Published in final edited form as:
Early Interv Psychiatry. 2013 November ; 7(4): . doi:10.1111/eip.12019.

Assessing Psychotic-Like Symptoms using the BASC-2: Adolescent, Parent, and Teacher Agreement

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Abstract

Aim—The aim of the current study was to investigate the psychometric properties of the BASC-2 Atypicality subscale in a sample of adolescents receiving mental health services.

Methods—A large sample (*N*=1,916) of adolescents aged 12–20 years (median=14.7 years) completed the BASC-2. A parent and teacher also completed the measure for each child. We analyzed internal consistency and interrater reliabilities for the Atypicality subscale, as well as the Depression and Hyperactivity subscales for comparison. Further analyses explored the influence of participant's subscale scores, gender, and quality of relationships with adults on interrater agreement.

Results—All subscales demonstrated good internal consistency, however, interrater agreement was low for all subscales. Gender, Atypicality subscale score, and self-reported quality of relationships with adults could not account for poor interrater agreement.

Conclusions—The Atypicality subscale has strong internal consistency across informants. Low interrater agreement for the Atypicality subscale, as well as other scales, however, presents a challenge when interpreting multi-informant scales.

Keywords

Adolescent; Diagnosis; Psychotic Disorders; Schizophrenia; Self Report

Introduction

Although psychotic disorders are rare in children, psychotic experiences may be relatively common, with 4–20% of youth assessed in the community or referred to mental health services endorsing symptoms.[1–3] These symptoms are associated with current impairment and risk for more severe psychopathology.[4] Validated self-report measures have been used extensively to learn more about psychosis and schizotypy among adults.[5,6] Self-report tools might prove useful for the assessment of psychotic-like experiences among youth, and have the potential to identify youth who may benefit from mental health services. Several self-report tools assessing "psychosis risk" in young people have been used in research contexts, with most measures focusing primarily on the assessment of psychotic-like experiences or

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"attenuated" psychotic symptoms.[7,8] Efforts to validate self-report measures targeting psychotic-like experiences against interview-based assessments have met with mixed success,[9] with some "psychosis risk" screening tools demonstrating strong convergence with clinician interviews in adolescent and young adult samples.[10–12] These screening instruments rely entirely on youth self-report; the extent to which adolescents' self-reported symptoms converge with parent or teacher accounts is unknown. The Behavior Assessment System for Children, Second Edition (BASC-2),[13] a comprehensive, multi-informant questionnaire, contains an "Atypicality" subscale that might provide a reasonable measure of psychosis in youth, however, this subscale has not been extensively studied.

Best practice recommendations encourage clinicians to consider information from multiple sources when evaluating problems in youth,[14] however, most multiple-informant measures have not demonstrated strong interrater reliability.[15,16] Informant discrepancies may be due to divergent perspectives on whether behaviors are contextually limited versus consistent, developmentally appropriate versus atypical, or purposeful versus involuntary.[17] Children's behavior may also vary across settings and caregiver. Low agreement between informants regarding psychotic symptoms might be expected, since youth may be reluctant to disclose psychotic symptoms,[18] and agreement is generally lower for unobservable symptoms relative to overt behaviors.[17]

The current study investigates the psychometric properties of the BASC-2 Atypicality scale in a large, naturalistic sample of adolescents receiving services. We also examine the internal consistencies and interrater reliabilities of the Atypicality subscale relative to the Depression and Hyperactivity subscales, as well as potential moderators of interrater reliability. We hypothesized that interrater agreement on the Atypicality subscale would be low relative to the Hyperactivity subscale.

Methods

Sample

Analyses include data from 1,916 trios of adolescents, parents, and teachers who completed the BASC-2 as part of ongoing outcomes monitoring for youth in grades 5–12 receiving special education and/or mental health services in a state education system. Fifty-five adolescents re-completed the measure 1–100 days after initial administration. Data from 162 adolescents with invalid scores on the L (faking good) or V (nonsensical) scales were excluded.

All procedures received Institutional Review Board approval at the University of Maryland, Baltimore County. All data were recorded such that participants could never be identified, directly or through linked identifiers. All work conforms to the Declaration of Helsinki provisions.

Measures

The BASC-2 is widely used to assess a range of behavioral and emotional problems in youth.[13] The BASC-2 has parent, teacher, and self-report formats (PRS, TRS, SRP respectively), with separate child and adolescent versions. The adolescent PRS, TRS, and SRP forms were used for this study. Analyses used the Atypicality, Depression, Hyperactivity, Relations with Parents, and Attitude to Teachers subscales. Although subscales are consistent across forms, the phrasing and content of items varies. Table 1 contains a brief description of each subscale. The Atypicality scale assesses psychotic-like experiences such as auditory and visual hallucinations and paranoia (e.g. thinking someone is out to get the child) as well as the child's disconnection from reality (e.g. saying things that make no sense, acting strangely, seeming unaware of others).

Statistical Analyses

BASC-2 data were analyzed using age-normed T-scores. Data were screened for normality; when skewed distributions were present both Pearson and Spearman correlational analyses were performed and results compared. As the results were nearly identical, we report Pearson coefficients only. Test-retest reliability for the self-report form was calculated using Pearson correlation. To enable comparisons between clinical subscales, internal consistency and interrater reliabilities were calculated for the Atypicality, Depression, and Hyperactivity subscales. Internal consistency for each subscale and form was calculated using Cronbach's alpha. To examine interrater agreement, Pearson correlations were calculated between each form's subscales, resulting in three interrater correlation values for each subscale (self with parent; self with teacher; parent with teacher).

For a more precise assessment of interrater reliability, we examined agreement on items assessing specific symptoms that were similar across rater forms. Within-rater and interrater Pearson correlations were examined for four items assessing auditory hallucinations, three items assessing visual hallucinations, three items assessing sadness, and three items pertaining to interrupting others. We also explored potential moderators of agreement. Atypicality scale interrater reliability estimates were examined for: males versus females; adolescents scoring low (T score below 50) versus high (T score above 70) on the Atypicality scale; adolescents with good (T score>=30) versus poor (T score<30) relations with parents; and adolescents with good (T score<70) versus poor (T score>=70) attitudes towards teachers.

Results

Of the 1,916 adolescents assessed in this analysis, 1,316 (68.7%) were male; they ranged in age from 12–20 years (median=14.7 years). Test-retest reliability for the self-report form (all scales combined) was high ($r = 0.88$).

Internal Consistency and Interrater Reliability

A multitrait-multimethod matrix[19] of internal consistencies, within-rater subscale correlations, and interrater agreement is presented in Table 2. The clinical subscales all demonstrated high internal consistencies. For all three subscales (Atypicality, Depression, Hyperactivity), within-rater correlations across subscales were stronger than interrater agreement on any individual subscale. Adolescents and teachers demonstrated greater agreement with regard to Hyperactivity, and less agreement on Depression and Atypicality. Adolescents and parents demonstrated the greatest agreement with regard to Depression. Parents and teachers demonstrated moderate agreement with regard to adolescents' depression and hyperactivity, and lower agreement on the Atypicality scale.

Similar items assessing auditory and visual hallucinations, sadness, and interrupting others were compared across raters (Table 3). For adolescents, items assessing hearing voices and hearing things were strongly correlated. Parent items assessing visual and auditory hallucinations were moderately correlated with self-report. Correlations between self-report and teacher ratings were smaller for hallucination items, with some similar items yielding non-significant correlations across informants.

Interrater correlations for items assessing sadness were significant and larger than those for the hallucination items. For sadness and hallucination items, self-report/parent ratings were more strongly correlated than self-report/teacher and parent/teacher ratings. Interrater correlations for the 'interrupting' items were significant, with the self-report/teacher and parent/teacher agreement slightly higher than self-report/parent ratings.

Moderators of Interrater Agreement

We explored the possibility that interrater agreement would be greater among more symptomatic youth and youth with better relationships with adults. Interrater correlations did not significantly differ by sex (correlations across raters ranged from 0.15 – 0.22 for males, and from 0.17 – 0.28 for females), Atypicality subscale score (r ranged from 0.06 – 0.14 for those with low Atypicality scores, and from 0.11 – 0.22 for those with high Atypicality scores), or Relationship with Parents subscale score (r ranged from 0.14 – 0.24 for those with good relations with parents, and from 0.16 – 0.27 for those with poor relations with parents). Adolescents with positive attitudes toward teachers did not demonstrate higher agreement with teachers, yet parents and teachers tended to show higher agreement with one another for these teens relative to those adolescents with negative attitudes toward teachers ($r = 0.18$ vs. $r = 0.02$, difference significant at $p<0.05$).

Discussion

Early psychotic experiences are associated with psychiatric and developmental problems,[20] yet few validated measures are available to assess psychotic-like experiences in children. Further, there is little empirical knowledge about the value of obtaining information from multiple informants when assessing psychotic symptoms in youth. Our analyses found the BASC-2 Atypicality scale to have good internal consistency, but poor interrater reliability. Findings for the Atypicality subscale were consistent with other subscales of mental health concerns more commonly seen in adolescents (i.e., depression, hyperactivity). Additional analyses examining items with nearly identical phrasing across forms yielded relatively low agreement as well, suggesting that lack of consensus, rather than divergent constructs, appears to be the most likely explanation for our findings. Without a 'gold standard,' it is difficult to determine which informant provides the most accurate and helpful rating. Semi-structured diagnostic interviews are generally considered the 'gold standard' for assessing psychotic-like experiences and other mental health problems, yet even clinician-administered assessments must resolve inconsistencies provided by multiple informants.

We explored the possibility that characteristics of the adolescent or the adolescent's relationship with raters might account for some variability in interrater reliability; however, we failed to find significant differences in agreement in subsamples divided by gender, symptom severity, or quality of relations with parents. A significant difference did emerge among parent/teacher agreements in subsamples divided by 'Attitude to Teachers' subscale scores, such that parents and teachers demonstrated stronger agreement for adolescents with more positive attitudes toward their teachers. Positive attitudes toward teachers may lead adolescents to disclose psychotic experiences to these adults, or may disinhibit students' behaviors in school. Teachers may then be more likely to share parental impressions of atypical behavior.

Limitations

A number of limitations should be noted. As *DSM-IV-TR* diagnoses and/or clinician impressions were not available within the current data, we are unable to compare BASC-2 scales to a 'gold standard.' Another approach might be to compare Atypicality scores with other validated measures of child psychosis; however, few such measures exist at this time. Additionally, descriptive information on the parent and teacher informants was not available.

Conclusions

Consistent with previous studies of interrater agreement of other childhood disorders and findings reported in the BASC-2 manual, we found low levels of agreement across all

informants for ratings of psychotic-like symptoms. Low agreement between raters presents a challenge for the field, since no research to date has determined the relative validity of self- versus parent-reported information for assessing psychotic symptoms in youth. Self-report instruments should be considered along with clinician assessments in order to clarify symptoms toward diagnosis and further explore the relation between multiple-informant questionnaires and diagnoses. Future research might also use approaches such as observational and ecological assessments in order to determine the relative usefulness of self, parent, and teacher reports.

Acknowledgments

This work was supported in part by National Institute of Mental Health grant T32-MH67533-7, a Research Seed Funding Initiative (RSFI) grant from University of Maryland, Baltimore County, and by the Division of Child and Adolescent Psychiatry within the University of Maryland. None of the funding sources had any role in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication.

References

1. Yoshizumi T. Hallucinatory experiences in a community sample of Japanese children. Journal of the American Academy of Child Adolescent Psychiatry. 2004; 43(8):1030. [PubMed: 15266199]
2. McGee R. Hallucinations in nonpsychotic children. Journal of the American Academy of Child Adolescent Psychiatry. 2000; 39(1):12. [PubMed: 10638059]
3. Biederman J, Petty C, Faraone SV, Seidman L. Phenomenology of Childhood Psychosis: Findings From a Large Sample of Psychiatrically Referred Youth. Journal of Nervous & Mental Disease. 2004; 192(9):607–614. [PubMed: 15348977]
4. Poulton R. Children's self-reported psychotic symptoms and adult schizophreniform disorder: a 15-year longitudinal study. Arch Gen Psychiatry. 2000; 57(11):1053. [PubMed: 11074871]
5. Schiffman J, Nakamura B, Earleywine M, LaBrie J. Symptoms of schizotypy precede cannabis use. Psychiatry research. 2005; 134(1):37. [PubMed: 15808288]
6. Roth RM. The relationship between schizotypal and obsessive-compulsive features in university students. Personality and Individual Differences. 2000; 29(6):1083.
7. Therman S, Heinimaa M, Miettunen J, Joukamaa M, Moilanen I, Mäki P, et al. Symptoms associated with psychosis risk in an adolescent birth cohort: improving questionnaire utility with a multidimensional approach. Early Intervention in Psychiatry. 2011; 5(4):343–348. [PubMed: 21910849]
8. Kline E, Wilson C, Ereshefsky S, Nugent KL, Pitts S, Reeves G, et al. Schizotypy, psychotic-like experiences and distress: An interaction model. Psychiatry Res. 2012 Epub ahead of print.
9. Granö N, Karjalainen M, Itkonen A, Anto J, Edlund V, Heinimaa M, et al. Differential results between self-report and interview-based ratings of risk symptoms of psychosis. Early intervention in psychiatry. 2011; 5(4):309–314. [PubMed: 21545689]
10. Chung YC, Kang NI, Im YJ, Kim SW, Cho IH, Lee YM, et al. Validation of the Korean version of the Eppendorf Schizophrenia Inventory as a screening measure to detect adolescents at ultra-high risk for psychosis. Early Intervention in Psychiatry. 2012 Epub ahead of print.
11. Kline E, Wilson C, Ereshefsky S, Denenny D, Thompson E, Pitts SC, et al. Psychosis risk screening in youth: A validation study of three self-report measures of attenuated psychosis symptoms. Schizophr Res. 2012; 141(1):72–77. [PubMed: 22921375]
12. Loewy RL, Therman S, Manninen M, Huttunen MO, Cannon TD. Prodromal psychosis screening in adolescent psychiatry clinics. Early intervention in psychiatry. 2012; 6(1):69–75. [PubMed: 21883972]
13. Reynolds, C.; Kamphaus, R. Behavior Assessment for Children, (BASC-2). Circle Pines, MN: American Guidance Service; 2004.
14. McClellan J, Werry J, Bernet W, Arnold V, Beitchman J, Benson RS, et al. Practice parameters for the assessment and treatment of children and adolescents with schizophrenia. J Am Acad Child Adolesc Psychiatry. 2001; 40(7):4S–23S. [PubMed: 11434484]

15. Achenbach TM, McConaughy SH, Howell CT. Child/adolescent behavioral and emotional problems: implications of cross-informant correlations for situational specificity. Psychol Bull. 1987; 101(2):213. [PubMed: 3562706]

16. Nelson R, Epstein M, Griffith A, Hopper J. Factor Structure, Internal Consistency, and Interrater Reliability of the Early Childhood Behavior Problem Screening Scale. Topics in Early Childhood Special Education. 2007; 27(3):148–154.

17. De Los Reyes A, Kazdin AE. Informant discrepancies in the assessment of childhood psychopathology: a critical review, theoretical framework, and recommendations for further study. Psychological Bulletin; Psychological Bulletin. 2005; 131(4):483.

18. Boydell KM, Gladstone BM, Volpe T. Understanding help seeking delay in the prodrome to first episode psychosis: a secondary analysis of the perspectives of young people. Psychiatr Rehabil J. 2006; 30(1):54–60. [PubMed: 16881246]

19. Campbell DT, Fiske DW. Convergent and discriminant validation by the multitrait-multimethod matrix. Psychol Bull. 1959; 56(2):81. [PubMed: 13634291]

20. Horwood J, Salvi G, Thomas K, Duffy L, Gunnell D, Hollis C, et al. IQ and non-clinical psychotic symptoms in 12-year-olds: results from the ALSPAC birth cohort. The British Journal of Psychiatry. 2008; 193(3):185–191. [PubMed: 18757973]

Table 1

BASC-2 Subscale Descriptions

Subscale	Description
Atypicality	Assesses "child's disconnection from or unawareness of his or her normal surroundings (e.g., acting confused, being out of touch with reality, saying things that make no sense)" as well as symptoms that are "common markers for more serious psychotic tendencies (e.g., hearing sounds or seeing things that are not really present, thinking that someone is watching them or out to get them)".[13]
Depression	Assesses common symptoms of depression such as sadness, loneliness, and anhedonia.[13]
Hyperactivity	Assesses disruptive behaviors such as "having trouble standing still, talking while others are talking, and being too noisy".[13]
Relations with Parents	Assesses adolescents' "perception of being important in the family, the status of the child-parent relationship, and the child's perception of the degree of parental trust and concern".[13]
Attitude to Teachers	Assesses adolescents' "perception of teachers as being uncaring, unfair, or unmotivated to help their students".[13]

Early Interv Psychiatry. Author manuscript; available in PMC 2014 November 01.

Table 2

Multi-Trait Multi-Method Matrix For Adolescents

Pearson's		Self-Report			Parent			Teacher		
		Atyp	Hyp	Dep	Atyp	Hyp	Dep	Atyp	Hyp	Dep
Self-Report	Atypicality	0.847								
	Hyperactivity	0.456*	0.784							
	Depression	0.579*	0.321*	0.847						
Parent	Atypicality	0.241*	0.142*	0.213*	0.810					
	Hyperactivity	0.119*	0.218*	0.096*	0.571*	0.831				
	Depression	0.235*	0.122*	0.316*	0.568*	0.541*	0.877			
Teacher	Atypicality	0.144*	0.103*	0.097*	0.164*	0.183*	0.118*	0.811		
	Hyperactivity	0.070*	0.238*	0.013	0.051**	0.299*	0.033	0.551*	0.947	
	Depression	0.168*	0.094*	0.191*	0.125*	0.162*	0.266*	0.570*	0.391*	0.832

*=p<0.01;

**=p<0.03.

Internal consistency alpha coefficients are displayed on the diagonal (blue blocks). Pearson correlations are displayed in all other cells (pink blocks=within rater, across scales; green blocks=across raters, same scale; yellow blocks=across raters, across scales).

Table 3

Within rater (self-report) and interrater correlations for similar items

Auditory Hallucinations	**SRP122**	**SRP160**	**PRS101**
SRP122: I hear voices in my head that no one else can hear.	--		
SRP160: I hear things that others cannot hear.	0.695*	--	
PRS101: Hears sounds that are not there.	0.196*	0.195*	--
TRS107: Hears sounds that are not there.	0.068*	0.090*	0.080*
Visual Hallucinations	SRP130	PRS27	TRS65
SRP130: I see weird things.	--		
PRS27: Sees things that are not there.	0.100*	--	
TRS65: Sees things that are not there.	0.021	0.035	--
Is Sad	SRP111	PRS142	TRS20
SRP111: I feel sad.	--		
PRS142: Is sad.	0.267*	--	
TRS20: Is sad.	0.128*	0.163*	--
Interrupts Others	SRP118	PRS80	TRS99
SRP118: I talk while other people are talking.	--		
PRS80: Interrupts others when they are speaking.	0.134*	--	
TRS99: Interrupts others when they are speaking.	0.180*	0.172*	--

* =p<0.01,

SRP=self-report, PRS=parent report, TRS=teacher report.