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Manic Symptoms in Youth: Dimensions, Latent Classes, and Associations With Parental Psychopathology

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Abstract

Objective—The purpose of the study was to define the latent structure of parent-reported manic symptoms and their association with functional impairment and familial risk in a community sample of Brazilian children.

Method—We screened for manic symptoms in a community sample of 2,512 children 6 to 12 years of age. Parents of children with “episodes of going abnormally high” completed a detailed mania section ($n = 479$; 19.1%). Confirmatory factor analysis (CFA) tested a solution with “Under-Control (UC)” and “Exuberant (EX)” dimensions, investigating the severity (threshold) and factor loading of each symptom. We also used latent class analysis (LCA) to evaluate the latent categorical structure of manic symptoms. Associations of these latent constructs with psychiatric comorbidity, psychosocial impairment, and family history of psychopathology were tested.

Results—The 2-dimensional model fit the data well. Only the UC dimension was associated with psychiatric morbidity, psychosocial impairment, and a family history of mania, depression, or suicide attempts. Both UC and EX items discriminated subjects with “episodes of going abnormally high,” but EX items lay at the mild end of the severity spectrum, whereas UC items lay at the severe end. The LCA yielded a small group of children with high levels of manic symptoms and a distinct profile of psychiatric comorbidity and impairment (“high-symptom group”).

Conclusion—In a large, community-based sample, we found a 2-dimensional latent structure for parent-reported manic symptoms in youth, and demonstrated familial associations between the UC

dimension and affective disorders. Both UC and EX items are clinically useful, but their contributions vary with symptom severity.

Keywords

mania; bipolar; latent; family history; factor analysis

Ongoing controversy surrounds the boundaries of bipolar disorder (BD) in youth.^{1,2} The lack of a clear definition of BD in youth may be partially responsible for the sharp rise in the rate at which pediatric BD is being diagnosed in the United States.³ Over-diagnosis of BD in youth is a concern; so too is underdiagnosis. Delays in identification and treatment may lead to adverse outcomes, such as erroneous pharmacological interventions.⁴ New approaches to assessing manic symptoms could facilitate the identification of BD in youth.

Few studies assess the symptomatic profile of pediatric BD in community samples,⁵ and all have been in North America or Europe. Taking an empirical (factor analytic or other multivariate) approach to manic symptoms in a population sample can offer an alternative to the use of “categories generated on the basis of historical or theoretical consideration.”⁶ Specifically, latent analysis approaches can be used to empirically explore psychopathological features of BD and to differentiate normal and pathological experiences.^{7,8} Such work should be conducted in multiple settings to test the invariance of the constructs across cultures. Indeed, few studies document the phenotypic characteristics of pediatric BD outside the United States and Europe, particularly in low- and middle-income countries, where the vast majority of the world’s children lives.^{9,10}

Latent factors are variables that are not measured directly but are estimated from observed variables, such as symptoms on a validated scale. Commonly used latent analytic approaches include factor analysis and latent class analysis (LCA). Factor analysis defines the latent trait or factor as a continuum, whereas LCA identifies categorical latent traits. In a large community sample of youth in the United Kingdom, exploratory factor analysis (EFA) yielded a 2-factor solution of manic symptoms: episodic exuberance (EX) and episodic under-control (UC).⁶ Stringaris *et al.*⁶ demonstrated that high levels of UC symptoms, but not the EX dimension, predicted psychosocial impairment and psychiatric comorbidity. Also, LCA identified 3 classes with different levels of severity of manic symptoms. In particular, a small class of children scored high on mania symptoms and exhibited severe psychiatric morbidity and impairment.

We attempted to examine and extend the findings of Stringaris *et al.*⁶ in a large, community-based Brazilian sample. While testing the 2-factor model of parent-reported mania symptoms using confirmatory factor analysis (CFA) in a non-European community sample, we also extended that primary work in 2 ways. First, we tested whether high levels of manic symptoms in children are associated with a history of mania in their parents. BD is highly heritable,^{11–13} and showing familial associations between latent classes of manic symptoms and a family history of mania would provide important external validity. Moreover, in clinical settings, family history of psychopathology is associated with worse outcomes and can guide diagnosis.^{14,15}

Second, while taking into account the 2-dimension solution and its factor loadings, we also used CFA to evaluate each item's performance in discriminating mania.^{7,16} This is important, because little is known about how items assessing euphoria, a core symptom of mania, perform in community-based samples of youth. Investigators have long noted the challenges associated with differentiating hypomanic euphoria from the affect associated with a healthy adolescent's first romantic experience.¹⁷ Therefore, it is important to determine the discriminative ability of each manic symptom in a youth sample because current diagnostic criteria are based on adult phenomenology, and the impact of development on each symptom's presentation is unknown.

Thus, the present study aimed to do the following: to use factor analysis and LCA to investigate the latent structure of parent-reported manic symptoms in a Brazilian community sample of youth; and to investigate associations among the latent constructs and psychiatric morbidity, psychosocial impairment, and family history of psychopathology.

METHOD

Participants

The sample is part of a large, community school-based study, the Prevention Project.¹⁸ The study was approved by the Ethics Committee of the University of São Paulo. Parents provided written informed consent for all participants. Children provided written or verbal informed assent.

In the screening phase, 9,937 parents of 6- to 12-year-old children were interviewed using the Family History Survey (FHS).¹⁹ Using a simple randomization procedure, we selected 2,512 subjects for further assessment: a high-risk subgroup ($n = 1,554$) and a random-selection subgroup ($n = 958$). To select the high-risk sample, we used FHS symptoms and a risk prioritization procedure that consisted of selecting individuals with high family loading of symptoms and/or ongoing symptoms in 1 of the 5 a priori targeted domains: learning disorders, attention-deficit/hyperactivity disorder (ADHD), anxiety, obsessive-compulsive disorder, and psychosis.¹⁸

Psychiatric Evaluation

Using the Development and Well-Being Assessment (DAWBA),²⁰ data on psychopathology were obtained from biological parents of 2,512 subjects in a household interview. The child's main caregiver was the informant. The DAWBA is a validated structured interview administered by trained lay interviewers that has been translated into several languages (<http://www.dawba.info>). The Brazilian Portuguese version shows appropriate psychometric properties and high interrater reliability.²¹ Interviewers received extensive training and supervision, first by using videotaped interviews of patients, and then through constant supervision and discussion during the field assessment period. Based on the information obtained during the interviews, diagnoses were assigned by 1 of 9 trained psychiatrists using a computerized platform. These psychiatrists were trained by attending several meetings led by a senior child psychiatrist with significant experience rating the DAWBA. Interrater reliability for a lifetime *DSM-IV* hypomanic or manic episode rating was tested. A second

child psychiatrist made an independent rating of 200 interviews, and the between-rater κ value for a hypomanic or manic episode was high ($\kappa = 0.80$; agreement 99.5%, expected 97.52%, $z = 11.49$, $p < .001$). We excluded individuals with pervasive developmental disorders ($n = 9$).

Family History of Psychopathology

During the household interview, the respondent (i.e., the mother in 91.5% of individuals) answered the Mini International Psychiatric Interview (MINI).^{22,23} The Brazilian version of the MINI has shown adequate interrater reliability and satisfactory psychometric characteristics.²³ MINI algorithms were used to generate 5 diagnostic groups of parental psychopathology: major depressive disorder (MDD), mania, any anxiety disorder (including panic, generalized anxiety disorder [GAD], social anxiety disorder [SAD], or agoraphobia), ADHD, and any substance use disorder (SUD), which included any alcohol/drug abuse or dependence. Past history of suicide attempts was extracted from the MINI Suicide Risk Section.

Manic Symptoms Evaluation

After a brief explanation of manic episodes as consisting of distinct and limited periods of “going excessively high,” the Mania Section of DAWBA begins with a screening question: “Does your son/daughter ever go abnormally high?” Possible answers were “No,” “A little,” and “A lot.” Parents who reported “A little” or “A lot” were considered to screen positive and were asked 26 items about manic symptoms that may have occurred during the period of going abnormally high (see <http://dawba.info/Bipolar>). From the entire sample ($N = 2,503$), 479 individuals (19.1%) screened positive by parent report. This subgroup composed our sample for this investigation. Rerunning analyses using data only from children whose parents reported “a lot” to the screening question did not change our results (see Supplement 1, available online).

Using DAWBA’s Mania Section, we report the prevalence of lifetime BD in our sample. We also report the lifetime prevalence of subjects meeting symptom and impairment criteria for short-lived (<4 days) episodes of “going abnormally high” according to the Stringaris *et al.*²⁴ criteria for bipolar disorder not otherwise specified (BP-NOS).

Measures of Impairment

The Strength and Difficulties Questionnaire (SDQ)²⁵ assesses behavioral and emotional difficulties and their resultant impairment and distress. We used the SDQ total difficulties score and the SDQ impact score to measure general psychopathology and impairment, respectively.^{26,27} Because the SDQ does not inquire specifically about manic symptoms, impairment measures are unlikely to be confounded by manic symptom severity.

Statistical Analysis

Two CFA models were run: a unidimensional and a 2-dimensional model based on Stringaris *et al.*⁶ For both, we used delta parameterization and weighted least-square parameters using a diagonal weight matrix with standard errors and with mean- and variance-adjusted χ^2 test statistics (WLSMV) estimators, and tetrachoric correlations

(because of dichotomized items). Model fit parameters were a χ^2 test of model fit, Tucker Lewis Index (TLI), Comparative Fit Index (CFI), and root mean square error of approximation (RMSEA). TLI and CFI values greater than 0.95 and RMSEA values less than 0.05 represent good-to-excellent model fit. The 2 nested models were compared based on the difference in χ^2 values and degrees of freedom (df).

Because the 2-dimensional model fit well (discussed below), we generated individual scores for each dimension by summing the DAWBA items, thereby creating 2 subscales (UC and EX). The UC subscale included the following 14 items: irritable, distractible, risk taking, less self-control, poor concentration, invades other people's personal space, bossy, less concerned about getting into trouble, overly sexed, constant changes of plans and activities, flight of ideas, talking to strangers, overconfident, and restless. The EX subscale included 10 items: cheerful, joking and laughing more than usual, outgoing, active, fast talk, noisier, gets more done, full of energy, excitable, and restless. As can be seen, restless is a cross-loading item. We used logistic and zero-inflated Poisson linear regression analyses to evaluate associations among the subscales (predictors), psychiatric comorbidities, and impact measures (outcomes). We used zero-inflated Poisson linear regression when the SDQ Impact Score was entered in the regression models as an outcome, since it was a zero-inflated variable. Standardized factor loading and threshold (with their respective standard errors) and r^2 values are reported for each item in the bidimensional model. The threshold is defined as the expected value of the latent response variable at which an individual transitions from a value of 0 ("not" and "a little") to a value of 1 ("a lot") on the categorical outcome variable.

We used LCA to identify groups of individuals based on the DAWBA's mania symptoms. To compare LCA models with different numbers of latent classes, we used the following: the Bayesian Information Criterion (BIC), in which small values correspond to better fit, as well as the sample size-adjusted BIC; the entropy criterion, in which values range from 0 to 1, where 1 indicates good classification; the bootstrap likelihood ratio (BLRT), a log likelihood-based test that compares model fit between k-1 and k class models; and a plot of log likelihood values against the number of classes.²⁸ To compare demographic and clinical features for each latent class, we used analysis of variance (with Bonferroni-corrected post hoc analyses) and χ^2 tests for continuous and categorical variables, respectively.

Finally, we tested relationships among parental psychopathology and latent constructs. Logistic regressions evaluated associations between parental diagnostic groups and UC/EX subscales. For LCA, we used multinomial logistic regressions with latent classes as the outcome and parental diagnostic groups as predictors.

All regression models were controlled for age and gender. Significance level was set at 0.05. We used STATA data analysis software version 10²⁹ for statistical analysis and Mplus version 7 to run CFA and LCA.³⁰

RESULTS

Individuals screening positive versus negative for “episodes of going abnormally high” did not differ in age, gender, socioeconomic status, or membership in high-risk versus random-selection groups (Table 1). Individuals who screened positive were more likely to have any *DSM-IV* disorder and a family history of psychiatric disorders. In the total sample, 5 children met criteria for lifetime bipolar I disorder (BP-I)/bipolar II disorder (BP-II) (0.2%); 4 were female; and the mean age was 9.4 years $\pm$ 1.34 years; 41 subjects met criteria for lifetime BP-NOS (1.6%).

CFA and Symptom Dimensions

The CFA using the 2-factor model solution resulted in adequate goodness-of-fit indexes: RMSEA 0.037 (90% CI = 0.031–0.044), CFI = 0.983, TLI = 0.982, χ^2 test of model fit = 379.417; $p < .001$). The internal reliability of the 2 subscales was excellent (UC = 0.96, EX = 0.95). The mean score for UC and EX subscales were 2.89 (SD 3.50) and 3.29 (SD 3.16), and the correlation between factors was 0.86 (standard error [SE] = 0.02). A 1-factor model also showed a good fit (RMSEA = 0.049, 90% CI = 0.043–0.055, CFI = 0.971, TLI = 0.968). The unrestricted model (2-factor) fit better ($\chi^2 = 62.692$, $df = 2$, $p < 0.001$). Therefore, we preferred the 2-dimension solution.

Dimensions, Impairment, and Parental Psychopathology

Using logistic regression, we examined associations among the UC and EX scores, psychopathology, and psychosocial impairment. First, we evaluated associations entering only 1 dimension at a time. Next, we evaluated associations obtained when entering both subscales as predictors (Table 2). Overall, when both subscales were entered in regression models, the UC score predicted psychiatric morbidity, whereas the EX score did not. Linear regression models tested if the 2 subscales predicted impairment. The UC ($\beta = 0.09$; 95% CI = 0.06–0.12; $p < 0.001$) but not the EX ($\beta = -0.04$; 95% CI = -0.07 to 0.001 ; $p = .06$) predicted impairment, even after controlling for comorbid diagnoses.

In univariate models, both the EX and UC subscales predicted parental history of major depression, mania, suicide attempts, and anxiety disorders; however, only the UC subscale predicted parental history of ADHD and SUD (Table 2). In multivariate analyses, only the UC subscale predicted parental history of major depression, BD, and suicide attempts, whereas the EX subscale did not predict any of the 6 domains of parental psychopathology. Rerunning all of the analyses with only those individuals with maternal respondents did not change the main results of the present study (data available upon request).

Items Performance

Next, we compared the relative ability of items from the UC and EX dimensions to evaluate manic manifestations. EX items were less severe than UC items; that is, the mean of the threshold parameter for EX items was 0.48 ± 0.30 versus 0.90 ± 0.31 for UC items (Table 3). Therefore, subjects who exhibited UC items tended to have more severe symptoms than those who exhibited EX items. However, items from the 2 dimensions performed similarly in distinguishing between individuals at different severity levels of a hypothesized manic

latent structure; the mean of the standardized factor loading for EX items was 0.77 ± 0.12 versus 0.75 ± 0.13 for UC items (Table 3).

Latent Class Analysis

BIC, sample size–adjusted BIC, bootstrap likelihood ratio, and entropy values are provided in Table S1, available online. A plot of the log-likelihood parameter suggested an inflection point favoring the 3-class solution (low, intermediate, and high). Hence, the 3-class solution was judged to be the best-fit model (Figure 1).

Although the 3 classes did not differ in age, gender, or SES, they differed on the SDQ Total Difficulties Score ($F_{2,476} = 20.79, p < .001; \eta_p^2 = 0.28$). Specifically, the high class had higher scores than the low and intermediate classes, but the low and intermediate classes did not differ. The 3 classes also differed on Total SDQ-Impact Score ($F_{2,476} = 31.78, p < .001; \eta_p^2 = 0.34$), with differences on all pairwise post hoc comparisons in the expected direction, and differed on EX/UC scores (see Supplement 1, available online).

Finally, we evaluated associations between parental psychopathology and latent classes through ordinal regression models, using the low class for reference (Table 4). A parental history of mania or any anxiety disorder predicted the child belonging to the intermediate or high class. However, parental history of depression and suicide attempts was associated only with the child belonging to the high class. ADHD in childhood and SUD were not associated with symptomatic latent classes (intermediate or high).

DISCUSSION

In this study, we evaluated parent-reported manic symptoms in a large Brazilian community sample of 6- to 12-year-old children by parent report, and examined a previously proposed 2-dimensional (EX and UC) model. We have added to previous work on the subject by identifying specific familial associations with the UC dimension and by examining the performance of items assessing mania. Whereas EX items capture the variance associated with milder mood symptoms, UC items capture variability related to more marked mood symptoms. To our knowledge, this is the first study to examine the latent structure of manic symptoms in a community sample outside the United States or Europe. Specifically, we demonstrate that the factorial structure proposed by Stringaris *et al.*⁶ fits our data and also provides family history validation for the proposed latent constructs of mania.

Using CFA,⁶ we provided cross-cultural validation for the 2-dimensional structure of symptoms of mania in childhood. The identification of the factorial structure of DAWBA's Mania Section in a Latin American country is the first step in evaluating its generalizability and validity.^{31,32} It is important to examine manic symptoms in the community dimensionally because, although such symptoms are common in youth at a subsyndromal level, later development of the full-blown BD phenotype is associated with symptom persistence and severity in a dose-response way.^{33,34} Indeed, Tijssen *et al.*³³ found a linear association between number of manic symptoms and mental health care use. Thus, regardless of whether these symptoms represent a risk factor for conversion to BD, their assessment is clinically important. Therefore, a dimensional rather than a categorical

approach to subsyndromal manic symptoms could further the development of preventive and early intervention strategies.

Subjects in the high LCA class and those with high UC scores had a relatively high risk of having parents with a mood disorder (depression, mania, and suicide attempts) but not of having ADHD or SUD. In addition, rates of parental mania in the high LCA class were similar to those found in clinical samples of pediatric BD (BP-I, BP-II, BP-NOS).^{35,36} Thus, in this sample, manic symptoms are associated with genetic loading for mood disorders in general and BD in particular. This also validated the DAWBA mania module's ability to ascertain BD symptoms. Moreover, we found rates of BP-NOS similar to those in other studies using DAWBA²⁴ and semi-structured interviews.³⁷

In our sample, the EX dimension was not associated with psychosocial impairment or psychopathology when entered together with the UC dimension in regression models. The lack of association between the EX dimension and impairment raises fundamental questions. Clinically, the boundary between normative adolescent elation and grandiosity versus manic symptoms is quite challenging, yet there is little relevant research. Here, CFA results analysis is informative. Episodic EX symptoms related to elated mood appear to capture variability at the mild end of manic manifestations, whereas UC symptoms capture variability at the severe end. However, both symptom types identify subjects with respect to the latent bidimensional structure, making these types potentially valuable for classifying individuals. These findings suggest that diagnostic systems for BD should require relatively severe and frequent EX symptoms in youth. This would improve the differentiation of normative from non-normative exuberant behaviors and emotions and would improve the diagnosis of BD in youth. In contrast, for at least some UC items, the presence of the symptom even at low levels may indicate a non-normative behavior requiring clinical attention.³⁸

Limitations include that several UC symptoms of mania are also symptoms of ADHD and ODD/CD. Therefore, we may have ascertained symptoms of externalizing disorders rather than manic symptoms. It should be noted, however, that these symptom reports were ascertained in the context of a DAWBA module that asks specifically about symptoms that occurred episodically, as in mania, rather than chronically, as in ADHD or ODD. Also, the association between these episodic UC symptoms and family history of mania suggests that they reflect mood-related manic symptoms rather than the waxing and waning of externalizing symptoms. Nonetheless, given the overlapping phenomenology between ADHD and BD, it is possible, if not likely, that these conditions have some overlapping pathophysiology, and this is an important area for future research.³⁹

Second, parental psychopathology was assessed for only 1 parent per child (usually, the mother). Therefore, variability associated with fathers and other family members was not considered. Despite that, we found associations between family history and the latent constructs. In addition, we used only parent-report information, without information from children or their teachers, which could inflate associations with parent-reported rating scales (compared to other interviews that use only child report or that synthesize both). Nevertheless, parent report on pediatric BD has been demonstrated to have strong

associations with clinician diagnosis and treatment outcomes.⁴⁰ Moreover, self-report from children 11 years old or younger are often not reliable and are typically not collected in community-based studies.²⁰

Third, the MINI family history algorithm classifies BP-II and cyclothymic disorder as unipolar depression and assigns a parental diagnosis of BD only to parents with BP-I disorder. Therefore, the MINI may have underestimated the prevalence of parental BD and inflated the association between child manic symptoms and parental unipolar depression. Also, we used a conservative Bonferroni adjustment. Finally, the use of lay interviewers and the lack of reliability assessment for these interviewers are limitations. However, the use of trained lay interviewers is virtually universal in community-based studies such as this, including those in Europe and the United States. Having psychiatrists as interviewers would be prohibitively expensive, especially outside Europe and the United States. Importantly, the final diagnostic ratings were done by trained child psychiatrists who reviewed all of the information obtained during the interview. This information included answers to structured questions as well as verbatim transcripts of the parents' answers to open-ended questions; the open-ended questions focused on the impairment associated with symptoms that were rated as present on the structured interview. In addition, the lay interviewers received continuous training and supervision on their interviewing methods by a clinical psychiatrist from the Prevention Project research team (P.M.P., G.A.S., A.G., T.M., A.S.G.).

In sum, this study provides important information about the distribution and relevance of manic symptoms in childhood. First, it confirms the importance of the UC dimension and reports, for the first time, an association with family history of mood disorder. Second, even though EX symptoms were not associated with impairment, this dimension contributes to the manic latent structure, albeit with less severe elevation than the UC trait. This suggests that, in youth, categorical diagnostic systems should require relatively marked elevation on the EX dimension, whereas more mild elevation on the UC dimension could be considered pathological. Our results, along with those of Stringaris *et al.*,⁶ suggest that pathophysiologic studies of BD should be designed to ascertain neuropsychological, neuroimaging, and other biomarkers of the UC and EX dimensions, rather than simply of mania or BD per se. Indeed, this approach is consistent with the National Institute of Mental Health (NIMH) Research Domain Criteria (RDoC) initiative, which recommends studying dimensions present across a number of diagnostic categories.⁴¹ Importantly, further investigation comparing categorical and dimensional latent structures with hybrid models, such as factor mixture analysis, will be important to elucidate the taxometric structure of BD symptoms. Finally, future longitudinal assessments in this sample will provide information concerning the stability of the reported manic symptoms and conversion to BD.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Clinical Guidance

- We found a 2-dimensional latent structure for manic symptoms in children 6 to 12 years of age, with an episodic under-control (UC) and an episodic exuberance (EX) dimension.
- Only the UC dimension was associated with psychiatric morbidity, psychosocial impairment, and a family history of mania, depression, or suicide attempts. However, both UC and EX symptoms are clinically useful, as they were equally discriminative.
- To improve the differentiation of normative from nonnormative EX behaviors and emotions (symptoms related to elation and grandiosity), clinicians should require relatively more severe and frequent symptoms in youth.

FIGURE 1.

Latent classes of parent-reported manic symptoms. Note: The y-axis represents the probability that individuals in the class will endorse a positive response in each symptom. The order of the symptoms on the horizontal axis represents the loading of each symptom in the dimensional 2-factor solution. Items on the left are predominantly Exuberant and, on the right, Under-control. DAWBA = Development and Well-Being Assessment.

TABLE 1

Sample Description: Screening for Episodes of “Going Abnormally High,” Positive and Negative versus Total Sample

	Positive n = 479 (19.1%)		Negative n = 2,024 (80.9%)		Total Sample N = 2,503	
	n	%	n	%	n	%
Demographic						
Gender (male)	257	53.7	1,071	52.9	1,328	53.1
Age (y), mean (SD)	9.66	1.95	9.72	1.91	9.71	1.92
SES						
Low	29	6.1	121	6.0	150	6.0
Medium	296	61.8	1,322	65.3	1,618	64.6
High	154	32.2	581	28.7	735	29.4
Selection (high-risk)	314	65.6	1,232	60.9	1,546	61.8
Child Psychiatric Diagnosis (DAWBA)						
Any disorder	209	43.6	434	21.4	643	25.7
Any anxiety disorder	88	18.4	159	7.9	247	9.9
Any depressive disorder	30	6.3	42	2.1	72	2.9
ADHD	95	19.8	178	8.8	273	10.9
Any CD/ODD	57	11.9	114	5.6	171	6.8
Parental Psychopathology						
Major depression	213	44.5	571	28.2	784	31.3
Mania	78	16.3	151	7.5	229	9.1
Suicide attempt	31	6.5	62	3.1	93	3.7
Any anxiety disorder	233	48.6	622	30.7	855	34.2
ADHD (childhood)	47	9.8	108	5.3	155	6.2
Any SUD	31	6.5	71	3.5	102	4.1

Note: ADHD = attention-deficit/hyperactivity disorder; CD/ODD = conduct disorder/oppositional defiant disorder; DAWBA = Development and Well-Being Assessment; MDD = major depressive disorder; OR = odds ratio; SES = socioeconomic status; SUD = substance use disorder.

*
p .01;

p .001.

TABLE 2
Associations of Psychopathology and Impact Measures (Outcomes) With Under-Control (UC) and Exuberant (EX) Subscales (Predictors)

	One Subscale at a Time as Predictor				Both Subscales as Predictors			
	EX		UC		EX		UC	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Childhood Psychopathology								
Any disorder	1.18	1.11–1.26***	1.28	1.20–1.37***	0.94	0.85–1.03	1.34	1.22–1.48***
Any anxiety disorder	1.13	1.05–1.21***	1.16	1.08–1.22***	1.00	0.89–1.12	1.15	1.04–1.26***
Any depression	1.10	0.98–1.23	1.19	1.08–1.30***	0.84	0.68–1.02	1.33	1.13–1.55***
Any ADHD	1.26	1.17–1.36***	1.31	1.22–1.40***	0.99	0.88–1.11	1.32	1.19–1.46***
Any CD/ODD	1.20	1.10–1.30***	1.24	1.16–1.33***	0.93	0.80–1.08	1.30	1.15–1.46***
Psychosocial impairment ^a								
SDQ impact score β (95% CI)	0.05	0.02–0.07***	0.07	0.05–0.09***	–0.04	0.07–0.00	0.09	0.06–0.12***
Parental Psychopathology								
MDD	1.10	1.04–1.17***	1.14	1.08–1.20***	0.98	0.90–1.07	1.15	1.06–1.25***
Mania	1.13	1.05–1.22***	1.14	1.07–1.21***	1.02	0.90–1.15	1.12	1.02–1.24*
Suicide attempt	1.16	1.03–1.30*	1.22	1.12–1.33***	0.88	0.72–1.07	1.31	1.13–1.53***
Any anxiety disorder	1.12	1.06–1.19***	1.12	1.06–1.18***	1.05	0.96–1.15	1.08	1.00–1.18
ADHD (childhood)	1.07	0.98–1.18	1.09	1.00–1.17*	0.99	0.86–1.15	1.09	0.96–1.23
Any SUD	1.17	0.96–1.41	1.16	1.01–1.35*	0.94	0.78–1.13	1.12	0.96–1.31

Note: All analyses controlled for age and gender. ADHD = attention-deficit/hyperactivity disorder; CD/ODD = conduct disorder/oppositional defiant disorder; MDD = major depressive disorder; OR = odds ratio; SDQ = Strength and Difficulties Questionnaire; SUD = substance use disorder.

^aControlling for dimensional measure of global psychopathology (SDQ total difficulties score).

* p .05;

** p .01;

*** p .001.

TABLE 3
Parameters of Items From Exuberant (EX) and Under-Control (UC) Dimensions in Confirmatory Factor Analysis

Dimension	Item	St Coefficient	SE	Threshold	SE	R ²
EX	Cheerful	0.730	0.038	0.547	0.060	0.533
EX	Talking fast	0.825	0.029	0.311	0.058	0.680
EX	Active	0.879	0.024	0.339	0.058	0.772
EX	Achieving more	0.545	0.055	0.870	0.066	0.297
EX	Noisy	0.827	0.028	0.235	0.058	0.684
EX	Full of energy	0.876	0.030	-0.013	0.057	0.767
EX	Excitable	0.829	0.034	0.949	0.068	0.687
EX	Jokes and laughs more	0.818	0.031	0.529	0.060	0.670
EX	More outgoing	0.861	0.027	0.529	0.060	0.742
Both	Restless	0.320	0.124	0.317	0.058	0.703
UC	Overly sexed	0.628	0.073	1.731	0.102	0.394
UC	Frequent changes of plan	0.761	0.040	0.966	0.068	0.579
UC	Talks to strangers	0.790	0.037	0.925	0.067	0.624
UC	Less concerned about trouble	0.800	0.037	1.062	0.071	0.639
UC	Invades personal space	0.844	0.032	1.009	0.069	0.713
UC	Overly confident	0.776	0.036	0.686	0.062	0.602
UC	Takes serious risks	0.828	0.040	1.159	0.074	0.685
UC	Irritable	0.712	0.042	0.706	0.063	0.507
UC	Distractible	0.797	0.033	0.720	0.063	0.636
UC	Disinhibited	0.791	0.038	0.966	0.068	0.626
UC	Poor concentration	0.852	0.026	0.571	0.061	0.727
UC	Too bossy	0.764	0.035	0.517	0.060	0.584
UC	Rapid shifts of topic	0.815	0.032	0.754	0.064	0.664

Note: Both = loadings in both dimensions; St coefficient = standardized coefficient; SE = standardized error.

Multinomial Regression Models Testing Associations of Parental History of Psychopathology (Predictors) With Latent Classes Analysis of Manic Symptoms (Outcome)

TABLE 4

	Low ^a n = 193	Intermediate n = 203		High n = 83	
		OR	95% CI	OR	95% CI
Depression	1.00	1.43	0.95–2.16	2.96	1.72–5.05**
Mania	1.00	3.46	1.82–6.57**	4.35	2.08–9.09**
Suicide attempt	1.00	1.64	0.63–4.27	4.43	1.67–11.72*
Any anxiety	1.00	2.02	1.35–3.04**	2.70	1.58–4.60**
ADHD (childhood)	1.00	1.08	0.53–2.18	1.98	0.90–4.34
Any SUD	1.00	1.56	0.66–3.68	1.81	0.65–5.08

Note: All analyses used age and gender as covariates. ADHD = attention-deficit/hyperactivity disorder; OR = odds ratio; SUD = substance use disorder.
^aNominal regression models: low category was set as the reference category.

* $p < .01$;
*** $p < .001$.