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Relationships between child-reported activity level and task orientation and parental ADHD symptom ratings

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Abstract

Objective—This study examines whether elementary school-aged children can report behaviors relevant to assessing symptoms of attention-deficit/hyperactivity disorder (ADHD).

Methods—Interviews were conducted with 120 children ages 6 to 12 and their parents across three waves as part of a longitudinal cohort study of ADHD detection and service use. Child self-reports obtained through the Dimensions of Temperament Scale-Revised-Child (DOTS-R-C) were correlated with parent reported ADHD symptoms, which were assessed through DSM-IV-based instrument ratings obtained concurrently and five years later.

Results—The DOTS-R-C subscales Activity Level and Task Orientation demonstrate adequate internal consistency after eliminating items requiring reverse scoring. Children's self-reports of Task Orientation Problems correlate with their parents' concurrent reports of inattention, $r(117) = .23$, $p < .05$, and with parents' Wave 3 reports of inattention, $r(118) = .25$, $p < .01$ as well as hyperactivity, $r(118) = .25$, $p < .01$. Children's self-reports of Activity Level correlate with their parents' concurrent reports of hyperactivity, $r(117) = .21$, $p < .05$, as well as Wave 3 reports of hyperactivity/impulsivity, $r(118) = .37$, $p < .001$ and inattention, $r(118) = .23$, $p < .05$.

Conclusions—Findings suggest that children may be capable of producing meaningful self-reports of activity level and task orientation. We propose that the development of child-friendly self-report instruments targeting ADHD symptoms is merited in order to facilitate the collection of child input during ADHD assessments.

Keywords

ADHD; child self-report; temperament; hyperactivity; inattention

Current practices in the assessment and evaluation of children with attention-deficit/hyperactivity disorder (ADHD) rely largely on adult reports of children's behavior. The American Academy of Child and Adolescent Psychiatry's Practice Parameters for the Assessment and Treatment of Children and Adolescents with Attention-Deficit/Hyperactivity Disorder¹ call for the use of interviews and rating scales to be completed by the patient's parent and teachers. A child interview is recommended to determine the presence of symptoms suggestive of additional comorbid disorders, but not to refute or confirm the diagnosis of ADHD, because young children are considered to be unaware of their own symptoms, and adolescents are expected to minimize their symptoms' significance.²

Clinical reluctance to include child self-reports in the diagnostic assessment process for ADHD may reflect concerns about limited empirical support for available assessment tools. A recent review of methods for assessing externalizing disorders cautions that the validity and reliability of widely used child self-report measures is not well-established, although some studies suggest that the Youth Self-Report and the Children's Action Tendency Scale are adequate measures.³ In contrast, in the context of temperament research, children have been found to be valid reporters of their own externalizing behavior. For example, the Revised Dimensions of Temperament Scale-Child (DOTS-R-C) has satisfactory construct and concurrent validity^{4, 5} and high rates of agreement between parental and child ratings on the DOTS-R-C have been reported.⁶

Including child self reports in the ADHD assessment process may be beneficial for several reasons. First, it may help with the process of treatment engagement since increased direct communication between physician and child has been shown to improve parental satisfaction with care and adherence to treatment regimens.^{7, 8} Furthermore, child self-ratings may tap into aspects of psychopathology not elicited by parental assessment tools based on the Diagnostic and Statistical Manual, 4th edition (DSM-IV). In a study examining the relationship between childhood temperament and adolescent ADHD symptom trajectories, childhood self-ratings of difficult temperament on the DOTS-R-C correlated with parent-rated externalizing symptoms in adolescence and were associated with less improvement of hyperactivity/impulsivity symptoms in adolescence.⁹ Subsequent analyses showed that the prediction of ADHD symptom persistence was only related to two of the six components comprising the difficult temperament variable, activity level and task orientation. Here, we follow up on these findings and examine whether elementary school children can report behaviors relevant to the assessment of ADHD symptoms. We hypothesize that children's self-reports of activity levels and task orientation on the DOTS-R-C can be interpreted as self-reports of certain ADHD symptoms. Specifically, we determine the internal consistency of children's self-reports of activity levels and task orientation on the DOTS-R-C, and examine their concurrent and predictive validity through correlations between child self-reports and parent ratings of ADHD symptoms obtained concurrently and five years later.

METHODS

Procedure

This research uses data from a longitudinal study on ADHD detection¹⁰ and has been approved by the University Institutional Review Board and the school district research director. Informed consent was obtained from parents and assent from children prior to study participation.

As shown in the Figure data was collected in three waves between the years 1999 and 2006 as follows. At Wave 1, parent ratings of the Swanson, Nolan, and Pelham, Version IV (SNAP-IV)¹¹ and treatment information were obtained to identify students at high risk for ADHD. At Wave 2, parents completed diagnostic interviews assessing ADHD and disruptive disorders, using the Diagnostic Interview Schedule, Version 4 (DISC-IV)¹² and children completed the

DOTS-R-C.^{12, 13} At Wave 3, the Vanderbilt ADHD Diagnostic Parent Rating Scale (VADPRS) was used to assess symptoms of ADHD.¹⁴

Participants

Using school district registration records, we identified 12,009 elementary school students enrolled in kindergarten through 5th grade in a North Central Florida public school district during the academic year 1998–1999. In order to achieve adequate power for future data analyses, 3,158 of these children were selected using a gender-stratified random design, over-sampling girls by a margin of two to one to ensure adequate representation. Only one child per household was eligible for selection to ensure subject independence. Children were eligible for the study if they lived in a household with a telephone, were not receiving special education services for mental retardation or autism, and were from Caucasian or African-American backgrounds. Children from other ethnic backgrounds were excluded because they comprised less than 5% of the total student population.

A total of 1,615 families completed telephone screening for ADHD risk at Wave 1, (79% participation rate). Using parental reports and standardized parent and teacher behavioral ratings, youth were identified as being at high risk for ADHD if a parent reported that their child had a professional ADHD diagnosis or was receiving formal ADHD treatment, had concerns reported by family or school professionals that the child may have ADHD, or had concerns reported about a behavioral problem if any parent ADHD subscale scores were elevated 2 standard deviations above age and gender norms. In Wave 2, those children considered high-risk for ADHD (N=266) and their parents underwent diagnostic and service use assessments at participants' homes or community locations; of those children 200 were ages 8 or older and eligible to complete the DOTS-R-C. Wave 3 consisted follow-up interview 5 years later to collect data on service use and behavior, which was completed by 159 parents and Wave 2 DOTS-R-C data were available from 120 adolescents. A detailed description of the study population and the sampling method is described elsewhere.¹⁰

This analysis includes 120 youths with complete data sets from all three study waves who had completed the Revised Dimensions of Temperament Scale - Child (DOTS-R-C) as elementary school students. This sample represents 60% of those who were eligible to complete the DOTS-R-C at Wave 2, and there were no differences in Wave 2 temperament scores between those children who participated in Wave 3 and those who did not. This sample consists of 66 girls (55%), 43 African Americans (36%), and 63 children (53%) qualifying for free or reduced school lunch, an indicator of poverty. Furthermore, 71 (59%) met DSM-IV criteria for ADHD; 47 (39.5%) for oppositional defiant disorder; and 14 (12%) for conduct disorder. Average age was 8.7 (SD 1.4) at Wave 1, 10.2 (SD 1.4) at Wave 2 and 15.7 (SD 1.4) at Wave 3.

Measures

Child Sociodemographic Characteristics—Sociodemographic characteristics including the youth's age, gender, lunch status and race were obtained from school district records and confirmed during interviews.

Child Self Reports of Activity Level and Task Orientation—The DOTS-R-C was designed to measure the nine dimensions of temperament originally proposed by Thomas and Chess in children aged eight years and older.^{4, 15} Windle and colleagues reported internal consistency coefficients (Cronbach alphas) for the nine dimensions that ranged from .54 (Rhythmicity-Daily Habits) to .81 (Activity Level-Sleep) in a sample of elementary students.⁴ The test-retest reliability was .64 for hyperactivity scale and .55 for the inattention scale. The construct validity of this scale has been supported by factor analytic results confirming the 9 factors. Concurrent validity with measures of perceived cognitive competence, perceived

social competence, and general self-worth has been established.⁴ The DOTS-R-C contains two subscales that measure constructs relevant to ADHD symptom assessment, Activity Level composed of 7 items (e.g., “I can’t sit still for long”) and Task Orientation, composed of 5 distractibility items (e.g., “Things going on around me cannot take me away from what I am doing”) and 3 persistence items (e.g., “Once I take something up, I stay with it”) (see Appendix). A four-choice response option is given for each item: (1) usually false, (2) more false than true, (3) more true than false, and (4) usually true. The measure was administered by trained research assistants who read the measure to the children and recorded their responses.

Adult Reports of Child ADHD Symptoms—ADHD symptoms were assessed using standardized parent questionnaires consisting of operationalized DSM-IV criteria for ADHD: the SNAP-IV¹¹ and the VADPRS.²⁴ To assign research diagnoses of ADHD, parents were administered the DISC-IV, which, consistent with DSM-IV diagnostic criteria, inquires about ADHD symptoms and related impairment across school and home settings.¹² Furthermore, we used DISC-IV inattentive and hyperactive/impulsive symptom counts, which could each range from 0 to 9, for the correlational analyses.

Data Analysis

The internal consistency of the DOTS-R-C and its Activity Level and Task Orientation subscales was assessed using Cronbach’s α . The relationships between children’s self-report of activity and task orientation on the DOTS-R-C and adult ADHD symptom ratings was assessed through Spearman correlation coefficients between these subscales and parents’ concurrent inattention and hyperactivity/impulsivity DISC-IV symptom scores, as well as with parents’ Wave 3 VADPRS Scale scores five years later.

RESULTS

Internal Consistency of the DOTS-R-C

The DOTS-R-C showed high internal consistency (Cronbach’s $\alpha = .80$). The original Activity Level and Task Orientation subscales demonstrated low levels of internal consistency with Cronbach’s α of .59 and .57, respectively; however, after eliminating one item in each scale that required reverse scoring and produced the lowest item-total correlations (−.13 and −.35), the Cronbach’s α for the revised 6-item Activity Level subscale increased to .75 and that of revised 7-item Task Orientation subscale to .66.

Correlations with Concurrent Parental ADHD Symptom Reports

Children’s reports of their Activity Level on the DOTS-R-C significantly correlated with their parents’ concurrent reports of hyperactivity/impulsivity on the DISC-IV $r(117) = .21, p < .05$. Children’s self-reports of Task Orientation Problems significantly correlated with their parents’ concurrent reports of inattention on the DISC-IV, $r(117) = .23, p < .05$.

Correlations with Subsequent (Wave 3) Parental ADHD Symptom Reports

Children’s self-reports of Activity Level on the DOTS-R significantly correlated with their parents’ Wave 3 reports of hyperactivity on the VADPRS, $r(118) = .37, p < .001$, as well as parents’ reports of inattention, $r(118) = .23, p < .05$.

Children’s self-report of Task Orientation Problems on the DOTS-R-C significantly correlated with their parents’ Wave 3 reports of inattention, $r(118) = .25, p < .01$ on the VADPRS as well as parents’ Wave 3 reports of hyperactivity $r(118) = .25, p < .01$.

DISCUSSION

Our study indicates that children may be capable of producing meaningful self-reports of activity level and task orientation. We found small correlations between children's self-reports of activity level and task orientation and their parents' concurrent reports of hyperactivity/impulsivity and inattention symptoms. These relationships did not attenuate and children's self-reports predicted parental ADHD symptom reports five years later. The observed relationships between child and parent reports were weak, but may become more pronounced if child's input is collected through a self-report measure explicitly addressing the full range of the 18 ADHD symptoms rather than just the items included in the DOTS-R-C, which focus on activity level and task orientation.

Although our findings cannot determine whether the DOTS-R-C facilitates the child's self-report of temperament traits or of ADHD symptoms, they suggest that the DOTS-R-C may serve as a useful example when designing measures that will incorporate children's perspectives into the ADHD assessment and treatment process. This may be important since several instruments enable child self-reports of anxiety or depression;^{17, 18} however, no established self-report assessment instruments for childhood ADHD symptoms are currently available, though one measure is available for adolescents aged twelve to eighteen.¹⁹ In addition, pilot work to develop a self evaluation scale for children with ADHD using a visual format has been reported.² Our data suggest that, if such instruments become available, children may be able make valuable contributions to the ADHD assessment process. As Wissow⁸ has noted, incorporating children's input into diagnosis and intervention planning can help to strengthen the relationship between patient, family and treatment provider, and may contribute to increasing treatment adherence,²⁰ areas in need of improvement for ADHD care. Further research is merited to develop valid measures for this purpose, using child-friendly language and focusing on pertinent aspects of ADHD that a child can be expected to comprehend.

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References

1. Pliszka S. Practice parameter for the assessment and treatment of children and adolescents with attention-deficit/hyperactivity disorder. *J Am Acad Child Adolesc Psychiatry* Jul;2007 46(7):894–921. [PubMed: 17581453]
2. Klimkeit E, Klimkeit E, Graham C, et al. Children Should Be Seen and Heard: Self-Report of Feelings and Behaviors in Primary-School-Age Children With ADHD. *Journal of Attention Disorders* Nov; 2006 10(2):181–191. [PubMed: 17085628]
3. Reitman D, Hummel R, Franz DZ, Gross AM. A review of methods and instruments for assessing externalizing disorders: theoretical and practical considerations in rendering a diagnosis. *Clin Psychol Rev* Aug;1998 18(5):555–584. [PubMed: 9740978]
4. Windle M, Hooker K, Lerner K, East P, Lerner J, Lerner R. Temperament, perceived competence, and depression in early and late adolescents. *Dev Psychol* 1986;22(3):384–392.
5. Windle M. Revised Dimensions of Temperament Survey (DOTS-R): Simultaneous group confirmatory factor analysis for adolescent gender groups. *Psychological Assessment* 1992;4(2):228–234.
6. Luby J, Steiner H. Concordance of Parent-Child Temperament Ratings in a Clinical Sample of Adolescent Girls. *Child Psychiatry and Human Development* Summer;1993 23(4):297–305. [PubMed: 8325137]
7. Pantell RH, Stewart TJ, Dias JK, Wells P, Ross AW. Physician communication with children and parents. *Pediatrics* Sep;1982 70(3):396–402. [PubMed: 7110814]

8. Wissow LS, Bar-Din Kimel M. Assessing provider-patient-parent communication in the pediatric emergency department. *Ambul Pediatr* Jul–Aug;2002 2(4 Suppl):323–329. [PubMed: 12135407]
9. Bussing, R.; Eyberg, S.; Vinson, S.; Perez, L.; Chen, Y.; Garvan, C. International Society for Research on Child and Adolescent Psychopathology. London, UK: 2007. Temperament, psychopathology, and family context: Predictors of teenage personality development.
10. Bussing R, Gary FA, Mason DM, Leon CE, Sinha K, Garvan CW. Child temperament, ADHD, and caregiver strain: exploring relationships in an epidemiological sample. *J Am Acad Child Adolesc Psychiatry* Mar;2003 42(2):184–192. [PubMed: 12544178]
11. Swanson, JM. School-based assessments and interventions for ADD students. Irvine, CA: K.C. Publishing; 1992.
12. Shaffer D, Fisher P, Lucas CP, Dulcan MK, Schwab-Stone ME. NIMH Diagnostic Interview Schedule for Children Version IV (NIMH DISC-IV): description, differences from previous versions, and reliability of some common diagnoses. *J Am Acad Child Adolesc Psychiatry* 2000;39(1):28–38. [PubMed: 10638065]
13. Lerner R, Palermo M, Spiro A III, Nesselroade J. Assessing the Dimensions of Temperamental Individuality across the Life Span: The Dimensions of Temperament Survey (DOTS). *Child Development* 1982;53:149–159.
14. Wolraich ML, Lambert W, Doffing MA, Bickman L, Simmons T, Worley K. Psychometric properties of the Vanderbilt ADHD diagnostic parent rating scale in a referred population. *J Pediatr Psychol* Dec;2003 28(8):559–567. [PubMed: 14602846]
15. Thomas, A.; Chess, S. Temperament and Development. New York: Brunner/Mazel; 1977.
16. Graham P, Stevenson J. Temperament and psychiatric disorder: the genetic contribution to behaviour in childhood. *Aust N Z J Psychiatry* 1987;21(3):267–274. [PubMed: 3325021]
17. Conners, KC. Conners' Abbreviated Symptom Questionnaire Manual. North Tonawanda, NY: Multi-Health Systems, Inc; 1990.
18. Reynolds, CR.; Richmond, BO. Revised Children's Manifest Anxiety Scale (RCMAS) Manual. Los Angeles, CA: Western Psychological Services; 1985.
19. Gadow KD, Gadow KD, Sprafkin J, et al. A DSM-IV-referenced, adolescent self-report rating scale. *Journal of the American Academy of Child & Adolescent Psychiatry* Jun;2002 41(6):671–679. [PubMed: 12049441]
20. Perwien A, Hall J, Swensen A, Swindle R. Stimulant treatment patterns and compliance in children and adults with newly treated attention-deficit/hyperactivity disorder. *J Manag Care Pharm* Mar–Apr;2004 10(2):122–129. [PubMed: 15032561]

APPENDIX: DOTS-R-C Subscales

Activity Level

I can't sit still for long.

I move around a lot.

If I have to stay in one place for a long time, I get very restless.

Even when I am supposed to be still, I get very fidgety after a few minutes.

I never seem to stop moving.

I never seem to be in the same place for long.

*Eliminated: I often stay still for long periods of time.

Task Orientation

Once I am involved in a task, nothing can distract me from it.

I persist at a task until it's finished.

I stay with an activity for a long time.

If I am doing one thing, something else occurring won't get me to stop.

Things going on around me cannot take me away from what I am doing.

Once I take something up, I stay with it.

I am hard to distract.

*Eliminated: I can always be distracted by something else, no matter what I may be doing.

Figure 1.
Outline of study participants and measures administered at each wave