



Brief report

Manic symptoms in youth with bipolar disorder: Factor analysis by age of symptom onset and current age



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ABSTRACT

Background: Factor analysis has been used to identify potential clinical subtypes of mania in pediatric bipolar disorder. Results vary in the number of factors retained. The present study used a formal diagnostic instrument to examine how symptoms of mania in young people are expressed, depending on age of symptom onset and current age.

Methods: Trained clinicians completed the Schedule of Affective Disorders and Schizophrenia for School-Age Children (K-SADS) Mania Rating Scale (MRS) with parents of 163 children with child-onset of symptoms (before age 12), 94 adolescents with child-onset of symptoms, and 90 adolescents with adolescent-onset of symptoms (after age 12). Factor analysis of symptom ratings during the most severe lifetime manic episode was performed for each age group.

Results: Symptom factor structures were established for each age group. Two factors were evident for children with child-onset of symptoms ("activated/pleasure seeking" and "labile/disorganized"), one factor was present for adolescents with child-onset of symptoms ("activated/pleasure seeking/disorganized") and two factors were evident for adolescents with adolescent-onset of symptoms ("activated/pleasure seeking" and "disorganized/psychotic"). The factor structures for children with child-onset and adolescents with adolescent-onset of symptoms were highly similar, with the latter factor structure including psychotic symptoms.

Limitations: Limitations include reliance on retrospective parent report and potential issues with generalizability.

Conclusions: Findings suggest mania symptomatology is largely similar when examined by both age of onset and current age, with some notable differences. Specifically, psychotic symptoms begin emerging as a distinct factor in adolescents with adolescent-onset of symptoms.

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1. Introduction

Recognition of pediatric bipolar disorder has increased over the past decade (Axelson et al., 2006; Findling et al., 2001). Given the social and emotional impairment experienced by children diagnosed with bipolar disorder, it is important to accurately assess for symptoms. Understanding variation in the symptomatic presentation of mania is a major goal of research on pediatric

bipolar illness, as symptoms may appear similar to symptoms of other disorders (Carlson and Meyer, 2006; Findling et al., 2001; Youngstrom et al., 2002). Investigators have used factor analysis in an effort to identify potential clinical subtypes of mania (Papolos et al., 2007; Youngstrom et al., 2002, 2008), as well as to determine whether factor structures are equivalent across age groups (Frazier et al., 2007). Study findings have been highly heterogeneous. The number of factors of mania reported has ranged from a single factor structure (Youngstrom et al., 2002, 2008) to as many as ten independent factors (Papolos et al., 2007).

One source of this discrepancy may be the different methods used to define and identify symptoms of bipolar disorder.

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Specifically, Papolos et al. (2007) used the Child Bipolar Questionnaire (CBQ; Papolos et al., 2006) and Youngstrom et al. (2002) used the Young Mania Rating Scale (YMRS; Young et al., 1978) to assess for symptoms of bipolar disorder and mania. Neither the CBQ nor the YMRS are formal diagnostic instruments.

In addition to using different instruments, previous factor analytic studies have not consistently or fully accounted for potential age differences in the presentation of manic symptoms (Papolos et al., 2007; Youngstrom et al., 2002). Identification of symptoms in the early phases of the disorder is particularly important, as earlier onset is a predictor of a poorer outcome, including increased comorbidities and poorer quality of life (Larsson et al., 2010; Perlis et al., 2004). Early identification of symptoms and diagnosis may allow for earlier treatment to improve long-term outcomes (Perlis et al., 2009).

To our knowledge, only two studies evaluated the factor structure of manic symptoms by participant age. Youngstrom et al. (2002) separated participants into younger (ages 5 to 11) and older (ages 12 to 17) groups for both genders, although age of symptom onset was not considered. A one factor solution was supported for all groups. Frazier et al. (2007) used the Schedule of Affective Disorders and Schizophrenia for School-Age Children (K-SADS) Mania Rating Scale (MRS) (Axelson et al., 2003) to examine symptoms of mania among two age groups, ages 4 to 10 and 11 to 17. Again, a one factor solution was found for both age groups. Age of symptom onset was not considered.

The first aim of the present paper was to investigate the underlying structure of symptoms of mania in groups of children and adolescents, using an established research-based semi-structured diagnostic interview (Schedule of Affective Disorders and Schizophrenia for School-Age Children, Present and Lifetime Version; K-SADS P/L) (Kaufman et al., 1996). A second aim was to understand whether symptom factor structures differ by current age and/or age of symptom onset.

2. Methods

2.1. Subjects

Subjects were drawn from a multi-site observational study of youth diagnosed with bipolar disorder aged 7 to 17 years, the Course and Outcome of Bipolar Youth (COBY). The present study included a sub-sample ($n=347$) of the total COBY sample of 446 enrolled. Excluded were 85 subjects enrolled early in the study who were not assessed for the most serious past episode of mania using the K-SADS Mania Rating Scale (MRS) (Hunt et al., 2009). Complete data were not available for an additional 14 subjects. Participants were enrolled at 3 academic medical centers: Brown University, University of California at Los Angeles, and University of Pittsburgh Medical Center. Most participants were referred from outpatient programs (65.5%). Study participants had a primary diagnosis of Bipolar I Disorder (BP-I; $n=219$), Bipolar II Disorder (BP-II; $n=17$), or Bipolar Disorder Not Otherwise Specified (BP-NOS; $n=111$). Bipolar I and Bipolar II diagnoses were made according to DSM-IV criteria (Axelson et al., 2006). The minimum age of onset for a bipolar diagnosis was set at 4 years of age. COBY-established criteria were used for diagnosing BP-NOS (see Axelson et al., 2006 for criteria).

Three subgroups were formed based on participants' current age and age of symptom onset. The first subgroup included 163 children with child-onset of symptoms (before age 12). Ninety-three (57%) were diagnosed with BP-I, 3 (2%) with BP-II, and 67 (41%) with BP-NOS. The second subgroup contained 94 adolescents with onset of symptoms before age 12. Sixty-two (66%) were diagnosed with BP-I, 6 (6%) with BP-II, and 26 (28%) with

BP-NOS. The third subgroup included 90 adolescents with onset of symptoms after age 12. Of these adolescents, 61 (68%) were diagnosed with BP-I, 10 (11%) with BP-II, and 19 (21%) with BP-NOS. A more complete description of the sample demographics, study inclusion and exclusion criteria, and participant recruitment is available in Hunt et al. (2009). Informed consent was obtained before initiation of the assessment from the participant's parent or guardian and from participants 14 years or older.

2.2. Measures

Trained clinicians interviewed parents for the presence of present and lifetime non-mood psychiatric disorders using the Schedule of Affective Disorders and Schizophrenia for School Age Children-Present and Lifetime version (K-SADS-PL) and for the presence of mania and depression using the K-SADS Mania Rating Scale (MRS) and the depression section of the K-SADS-PL (DEP-P). The K-SADS MRS records the presence of 22 manic symptoms. Consistent with Axelson et al. (2006) and Hunt et al. (2009), symptom ratings from the most severe manic episode were used in the present study. Clinician summary scores for each item on the MRS were used in the current study.

2.3. Statistical analysis

Three statistical decision rule techniques, Glorfield's modification of Horn's parallel analysis (PA) (Glorfield, 1995; Horn, 1965), Minimum Average Partial (MAP) method (Velicer, 1976), and examination of the scree plots were used to determine the factor structure of symptom ratings for each age group. These techniques have demonstrated better accuracy than other retention decision rules (Zwick and Velicer, 1986). Factor analysis using a promax rotation was performed for each age group. SPSS Version 19 (2011) was used for all analyses.

3. Results

The MAP method suggested two factors for children with child-onset of symptoms, one factor for adolescents with child-onset of symptoms, and two factors for adolescents with adolescent-onset of symptoms. Parallel analysis suggested four factors for each age group. However, the MAP one and two factor solutions had increased clinical interpretability, included more than four items per factor, and were therefore selected for further analysis. A similar selection method between competing solutions was used by Youngstrom et al. (2008). This factor structure was also indicated by examination of the scree plots.

Factors are presented with their item loading scores in Table 1. For children with child-onset mania, two significant factors accounted for 28.4% of the total variance. The correlation between the two factors was 0.24. Thirteen items loaded on the first factor, which appeared to represent "activated/pleasure-seeking" symptoms. These included elation, racing thoughts, increase in goal directed activity, accelerated speech, increased productivity, unusually energetic, motor hyperactivity, and uninhibited people seeking. Cronbach's alpha for these thirteen items was adequate ($\alpha=.77$). Factor 2 represented "labile and disorganized" symptoms including irritability, mood lability, poor judgment, and sentence incoherence. Cronbach's alpha for these six items was adequate ($\alpha=.64$). Derailment, hypersexuality, hallucinations, and delusions did not significantly load on either factor.

For adolescents with child-onset of mania, a single factor accounted for 20.2% of the total variance and appeared to represent both "activated/pleasure-seeking" and "disorganized" behavior. Cronbach's alpha for these eighteen items was adequate

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