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## The latent structure of oppositional defiant disorder in children and adults

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### ABSTRACT

An understanding of the latent structure of oppositional defiant disorder (ODD) is essential for better developing causal models, improving diagnostic and assessment procedures, and enhancing treatments for the disorder. Although much research has focused on ODD—including recent studies informing the diagnostic criteria for DSM-5—research examining the latent structure of ODD is sparse, and no known study has specifically undertaken a taxometric analysis to address the issue of whether ODD is a categorical or dimensional construct. To address this gap, the authors conducted two separate studies using a set of taxometric analyses with data from the NICHD Study of Early Child Care and Youth Development (child study;  $n = 969$ ) and with data from a large mixed sample of adults, which included participants reporting psychiatric difficulties as well as healthy controls (adult study;  $n = 600$ ). The results of a variety of non-redundant analyses across both studies revealed a dimensional latent structure for ODD symptoms among both children and adults. These findings are consistent with previous studies that have examined latent structure of related constructs (e.g., aggression, antisocial behavior) as well as studies that have examined the dimensional versus categorical structure of ODD using methods other than taxometric analysis.

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### 1. Introduction

Oppositional defiant disorder (ODD), a common childhood disorder marked by argumentativeness, hostility, and noncompliance, has been tied to concurrent and future academic, social, and behavioral difficulties (Burke et al., 2010; Greene et al., 2002). Many children with ODD later meet criteria for conduct disorder (CD; Burke et al., 2010), including engaging in serious violent or criminal behavior and experiencing legal and substance use problems (Loeber et al., 2009). With the recent release of the DSM-5 (American Psychiatric Association, 2013), there has been renewed discussion of the appropriateness of a categorical versus dimensional classification of behavioral disorders and questions about whether appropriate statistical procedures were used to inform these decisions (Walters, 2013). Although ODD has received much attention in the literature—including issues related to changes in DSM-5 (e.g., Pardini et al., 2010)—research on its latent structure is in its infancy (Frick and Nigg, 2012). Specifically, does ODD exist on

a continuum, or is it a qualitatively discrete condition that is either present or absent? Although researchers have called for investigations to advance our understanding of the clinical utility of a dimensional versus categorical conceptualization of ODD (e.g., Pardini et al., 2010), most research has focused on outcomes based on those conceptualizations, whereas the specific question regarding the latent structure of ODD itself remains largely unanswered by the literature.

Such a question is important to answer in that determining the latent structure of ODD will (a) help to further refine the diagnostic criteria for ODD, (b) aid with the development of instruments used to assess symptoms of ODD, (c) have implications for understanding the etiology of ODD, and (d) contribute to the development of treatments for children with ODD. For example, knowing the latent structure of ODD can inform whether psychometric research should focus on determining the most accurate cut score for case assignment (if taxonic) or on examining the correlates of a measure (if dimensional). Furthermore, dimensional findings could support the study of subclinical populations for understanding the etiology and treatment of ODD, whereas a taxonic structure would indicate that research on ODD should be limited to those who meet full diagnostic criteria (see Ruscio and Ruscio, 2004). Thus, a better

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understanding of the latent structure of the disorder has obvious clinical implications. Furthermore, it is an important issue for research given that most studies use a dimensional approach to symptom measurement (Frick and Nigg, 2012) despite the categorical treatment of ODD in the DSM-5 (American Psychiatric Association, 2013) and its predecessor the DSM-IV-TR (American Psychiatric Association, 2000), the latter of which did not even include an ODD severity index (Pardini et al., 2010). As such, evidence for a dimensional latent structure of ODD would bolster the decision to treat measurement of the construct on a continuum. Likewise, use of a categorical classification (particularly a dichotomy, such as having a diagnosis or not) for a naturally dimensional construct, would minimize the predictive validity of measures assessing that construct when they are used to form categories (cf. Fergusson et al., 2010). Thus, evidence of a dimensional latent structure of ODD would contraindicate the dichotomization of otherwise continuous measures for the purposes of forming groups (i.e., with and without ODD) in research.

Despite the obvious advantages of detecting whether ODD is categorical (taxonic) or is the extreme of an underlying existing continuum (dimensional), research investigating the latent structure of ODD is sparse. Some researchers have examined questions pertinent to the issue. For example, Fergusson et al. (2010) examined the differential relation between ODD among older adolescents (14–16 years) and outcomes during late adolescence and early adulthood (primarily 18–25 years) when treating ODD dimensionally (i.e., symptom counts based on either self- or mother-report) versus categorically (i.e., meeting diagnostic criteria based on endorsement of four or more symptoms in a given 12-month period by either respondent). Even when controlling for a range of covariate factors, the associations between ODD and a host of subsequent potentially related outcomes—including property and violent offenses, arrests, substance use, mental health disorders, pregnancy or parenthood by age 20, interpartner violence, and poor educational or employment outcomes—were consistently higher when ODD was treated dimensionally. Furthermore, on average, the categorical models estimated only about a half as much variance in the outcomes as the dimensional models.

Such findings are consistent with research on other externalizing behavior problems (e.g., attention-deficit/hyperactivity disorder (ADHD); Frazier et al., 2007; Marcus and Barry, 2011), indicating that dimensional models demonstrate stronger validity coefficients with criterion measures than dichotomous models. Other studies (e.g., Fergusson and Horwood, 1995) also have found that dimensional measures of externalizing behavior, defined more broadly, are better predictors of subsequent problems than are categories of diagnoses and that associated features, and outcomes appear to relate to such behaviors in a linear fashion. Despite the compelling nature of such studies and the support they render for a dimensional approach to assessing ODD, they, nevertheless, do not directly address the issue of the latent structure of ODD. For example, ODD may have a categorical latent structure even if there are varying levels of severity within the taxon. Such a latent structure would not be inconsistent with the research to date finding that a dimensional treatment of ODD better predicts outcomes. To more directly address the issue of its underlying structure, taxometric analyses, which allow an examination of the latent structure of a theoretical construct via a set of indicators for that construct, can be used (Meehl, 1995; Waller and Meehl, 1998).

Although no known study to date has used taxometric analyses to examine ODD, taxometric studies of other externalizing problems including attention-deficit/hyperactivity disorder (as well as inattention and hyperactivity/impulsivity separately) in children (Marcus and Barry, 2011) and adults (Marcus et al., 2012), juvenile

psychopathy (Edens et al., 2011; Murrie et al., 2007), and antisocial personality disorder (Walters, 2009) have revealed support for a dimensional structure for these problems. Another study made use of self- and teacher-reports to examine the latent structure of childhood aggression, a correlate of ODD, and concluded that childhood aggression also exists on a continuum (Walters et al., 2010b).

Even more relevant to the structure of ODD, a recent study by Witkiewitz et al. (2013) utilized factor mixture modeling (FMM) to examine lifetime diagnoses (i.e., data collected longitudinally) of externalizing disorders (ODD, CD, ADHD, substance use disorders, and adult antisocial behavior) along the dimensional-categorical spectrum. Fully continuous latent variable models fit the observed data better than fully categorical or mixed models. Furthermore, ODD fell on a factor with ADHD, CD, and adult antisocial behavior, whereas another factor emerged for substance use disorders and adult antisocial behavior (i.e., adult antisocial behavior shared variance with both factors). The findings by Witkiewitz et al. (2013) suggest that ODD, at least within the context of other externalizing disorders across the period from age 6 years to early adulthood, has a dimensional latent structure. Nonetheless, research specifically examining the latent structure of ODD is needed. In fact, replicating such findings using taxometric analyses would be ideal given that taxometric procedures and FMM are mathematically distinct, are based on different sets of assumptions, and may arrive at qualitatively different results that are not directly comparable—even when using the same data for one construct (e.g., FMM may yield a 3 group structure, whereas taxometric methods can only result in either a dimensional or a 2 group structure; Lubke and Muthén, 2005; Waller and Meehl, 1998; but see McGrath and Walters, 2012; Walters et al., 2010a for ways to integrate taxometrics with other latent modeling methods to identify polytomous constructs).

DSM-5 has tweaked the diagnostic criteria so that the symptoms better capture ODD among adults (e.g., adding “authority figures” not just “adults” to the “often argues” criterion; American Psychiatric Association, 2013, p. 462). Likewise, recent studies have examined ODD symptoms among adults (e.g., Harpold et al., 2007; Reimherr et al., 2013; Witkiewitz et al., 2013) and concluded that ODD is a valid diagnosis for adults and is relatively common among adults, especially those with ADHD. Still, the preponderance of studies on ODD have been conducted on child and adolescent samples. When examining the issue of the underlying structure of the disorder itself, however, it is apropos to do so within both a child sample and an adult sample to address developmental questions that have been raised in the research (e.g., Frick and Nigg, 2012; Tackett, 2010).

The primary objective of the present set of studies is to address the gap in the literature regarding our understanding of the latent structure of ODD through an examination using taxometric analyses. Furthermore, to consider a developmental perspective, data from both a large child community sample and data from a large adult mixed psychiatric/control sample were used. Each of the two data sets included a measure directly assessing the eight symptoms (i.e., indicators) of ODD. For the child data set, multiple informants (including mother- and teacher-reports) were available; for the adult data set, ratings were self-report of current symptoms.

## 2. Study 1

### 2.1. Method

#### 2.1.1. Participants

Data on ODD symptom ratings from at least one informant (mother or teacher) were provided on 969 children who

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