic symptoms (Altshuler et al., 2006). The reverse direction of influence, in which social impairments contribute to the onset or worsening of mood episodes, must also be considered. These questions would be best addressed through longitudinal studies tracking the social functioning of youth with BD across mood states and developmental periods.

Finally, it is important to consider the role of social functioning in the treatment of pediatric BD. Clinical trials should obtain repeated measures of social functioning within family and peer contexts to help identify potential mediators of treatment efficacy. A broader view of treatment outcomes is also needed, expanding beyond symptom counts to better understand how psychosocial interventions influence the quality of life for bipolar youth, including their ability to function in friendships, family relationships, academic settings, and their broader communities. Research examining the social-cognitive underpinnings of interpersonal dysfunction among youth with BD can suggest potential targets for treatment, such as improving distress tolerance or managing interpersonal conflict. The next generation of research on interventions for pediatric BD should target the dynamic interplay between social role functioning and illness course, and how they jointly contribute to quality of life.

REFERENCES

Altshuler, L. L., Post, R. M., Black, D. O., Keck, P. E., Nolen, W. A., Frye, M. A., et al. (2006). Subsyndromal depressive symptoms are associated with functional impairment in patients with bipolar disorder: Results of a large, multisite study. *Journal of Clinical Psychiatry*, *67*, 1551–1560.

Bender, R. E., Alloy, L. B., Sylvia, L. G., Urosevic, S., & Abramson, L. Y. (2010). Generation of life events in bipolar spectrum disorders: A re-examination and extension of the stress generation theory. *Journal of Clinical Psychology*, *66*, 907–926.

Beyer, J. L., Kuchibhatia, M., Looney, C., Engstrom, E., Cassidy, F., & Krishnan, K. R. R. (2003). Social support in elderly patients with bipolar disorder. *Bipolar Disorders*, *5*, 22–27.

Biederman, J., Faraone, S. V., Wozniak, J., Mick, E., Kwon, A., Cayton, G. A., et al. (2005). Clinical correlates of bipolar disorder in a large, referred sample of adolescents. *Journal of Psychiatric Research*, *39*, 611–622.

Biederman, J., Mick, E., Faraone, S. V., Spencer, T. J., Wilens, T. E., & Wozniak, J. (2000). Pediatric mania: A developmental subtype of bipolar disorder? *Biological Psychiatry*, *48*, 458–466.

Brotman, M. A., Guyer, A. E., Lawson, E. S., Horsey, S. E., Rich, B. A., Dickstein, D. P., et al. (2008). Facial emotion labeling deficits in children and adolescents at risk for bipolar disorder. *American Journal of Psychiatry*, *165*, 385–389.

Brotman, M. A., Skup, M., Rich, B. A., Blair, K. S., Pine, D. S., Blair, J. R., et al. (2008). Risk for bipolar disorder is associated with face-processing deficits across emotions. *Journal of the American Academy of Child and Adolescent Psychiatry*, *47*, 1455–1461.

Carlson, G. A., Findling, R. L., Post, R. M., Birmaher, B., Blumberg, H. P., Correll, C., et al. (2009). AACAP 2006 Research Forum—Advancing research in early-onset bipolar disorder: Barriers and suggestions. *Journal of Child and Adolescent Psychopharmacology*, *19*, 3–12.

Cerullo, M. A., Adler, C. M., DelBello, M. P., & Strakowski, S. M. (2009). The functional neuroanatomy of bipolar disorder. *International Review of Psychiatry*, *21*, 314–322.

Chang, K. D., Blasey, C., Ketter, T. A., & Steiner, H. (2001). Family environment of children and adolescents with bipolar parents. *Bipolar Disorders*, *3*, 73–78.

Cicchetti, D. (2010). A developmental psychopathology perspective on bipolar disorder. In D. J. Miklowitz & D. Cicchetti (Eds.), *Understanding bipolar disorder: A developmental psychopathology perspective* (pp. 1–34). New York: Guilford Press.

Coryell, W. H., Scheftner, W., Keller, M., Endicott, J., Maser, J., & Klerman, G. L. (1993). The enduring psychosocial consequences of mania and depression. *American Journal of Psychiatry*, *150*, 720–727. Retrieved July 9, 2010, from http://ajp.psychiatryonline.org/

Coryell, W., Turvey, C., Endicott, J., Leon, A. C., Mueller, T., Solomon, D., et al. (1998). Bipolar I affective disorder:

Predictors of outcome after 15 years. *Journal of Affective Disorders*, *50*, 109–116.

Crick, N. R. (1996). The role of overt aggression, relational aggression, and prosocial behavior in the prediction of children's future social adjustment. *Child Development*, *67*, 2317–2327.

Crick, N. R., & Dodge, K. A. (1994). A review and reformulation of social information-processing mechanisms in children's social adjustment. *Psychological Bulletin*, *115*, 74–101.

Cusi, A., MacQueen, G. M., & McKinnon, M. C. (2009). Altered self-report of empathic responding in patients with bipolar disorder. *Psychiatry Research*, *178*, 354–358.

DelBello, M. P., Hanseman, D., Adler, C. M., Fleck, D. E., & Strakowski, S. M. (2007). Twelve-month outcome of adolescents with bipolar disorder following first hospitalization for a manic or mixed episode. *American Journal of Psychiatry*, *164*, 582–590.

Dienes, K. A., Chang, K. D., Blasey, C. M., Adleman, N. E., & Steiner, H. (2002). Characterization of children of bipolar parents by parent report CBCL. *Journal of Psychiatric Research*, *36*, 337–346.

Dienes, K. A., Hammen, C., Henry, R. M., Cohen, A. N., & Daley, S. E. (2006). The stress sensitization hypothesis: Understanding the course of bipolar disorder. *Journal of Affective Disorders*, *95*, 43–49.

Esposito-Smythers, C., Birmaher, B., Valeri, S., Chiappetta, L., Hunt, J., Ryan, N., et al. (2006). Child comorbidity, maternal mood disorder, and perceptions of family functioning among bipolar youth. *Journal of the American Academy of Child and Adolescent Psychiatry*, *45*, 955–964.

Feeny, N. C., Danielson, C. K., Schwartz, L., Youngstrom, E. A., & Findling, R. L. (2006). Cognitive-behavior therapy for bipolar disorders in adolescents: A pilot study. *Bipolar Disorders*, *8*, 508–515.

Freeman, A. J., Youngstrom, E. A., Michalak, E., Siegel, R., Meyers, O., & Findling, R. L. (2009). Quality of life in pediatric bipolar disorder. *Pediatrics*, *123*, 446–452.

Fristad, M. A., Verducci, J. S., Walters, K., & Young, M. E. (2009). Impact of multifamily psychoeducational psychotherapy in treating children aged 8 to 12 years with mood disorders. *Archives of General Psychiatry*, *66*, 1013–1021.

Geller, B., Bolhofner, K., Craney, J. L., Marlene, W., DelBello, M. P., & Gundersen, K. (2000). Psychosocial functioning in a prepubertal and early adolescent bipolar disorder phenotype. *Journal of the American Academy of Child and Adolescent Psychiatry*, *39*, 1543–1548.

Geller, B., Craney, J. L., Bolhofner, K., Nickelsburg, M. J., Williams, M., & Zimerman, B. (2002). Two-year prospective follow-up of children with a prepubertal and early adolescent bipolar disorder phenotype. *American Journal of Psychiatry*, *159*, 927–933.

Geller, B., Tillman, R., Craney, J. L., & Bolhofner, K. (2004). Four-year prospective outcome and natural history of mania in children with a prepubertal and early adolescent bipolar disorder phenotype. *Archives of General Psychiatry*, *61*, 459–467.

Geller, B., Warner, K., Williams, M., & Zimerman, B. (1998). Prepubertal and young adolescent bipolarity versus ADHD: Assessment and validity using the WASH-U-KSADS, CBCL and TRF. *Journal of Affective Disorders*, *51*, 93–100.

Goldstein, T. R., Axelson, D. A., Birmaher, B., & Brend, D. A. (2007). Dialectical behavior therapy for adolescents with bipolar disorder: A 1-year open trial. *Journal of the American Academy of Child and Adolescent Psychiatry*, *46*, 820–830.

Goldstein, T. R., Birmaher, B., Axelson, D. A., Goldstein, B. I., Gill, M. K., Esposito-Smythers, C., et al. (2009). Psychosocial functioning among bipolar youth. *Journal of Affective Disorders*, *114*, 174–183.

Goldstein, T. R., Miklowitz, D. J., & Mullen, K. L. (2006). Social skills knowledge and performance among adolescents with bipolar disorder. *Bipolar Disorders*, *8*, 350–361.

Grandin, L. A., Alloy, L. B., & Abramson, L. Y. (2007). Childhood stressful life events and bipolar spectrum disorders. *Journal of Social and Clinical Psychology*, *26*, 460–478.

Guyer, A. E., McClure, E. B., Adler, A. D., Brotman, M. A., Rich, B. A., Kimes, A. S., et al. (2007). Specificity of facial expression labeling deficits in childhood psychopathology. *Journal of Child Psychology and Psychiatry*, *48*, 863–871.

Hammen, C. (1991). Generation of stress in the course of unipolar depression. *Journal of Abnormal Psychology*, *100*, 555–561.

Hammen, C. (2003). Interpersonal stress and depression in women. *Journal of Affective Disorders*, *74*, 49–57.

Hillegers, M. H., Burger, H., Wals, M., Reichart, C. G., Verhulst, F. C., Nolen, W. A., et al. (2004). Impact of stressful life events, familial loading, and their interaction on the onset of mood disorders. *British Journal of Psychiatry*, *185*, 97–101.

Hlastala, S. A., Kotler, J. S., McClellan, J. M., & McCauley, E. A. (2010). Interpersonal and social rhythm therapy for adolescents with bipolar disorder: Treatment development and results from an open trial. *Depression and Anxiety*, *27*, 457–464.

Hoza, B., Mrug, S., Gerdes, A. C., Hinshaw, S. P., Bukowski, W. M., Gold, J. A., et al. (2005). What aspects

of peer relationships are impaired in children with ADHD? *Journal of Consulting and Clinical Psychology*, *73*, 411–423.

Johnson, S. L., Cuellar, A., Ruggero, C., Perlman, C., Goodnick, P., White, R., et al. (2008). Life events as predictors of mania and depression in bipolar I disorder. *Journal of Abnormal Psychology*, *117*, 268–277.

Joseph, M. F., Frazier, T. W., Youngstrom, E. A., & Soares, J. C. (2008). A quantitative and qualitative review of neurocognitive performance in pediatric bipolar disorder. *Journal of Child and Adolescent Psychopharmacology*, *18*, 595–605.

Kee, K. S., Green, M. F., Mintz, J., & Brekke, J. S. (2003). Is emotion processing a predictor of functional outcome in schizophrenia? *Schizophrenia Bulletin*, *29*, 487–497. Retrieved October 6, 2010, from http://schizophrenia bulletin.oxfordjournals.org/content/current

Kim, E. Y., Miklowitz, D. J., Biuckians, A., & Mullen, K. (2007). Life stress and the course of early-onset bipolar disorder. *Journal of Affective Disorders*, *99*, 37–44.

Kutcher, S., Robertson, H. A., & Bird, D. (1998). Premorbid functioning in adolescent onset bipolar I disorder: A preliminary report from an ongoing study. *Journal of Affective Disorders*, *51*, 137–144.

Lemerise, E. A., & Arsenio, W. F. (2000). An integrated model of emotion processes and cognition in social information processing. *Child Development*, *71*, 107–118.

Leverich, G. S., McElroy, S. L., Suppes, T., Keck, P. E., Denicoff, K. D., Nolen, W. A., et al. (2002). Early physical and sexual abuse associated with an adverse course of bipolar illness. *Biological Psychiatry*, *51*, 288–297.

Lewinsohn, P. M., Klein, D. N., & Seeley, J. R. (1995). Bipolar disorders in a community sample of older adolescents: Prevalence, phenomenology, comorbidity, and course. *Journal of the American Academy of Child and Adolescent Psychiatry*, *34*, 454–463.

Luby, J., Tandon, M., & Nicol, G. (2007). Three clinical cases of DSM-IV mania symptoms in preschoolers. *Journal of Child and Adolescent Psychopharmacology*, *17*, 237–243.

MacQueen, G. M., Young, S. N., & Joffe, R. T. (2001). A review of psychosocial outcome in patients with bipolar disorder. *Acta Psychiatrica Scandinavica*, *103*, 163–170.

Malkoff-Schwartz, S., Frank, E., Anderson, B., Sherrill, J. T., Seigel, L., Patterson, D., et al. (1998). Stressful life events and social rhythm disruption in the onset of manic and depressive bipolar episodes. *Archives of General Psychiatry*, *55*, 702–707.

Mathews, J. R., & Barch, D. M. (2010). Emotion responsivity, social cognition, and functional outcome in schizophrenia. *Journal of Abnormal Psychology*, *119*, 50–59.

McClure, E. B., Pope, K., Hoberman, A. J., Pine, D. S., & Leibenluft, E. (2003). Facial expression recognition in adolescents with mood and anxiety disorders. *American Journal of Psychiatry*, *160*, 1172–1174.

McClure, E. B., Treland, J. E., Snow, J., Schmajuk, M., Dickstein, D. P., Towbin, K., et al. (2005). Deficits in social cognition and response flexibility in pediatric bipolar disorder. *American Journal of Psychiatry*, *162*, 1644–1651.

Mendenhall, A. N., Fristad, M. A., & Early, T. J. (2009). Factors influencing service utilization and mood symptoms in children with mood disorders: Effects of multifamily psychoeducational groups. *Journal of Consulting and Clinical Psychology*, 77, 463–473.

Merikangas, K. R., Akiskal, H. S., Angst, J., Greenberg, P. E., Hirschfeld, R. M. A., Petukhova, M., et al. (2007). Lifetime and 12-month prevalence of bipolar spectrum disorder in the national comorbidity survey replication. *Archives of General Psychiatry*, *64*, 543–552.

Meyer, S. E., & Carlson, G. A. (2010). Development, age of onset, and phenomenology in bipolar disorder. In D. J. Miklowitz & D. Cicchetti (Eds.), *Understanding bipolar disorder: A developmental psychopathology perspective* (pp. 35–66). New York: Guilford Press.

Meyer, B., Johnson, S. L., & Winters, R. (2001). Responsiveness to threat and incentive in bipolar disorder: Relations of the BIS/BAS scales with symptoms. *Journal of Psychopathology and Behavioral Assessment*, *23*, 133–143.

Miklowitz, D. J. (2008). Adjunctive psychotherapy for bipolar disorder: State of the evidence. *American Journal of Psychiatry*, *165*, 1408–1419.

Miklowitz, D. J., Axelson, D. A., Birmaher, B., George, E. L., Taylor, D. O., Schneck, C. D., et al. (2008). Family-focused treatment for adolescents with bipolar disorder. *Archives of General Psychiatry*, *65*, 1053–1061.

Miklowitz, D. J., Axelson, D. A., George, E. L., Taylor, D. O., Schneck, C. D., Sullivan, A. E., et al. (2009). Expressed emotion moderates the effects of family-focused treatment for bipolar adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, *48*, 643–651.

Miklowitz, D. J., Biuckians, A., & Richards, J. A. (2006). Early-onset bipolar disorder: A family treatment perspective. *Development and Psychopathology*, *18*, 1247–1265.

Miklowitz, D. J., & Johnson, S. L. (2009). Social and familial factors in the course of bipolar disorder: Basic processes and relevant interventions. *Clinical Psychology: Science and Practice*, *16*, 281–296.

Miklowitz, D. J., Otto, M. W., Frank, E., Reilly-Harrington, N. A., Kogan, J. N., Sachs, G. S., et al. (2007). Intensive psychosocial intervention enhances functioning in patients with bipolar

depression: Results from a 9-month randomized controlled trial. *American Journal of Psychiatry*, *164*, 1–8.

Miklowitz, D. J., & Scott, J. (2009). Psychosocial treatments for bipolar disorder: Cost-effectiveness, mediating mechanisms, and future directions. *Bipolar Disorders*, *11*, 110–122.

Miller, I. W., Epstein, N. B., Bishop, D. S., & Keitner, G. I. (1985). The McMaster Family Assessment Device: Reliability and validity. *Journal of Marital and Family Therapy*, *11*, 345–356. doi:10.1111/j.1752-0606.1985.tb00028.x

Morriss, R., Scott, J., Paykel, E., Bentall, R. P., Hayhurst, H., & Johnson, T. (2007). Social adjustment based on reported behavior in bipolar affective disorder. *Bipolar Disorders*, *9*, 53–62.

Muralidharan, A., Yoo, D., Ritschel, L. A., Simeonova, D. I., & Craighead, W. E. (2010). Development of emotion regulation in children of bipolar parents: Putative contributions of socioemotional and familial risk factors. *Clinical Psychology: Science and Practice*, *17*, 169–186.

Nelson, E. E., Leibenluft, E., McClure, E. B., & Pine, D. S. (2005). The social re-orientation of adolescence: A neuroscience perspective on the process and its relation to psychopathology. *Psychological Medicine*, *35*, 163–174.

Passarotti, A., & Pavuluri, M. N. (2008). Neural bases of emotional processing in pediatric bipolar disorder. *Expert Review of Neurotherapeutics*, *8*, 1381–1387.

Pavuluri, M. N., Marlow-O'Conner, M., Harral, E., & Sweeney, J. A. (2007). Affective neural circuitry during facial emotion processing in pediatric bipolar disorder. *Biological Psychiatry*, *62*, 158–167.

Petti, T., Reich, W., Todd, R. D., Joshi, P., Galvin, M., De Paulo, J. R., et al. (2004). Psychosocial variables in children and teens of extended families identified through bipolar affective probands. *Bipolar Disorders*, *6*, 106–113.

Post, R. M., & Miklowitz, D. J. (2010). The role of stress in the onset, course, and progression of bipolar illness and its comorbidities: Implications for therapeutics. In D. J. Miklowitz & D. Cicchetti (Eds.), *Understanding bipolar disorder: A developmental psychopathology perspective* (pp. 370–413). New York: Guilford Press.

Quackenbush, D., Kutcher, S., Robertson, H. A., Boulos, C., & Chaban, P. (1996). Premorbid and postmorbid school functioning in bipolar adolescents. *Canadian Journal of Psychiatry*, *41*, 16–22. Retrieved October 11, 2010, from http://psycnet.apa.org/psycinfo/1996-03589-003

Rabiner, D. L., Lenhart, L., & Lochman, J. E. (1990). Automatic versus reflective social problem solving in relation to children's sociometric status. *Developmental Psychology*, *26*, 1010–1016.

Rademacher, J., DelBello, M. P., Adler, C., Stanford, K., & Strakowski, S. M. (2007). Health-related quality of life in adolescents with bipolar I disorder. *Journal of Child and Adolescent Psychopharmacology*, *17*, 97–103.

Radua, J., Phillips, M. L., Russell, T., Lawrence, N., Marshall, N., Kalidindi, S., et al. (2010). Neural response to specific components of fearful faces in healthy and schizophrenic adults. *Neuroimage*, *49*, 939–946.

Rich, B. A., Fromm, S. J., Berghorst, L. H., Dickstein, D. P., Brotman, M. A., Pine, D. S., et al. (2008). Neural connectivity in children with bipolar disorder: Impairment in the face emotion processing circuit. *Journal of Child Psychology and Psychiatry*, *49*, 88–96.

Rich, B. A., Grimley, M. E., Schmajuk, M., Blair, K. S., Blair, R. J. R., & Leibenluft, E. (2008). Face emotion labeling deficits in children with bipolar disorder and severe mood dysregulation. *Development and Psychopathology*, *20*, 529–546.

Rich, B. A., Schmajuk, M., Perez-Edgar, K. E., Fox, N. A., Pine, D. S., & Leibenluft, E. (2007). Different psychophysiological and behavioral responses elicited by frustration in pediatric bipolar disorder and severe mood dysregulation. *American Journal of Psychiatry*, *164*, 309–317.

Rich, B. A., Vinton, D. T., Roberson-Nay, R., Hommer, R. E., Berghorst, L. H., McClure, E. B., et al. (2006). Limbic hyperactivation during processing of neutral facial expressions in children with bipolar disorder. *Proceedings of the National Academy of Science of the United States of America*, *103*, 8900–8905.

Romero, S., DelBello, M. P., Soutullo, C. A., Stanford, K., & Strakowski, S. M. (2005). Family environment in families with versus families without parental bipolar disorder: A preliminary comparison study. *Bipolar Disorders*, 7, 617–622.

Rosenthal, R., Hall, J. A., DiMatteo, M. R., Rogers, P. L., & Archer, D. (1979). *Sensitivity to nonverbal communication: The PONS test*. Baltimore: Johns Hopkins University Press.

Rucklidge, J. J. (2006). Psychosocial functioning of adolescents with and without paediatric bipolar disorder. *Journal of Affective Disorders*, *91*, 181–188.

Schenkel, L. S., Marlow-O'Connor, M., Moss, M., Sweeney, J. A., & Pavuluri, M. N. (2008). Theory of mind and social inference in children and adolescents with bipolar disorder. *Psychological Medicine*, *38*, 791–800.

Schenkel, L. S., Pavuluri, M. N., Herbener, E. S., Harral, E. M., & Sweeney, J. A. (2007). Facial emotion processing in acutely ill and euthymic patients with pediatric bipolar disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, *46*, 1070–1079.

Schenkel, L. S., West, A. E., Harral, E. M., Patel, N. B., & Pavuluri, M. N. (2008). Parent-child interactions in pediatric bipolar disorder. *Journal of Clinical Psychology*, *64*, 422–437.

Shen, G. H., Alloy, L. B., Abramson, L. Y., & Sylvia, L. G. (2008). Social rhythm regularity and the onset of affective episodes in bipolar spectrum individuals. *Bipolar Disorders*, *10*, 520–529.

Sullivan, A. E., & Miklowitz, D. J. (2010). Family functioning among adolescents with bipolar disorder. *Journal of Family Psychology*, *24*, 60–67.

Tillman, R., Geller, B., Nickelsburg, M. J., Bolhofner, K., Craney, J. L., DelBello, M. P., et al. (2003). Life events in a prepubertal and early adolescent bipolar disorder phenotype compared to attention-deficit hyperactive and normal controls. *Journal of Child and Adolescent Psychopharmacology*, *13*, 243–251.

Townsend, L. D., Demeter, C. A., Youngstrom, E., Drotar, D., & Findling, R. L. (2007). Family conflict moderates response to pharmacological intervention in pediatric bipolar disorder. *Journal of Child and Adolescent Psychopharmacology*, *17*, 843–851.

Wals, M., Hillegers, M. H. J., Reichart, C. G., Verhulst, F. C., Nolen, W. A., & Ormel, J. (2005). Stressful life events and onset of mood disorders in children of bipolar parents during 14-month follow-up. *Journal of Affective Disorders*, *87*, 253–263.

West, A. E., Henry, D. B., & Pavuluri, M. N. (2007). Maintenance model of integrated psychosocial treatment in pediatric bipolar disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, *46*, 205–212.

Wilens, T. E., Biederman, J., Forkner, P., Ditterline, J., Morris, M., Moore, H., et al. (2003). Patterns of comorbidity and dysfunction in clinically referred preschool and school-age children with bipolar disorder. *Journal of Child and Adolescent Psychopharmacology*, *13*, 495–505.

Zahn-Waxler, C., Cummings, E. M., McKnew, D. H., & Radke-Yarrow, M. (1984). Altruism, aggression, and social interactions in young children with a manic-depressive parent. *Child Development*, *55*, 112–122.

Zaki, J., Bolger, N., & Ochsner, K. (2008). It takes two: The interpersonal nature of empathic accuracy. *Psychological Science*, *19*, 399–404.

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