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Oppositional Defiant Disorder toward Adults and Oppositional Defiant Disorder toward Peers: Initial Evidence for Two Separate Constructs

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Abstract

Confirmatory factor analysis of 25 items on the Child and Adolescent Disruptive Behavior Inventory (CADBI v.2.3) was conducted on teacher ratings of 824 kindergarten children and replicated on 534 children. Model fit was improved when correcting for two method effects: (a) adjacent items, and (b) identical behaviors (e.g., argues with adults, argues with peers). The results showed that the 25 items load on three distinct but correlated factors: Hyperactivity, Oppositional to Adults, and Oppositional to Peers. These more refined constructs from the CADBI may be useful for practitioners in identifying children who are at risk and for helping define appropriate contexts in which to intervene. The CADBI and analytic procedures also may contribute to future psychoeducational research on the development of problem behavior.

Keywords

Children; Measurement; Oppositional Defiant Disorder; Factor Analysis

Oppositional defiant disorder (ODD) involves “a recurrent pattern of negativistic, defiant, disobedient, and hostile behavior *toward authority figures* that persists for 6 months” (American Psychiatric Association [APA], 2000, p. 100, emphasis added). Although the target of the oppositional defiant behavior is authority figures (parents and teachers), the description of ODD also indicates that the behavior can be directed toward peers (i.e., “Hostility can be directed at adults or peers and is shown by deliberately annoying others or by verbal aggression,” APA, 2000, p. 100). There is thus ambiguity between the definition that describes

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the essential feature of ODD as defiance towards authority, and the more general description of the disorder that considers general hostility towards peers.

The symptoms of ODD also reflect this ambiguity. For two symptoms, the target of the oppositional defiant behavior is an adult (i.e., often argues with adults; often actively defies or refuses to comply with adults' requests or rules), while the other six symptoms leave the target unspecified (i.e., often blames others for his or her mistakes or misbehavior; often loses temper; often deliberately annoys people; is often touchy or easily annoyed by others; is often angry and resentful; and is often spiteful or vindictive). Because the target for these six symptoms may be an adult, sibling, or a peer, some children may show oppositional defiant behavior primarily toward parents, others toward teachers, others siblings or peers as well as various combinations. A question is thus whether there is one construct here with multiple targets, as implied by the DSM description, or separate constructs that are specific to a given target.

Research on antisocial behavior suggests the possibility of target-specific ODD constructs embedded within complex developmental sequences (Loeber et al., 2002; Pardini, Obradović, & Loeber, 2006; Patterson, Reid, & Dishion, 1992; Raine et al., 2006). A child born with a difficult temperament or biologically predisposed to hyperactivity appears at an increased risk for the development of oppositional behavior toward parents (Frick & Morris, 2004; Nigg, Goldsmith, & Sachek, 2004), especially if coercive parent-child interactions also occur (e.g., Patterson, 1982). Although this coercive cycle typically begins in interactions with parents, the cycle can generalize to siblings in the home and subsequently to others outside the home, such as teachers and classmates (Campbell, 2002; Patterson, DeBarysh, & Ramsey, 1989). In turn, the oppositional defiant behavior toward teachers and peers in the early school environment may represent intermediate constructs between the original oppositional defiant behavior toward parents and subsequent more serious conduct problems in later childhood and adolescence (Loeber, 1990; Patterson et al., 1992).

The findings on the development of oppositional defiant behavior suggest that further refining the DSM ODD construct may be useful. In this study, therefore, we sought to determine if ODD toward kindergarten teachers and ODD toward peers represent two separate constructs rather than a single one. Here the only difference between the two sets of eight ODD symptoms was the target (e.g., argues with teachers vs. argues with peers). Because the two targets are within the same setting (school) and were rated by the same source (the kindergarten teacher) these analyses represent a stringent test of the distinctiveness of the two constructs. In addition, the ADHD (HI) construct was important to this investigation, given the high levels of co-occurrence of hyperactivity/impulsivity (HI) behavior and oppositional defiant behavior in young children (e.g., Burns et al., 2001; Gomez, Burns, Walsh, & Hafetz, 2005). The extent to which the ADHD-HI construct was distinct from the two ODD constructs was thus also examined.

Method

Participants

The study sample was selected from a population of elementary students in a number of small to medium-sized communities in Oregon (ranging from 1,478 to 137,893 persons). These students attended schools that agreed to participate in a larger study evaluating an intervention to reduce conduct problems and to improve social skills among first graders (Taylor et al., 2005). To participate, schools were required to have at least two first grade classrooms. A total of 42 schools were approached to be part of the larger study and 23 agreed and participated in the initial screening reported here. The percentage of students eligible for free or reduced lunches varied widely, from 6% to 72% (median 45%); 50.6% of the sample were boys. These data represent an initial screening for a longitudinal study, and race and ethnicity were not

collected. However, 717 of the children were recruited for the subsequent longitudinal study, and of this sample, 16% were of Hispanic ethnicity. Of those reporting race, 90% were Caucasian, 5% were American Indian, 2% were African-American, 1% were Asian, and 4% were “other.”

Participants in the present study were kindergarten children in these schools whom teachers rated using a brief questionnaire of social behavior. Children who had been diagnosed with autism or severe developmental delay were excluded from the sample. Ratings were completed on 1,358 children from three cohorts. These 1,358 kindergarten students were divided into two samples for analyses; 824 recruited in the first 2 years of the study and 534 recruited in different communities in the 3rd year of the study. These ratings were completed by 50 teachers, with each teacher rating between 8 and 51 children.

Measure

Child and Adolescent Disruptive Behavior Inventory–Teacher Version 2.3

(Screeners)—A short version of the teacher CADBI (Burns, Taylor, & Rusby, 2001) consists of 25 items (i.e., eight items for the ODD toward adults subscale, eight items for the ODD toward peers subscale, and nine items for the ADHD-HI subscale). Each item is rated on an 8-point frequency of occurrence scale for the past month (1: “never in the past month”, 2: “1–2 times in the past month”, 3: “3–4 times in the past month”, 4: “2–4 times per week”, 5: “1 time per day”, 6: “2–5 times per day”, 7: “6–9 times per day”, 8: “10 or more times per day”). The instructions were to “please circle the answer that best describes the child’s behavior in the past MONTH. Please consider the child’s behavior ONLY in the school environment.”

Analytical Strategy

Confirmatory factor analysis (CFA) was used to evaluate the structural organization of teacher ratings of the eight ODD symptoms toward teachers, eight ODD symptoms toward peers, and nine ADHD-HI symptoms for kindergarten children. Support for the distinction among the three constructs would require that the three-factor model (ODD-teachers, ODD-peers, and ADHD-HI) provide a good fit in an absolute sense as well as a statistically better fit than the two-factor model (ODD and ADHD-HI).

The analyses were conducted two ways, treating the 25 CADBI items as continuous and treating them as ordinal. Fit statistics from both approaches are presented. Ordinal data can be treated as continuous when ordinal scales have five or more levels and the sample size is greater than 200 (West, Finch, & Curran, 1995). Doing so in MPLUS 3.13 allows for the calculation not only of RMSEA and CFI (which are also available for ordinal data as well) but also SRMR. This strategy also allows for the direct calculation of $\Delta\chi^2$ for comparing models. Finally, incomplete data can be included in which individual items were not completed using full information maximum likelihood with the EM algorithm (Muthén & Muthén, 2004). Missing data cannot be estimated in this manner for ordinal models. For these reasons, analyses that treated the data as interval data were relied upon for comparison of models. In practice both approaches produced very similar results.

All analyses were conducted on teacher ratings of 824 kindergarten students collected during the first 2 years of the study. All analyses employed multilevel modeling procedures in which data were clustered by teacher in order to obtain the correct standard errors for the CFA procedures. This procedure was necessary because each teacher rated multiple students.

The analyses were structured according to a model comparison strategy. The first step involved comparing several different but plausible models (MacCallum & Austin, 2000). Whether a more complex model showed improvement over a simpler model was evaluated by whether

the $\Delta\chi^2$ was significant. In determining whether a model is a “good fit” to the data, the recommendations of Hu & Bentler (1999) to rely on two fit statistics achieving a certain standard defined in advance, rather than just one, was followed. The combination of RMSEA < .06 and SRMR < .09 was used. The CFI for all models, a commonly reported measure of fit, is also reported. The planned analyses were to compare a one-factor model for the 25 items with a two-factor model (ADHD-HI and ODD) and a three-factor model (ADHD-HI, ODD-Adults, ODD-Peers), as well as to two models designed to correct for the “identical behavior” and “adjacent items” method effects.

After all of the above analyses had been conducted and the best fitting models identified, the same analyses were conducted on the second sample ($N = 534$). This replication of the analyses provides greater confidence in the generalizability of the findings.

Results

As is common to rating measures of problem behaviors, many of these items exhibited substantial skew and kurtosis. For a normative sample such as this, the highest scores are extremely rare (outliers), and so for these analyses all responses of “2–5 times per day,” “6–9 times per day” and “10 or more times per day” were coded as a 6.

A CFA of teacher ratings from the first sample was conducted with data clustered by teacher in which all items were forced to load on a single factor. This model was not a “good fit” (for interval data RMSEA = .103, SRMR = .098, CFI = .72; for ordinal data RMSEA = .142, CFI = .90). Next, a two-factor model was tested, in which all the ADHD-HI items loaded on one factor and all of the ODD items loaded on a second factor. This model showed a substantial improvement in fit, $\Delta\chi^2 (1, N = 824) = 2081.8, p < .001$. However, the model failed to show adequate overall fit for the data (for interval data RMSEA = .087, SRMR = .073, CFI = .80; for ordinal data RMSEA = .098, CFI = .94). Next, a three-factor model was tested in which items were allowed to load only on their respective factors of ADHD-HI, ODD to teachers and ODD to peers. This model again showed substantial improvement in fit, $\Delta\chi^2 (2, N = 824) = 1845.8, p < .001$, but did not achieve Hu & Bentler’s standards of overall fit (for interval data RMSEA = .068, SRMR = .061, CFI = .88; for ordinal data RMSEA = .079, CFI = .95).

Next, we tested whether correcting for anticipated method effects would improve the model fit. First, the a priori alternative model was tested that freed the covariances of identical behaviors from the constraint that they must equal zero to account for method effects. In practice this allowed items such as “argues with adults” and “argues with peers” to correlate more highly with each other than would otherwise be expected. Statistically, we addressed this issue by freeing the covariance between all eight pairs of identical behavior items from zero but retaining the model constraint that they be assumed to equal each other. This minimized the opportunity to capitalize on chance, ensuring the model only benefited from the average difference of these covariances from zero (see Figure 1 for graphic illustration, labeled A). This resulted in a significant and meaningful improvement in the model fit, $\Delta\chi^2 (1, N = 824) = 461.8, p < .001$, and the change in the relationship between the three underlying factors was negligible. However, the result still did not achieve the Hu & Bentler standards for overall fit (for interval data RMSEA = .061, SRMR = .060, CFI = .90; for ordinal data RMSEA = .076, CFI = .95).

Next, the second a priori alternative model with a second method factor was tested to account for the average influence of an item on a subsequent item. This was addressed by freeing the covariance of each adjacent pair of items from equaling zero, but retaining the model constraint that they be assumed to equal each other (see Figure 1 for graphic illustration, labeled B). A total of 22 relationships were constrained with a single degree of freedom in this manner.¹ This

resulted in a significant and meaningful improvement in the model fit, $\Delta\chi^2(1, N = 824) = 573.3$, $p < .001$. Once again the relationship among the three main factors remained virtually unchanged and the model now achieved Hu & Bentler's conservative standards for adequate overall fit (for interval data RMSEA = .054, SRMR = .057, CFI = .92; for ordinal data RMSEA = .069, CFI = .96).

After all analyses had been completed on Sample 1 and the best fitting models identified, the same analyses were conducted on Sample 2. As Table 1 illustrates, the same conclusions were reached at every step. The three-factor model resulted in a substantial improvement over the two-factor model. Allowing for covariance between adjacent items and identically worded items in the same manner resulted in substantial improvements to the model. The final model again met current standards of overall fit. These analyses were also rerun separately by gender with the same conclusions reached. The final model achieved adequate fit for boys (for interval data RMSEA = .059, SRMR = .056, CFI = .91; for ordinal data RMSEA = .070, CFI = .97) and girls (for interval data RMSEA = .041, SRMR = .057, CFI = .93; for ordinal data: RMSEA = .063, CFI = .97). This replication in a second sample and across genders gives increasing confidence that the three-factor model is reliable.

The same analyses were rerun using the entire sample to generate best estimates of the relationship between the latent constructs. These are included in Figure 1. Oppositional to teachers correlated with oppositional to peers ($r = .79$), oppositional to teachers correlated with hyperactive ($r = .67$), and oppositional to peers correlated with hyperactive ($r = .75$). Although these latent constructs were highly correlated, they were not identical. The final model achieved adequate fit (for interval data RMSEA = 0.047; SRMR = 0.053; CFI = 0.927; for ordinal data RMSEA = 0.062; CFI = 0.950).

Discussion

This study demonstrated that “oppositional toward adults” and “oppositional toward peers” are distinct but correlated constructs and that both are distinct from hyperactivity/impulsivity. All items load on their hypothesized constructs, which was further supported in a replication with a different sample of students. This three-factor structure demonstrated good fit for both boys and girls. Tests of factor invariance would offer more rigorous analyses of whether the factor structure is nearly identical across genders but were beyond the scope of this paper.

The CADBI 2.3, a new measure of disruptive behavior, holds promise as a useful assessment tool that offers a more fine-grained and reliable distinction between ODD to teachers and ODD to peers. Such a distinction may be useful in defining contexts in which to intervene, developing effective ways to intervene early, and measuring the effects of interventions.

This paper also demonstrates procedures for addressing two method effects that accounted for modest but significant variance. One procedure corrected for the fact that items tend to be influenced by how the previous item is rated. A second corrected for the fact that a number of items asked about identical behaviors that were directed toward different persons (toward peers and toward teachers). Both corrections resulted in only small changes in the estimates of the relationship among underlying constructs while improving model fit. The procedures used in this paper to identify and account for these method effects may be useful for other researchers analyzing questionnaire data yet do not diminish the practical implications for the measurement of these three separate constructs.

¹The questionnaire design included new instructions between items 8 & 9, and 16 & 17, so we did not hypothesize that these adjacent items would show higher covariance than otherwise expected.

An important limitation is that the study involved only teacher ratings of kindergarten children. Understanding the unique factors of ODD to teachers and ODD to peers at school is important at an early age, given the implications for developing effective early interventions to prevent more serious conduct problems. Future research will also be necessary to determine whether teacher ratings of children at different ages as well as parent ratings of children's behavior follow a similar pattern. Another limitation is that this study does not assess whether the oppositional to teachers and oppositional to peers constructs have different correlates, follow different developmental trajectories, or predict different outcomes.

Future research on disruptive behavior may benefit from incorporating the two correlated but distinct constructs of oppositional to teachers and oppositional to peers to learn whether they have separate correlates, antecedents and consequences. For example, the oppositional toward peers construct may correlate more highly with physical aggression or bullying (which are low frequency behaviors, but occur more toward peers than adults). If this is the case, assessing oppositional towards peers may be a useful way to detect and screen for such more serious behaviors. Future research can answer these and other questions.

Building on these findings future research could find that even more refined distinctions may be useful, such as whether certain behaviors occur towards siblings and/or close friends, or toward teachers and/or parents. In addition to assessing toward whom problem behaviors are exhibited, it may also be relevant to consider toward whom social skills are exhibited. Future research considering these issues may result in more specific assessment measures that would better inform the development of interventions that are more specifically targeted at a child's difficulties.

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Figure 1.
Illustration of three main factors and two method effects.

Sample 2: Model Fit Indices for Models of ADHD-Hyperactivity/Impulsivity, Oppositional Defiant Disorder towards Adults, and Oppositional Towards Peers Symptoms (N = 534)

Table 1

Models	df	Y-B χ^2	$\Delta\chi^2$	CFI	SRMR	RMSEA
Model 1: One Factor						
Interval	275	1602.7	--	.68	.109	.095
Ordinal	10	1116.7	--	.86	--	.141
Model 2: H/I & ODD Factors						
Interval	274	1174.7	1345.6***	.78	.079	.078
Ordinal	11	53.1	--	.94	--	.085
Model 3: H/I, ODD-Adults, and ODD-Peers						
Interval	272	829.1	1033.4***	.87	.068	.062
Ordinal	12	40.0	--	.96	--	.066
Model 4: Model 3 plus Method (identical behavior)						
Interval	271	740.9	240.5***	.89	.065 ^a	.057 ^a
Ordinal	12	37.8	--	.97	--	.063
Model 5: Model 4 plus 2 nd Method (adjacent items)						
Interval	270	703.3	104.4***	.90	.063 ^a	.055 ^a
Ordinal	12	36.0	--	.97	--	.061

Note. Y-B χ^2 = Yuan-Bentler T2* test statistic; $\Delta\chi^2 = \chi^2$ of improvement between two models is calculated by the formula $2(H_0b-H_0a)$; CFI = comparative fit index; SRMR = standardized root mean square residual; RMSEA = root mean-square error of approximation; MLR estimation; H/I = hyperactivity/impulsivity; and ODD = oppositional defiant disorder.

^aDenotes that model met alternative Hu & Bentler criteria based on RMSEA & SRMR.

p < .001