Chapter 5
A Multidimensional Approach to Disruptive Behaviors: Informing Life Span Research from an Early Childhood Perspective

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The historical use of categorical diagnoses of disruptive behavior syndromes and disorders has been integral to clinical identification, treatment, and service utilization. The major nosological frameworks for classification have been the Diagnostic and Statistical Manual (DSM) (American Psychiatric Association, 2000) and International Classification of Diseases (World Health Organization, 2000). Increasingly, however, there is consensus that categorical approaches, which rely on an array of symptom criteria to classify an individual as having or not having a single disorder, may not fully capture clinical and developmental patterns of disruptive behaviors across the life cycle (Baillargeon, Zoccolillo, et al., 2007; Frick & White, 2008; Maughan, 2005; Rutter, 2003; Wakschlag et al., 2011). In contrast, multidimensional conceptualizations of psychopathology, which incorporate more than one domain or dimension of behavior and assess each domain/dimension along a continuum, offer many unique advantages to clinical characterization of disruptive behavior, including (1) improved characterization of heterogeneity, (2) provision of alternative strategies for understanding developmental course, (3) parsing the

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manner in which different components or dimensions of disruptive behavior may have varying associations with co-occurring symptoms, and (4) linkage of specific dimensions relevant to disruptive behavior to neurobiologic mechanisms as well as family and ecological contextual factors.

In this chapter, we propose a novel, developmentally based, multidimensional approach to disruptive behavior that can be applied across the life span to highlight the advantages of multidimensional versus dichotomous characterization. The specific dimensions identified within our multidimensional conceptualization of disruptive behaviors have strong support in the literature, but there is only preliminary work supporting the integrative approach that we present in this chapter. As a foundation, we first (a) highlight key findings in the history of categorical approaches to assessment of disruptive behavior disorders (DBDs), emphasizing research on subtypes that inform identification of salient dimensional components of disruptive behavior, (b) synthesize extant research and theory on dimensional approaches to disruptive behavior, and (c) review the advantages of adopting a multidimensional approach for deeper understanding of clinically significant disruptive behaviors. Following an elaboration of our multidimensional model of disruptive behavior, we conclude with a discussion of emerging areas of knowledge and critical next steps for scientific advancement. Although our approach is a life span framework, we focus particularly on early childhood to elucidate the framework—in part because of the particular complexities in the distinction between normative misbehavior and clinically concerning misbehavior in this period and in part because multidimensional inquiry about clinically significant disruptive behavior in early childhood has received more limited attention than inquiry about older children and adults.

A History of Categorical Approaches to Disruptive Behaviors

Diagnoses

Tracing the nosological history of DBDs highlights one challenge of developing an empirical knowledge base for investigating disruptive behavior. The shifting terrains of diagnostic conceptualizations have made it difficult to accumulate systematic knowledge about the prevalence and stability of disruptive diagnoses over time (Robins, 1999). The first edition of the DSM, published in 1952, included no childhood diagnoses. With the publication of DSM-II in 1968, disruptive behavior was captured in the diagnoses of runaway reaction, unsocialized aggressive reaction, and group delinquent reaction. Published in 1969, ICD-8 included the umbrella diagnosis of behavior disorders of childhood, which was further expanded in 1977s ICD-9 to include ten categories and one V-code. DSM-III (1980) saw the introduction of conduct disorder (CD). Oppositional disorder also first appeared in *DSM-III*, with "defiant" added to the clinical construct in the text revision. ICD-10 (1990) was modified to reflect DSM's formulation, with oppositional defiant disorder (ODD) under the larger umbrella of CDs. DSM-IV (1994) included further

modifications to definitional specification through revisions to symptom counts and descriptions (Costello & Angold, 2001; Robins, 1999).

DSM IV-TR parses DBDs into oppositional and conduct problems. ODD is defined by irritable disposition and resistant interactions with authority figures, whereas CD is defined more by disregard for social norms, rules, and the rights and wellbeing of others (as well as more physical aggression) (Wakschlag, Leventhal, Thomas, & Pine, 2007). The core diagnostic features of these disorders have stayed relatively steady over the past four editions of *DSM*, though changes in specific symptoms have led to fluctuations in prevalence rates. The newer diagnostic nosological system, developed for very young children by a consensus panel of experts in infant mental health (DC:0–3R multiaxial system) to address perceived gaps in the DSM and ICD systems, largely defers to the DSM when young children present with disruptive problems. However, there may be some overlap between the DSM-IV diagnoses of both ODD and CD and the DC:0–3 diagnosis of regulation disorders of sensory processing Type B—Negative/Defiant, particularly when coupled with a parent–child interaction disturbance. Of note, assigning a diagnosis of regulation disorders of sensory processing requires the presence of a constitutional or maturational etiology and at the present time specific criteria for determining subtypes are not available (Zero to Three, 2005).

Currently, the two diagnoses of behavior problems in the DSM—CD and ODD—are conceived of as a developmental sequence: a diagnosis of CD precludes a diagnosis of ODD because the assumption is that there is a developmental progression from ODD to CD. Longitudinal studies from clinic-referred samples of older children have supported this assumption: children diagnosed with ODD are at significantly increased risk of developing CD (Burns et al., 1997; Lahey, McBurnett, & Loeber, 2000; Pillow, Pelham, Hoza, Molina, & Stultz, 1998; Rowe, Maughan, Pickles, Costello, & Angold, 2002). They are also at increased risk for developing other disorders, such as anxiety and depression (Burke, Loeber, Lahey, & Rathouz, 2005). These findings highlight the importance of understanding, identifying, and intervening with clinically significant disruptive behavior early in its course.

The vast majority of studies of younger children have focused solely on ODD, because of concerns about the developmental applicability of CD to young children (Campbell, 2006; Keenan et al., 2007; Kim-Cohen et al., 2005; Wakschlag, Briggs-Gowan, et al., 2007). Thus, the validity of the ODD:CD distinction in young children remains unknown. Results from a factor analytic study of DSM symptoms support a single disruptive behavior syndrome in preschoolers (Sterba, Egger, & Angold, 2007). Further, the developmental sequence model makes little sense in young children when oppositional and conduct problems emerge simultaneously.

Subtypes

Early work on delineating the varied presentations of disruptive behavior focused on disruptive behavior "subtypes." Indeed, distinctions among disruptive behavior presentations are as old as the study of disruptive behaviors themselves. The parallel

between subtype and dimensional approaches is in their joint recognition of systematic heterogeneity within disruptive behaviors, which informs understanding of severity, course, and treatment. Moreover, identification of subtypes can inform selection of core defining features of disruptive behaviors. The difference between the two approaches is that subtypes focus on identifying subsets of individuals whereas dimensional approaches focus on identifying relevant subsets of behaviors.

Beginning with Hewitt and Jenkins's (1946) distinction between "socialized" and "unsocialized" delinquent behavior, researchers have described a host of potential subtypes of presentations of disruptive behaviors (Hewitt & Jenkins, 1946). Individuals with "socialized" and "unsocialized" delinquent behavior were described as distinguishable on perspective-taking, abstract reasoning, and empathy (Quay, Routh, & Shapiro, 1987). This distinction was presented in the *DSM-III* and in ICD-9 and -10 as a potential subtype.

A robust body of research addresses the delineation of CD subtypes based on age at onset (Moffitt, 1993). "Early onset" conduct problems (i.e., life-course-persistent) may have unique etiology and neurodevelopmental correlates from adolescent-limited conduct problems (Moffitt & Caspi, 2001). *DSM-IV* acknowledges this distinction as possible subtypes within the nosology of CD. The childhood versus adolescent onset distinction has been widely validated, replicated, and extended. Specifically, individuals with early onset of CD are more likely to have experienced perinatal complications, undercontrolled temperament, neurological abnormalities, and delayed motor development in early childhood. They are also more likely to have low intellectual ability, reading difficulties, low scores on neuropsychological tests of memory, hyperactivity, and slow heart rate in later childhood (Moffitt, 2006). Early versus late onset CD is more strongly associated with physical aggression and, by definition, a more persistent presentation (Lahey & Loeber, 1997).

Another subtype distinction that has been made is between presentations characterized by aggressive versus nonaggressive behaviors. This categorical distinction is supported by factor analytic work (Achenbach, Conners, Quay, Verhulst, & Howell, 1989; Frick et al., 1991; Tackett, Krueger, Sawyer, & Graetz, 2003). Aggressive conduct problems include fighting, physical cruelty, and violent behavior whereas nonaggressive conduct problems include nonviolent delinquent behaviors such as illegal acts and status violations (e.g., breaking curfew), and defiance. These two subtypes have been shown to have disparate etiologic correlates, with nonaggressive rule-breaking behavior appearing to be much more influenced by environmental factors than aggressive conduct problems (Tackett, Krueger, & Iacono, 2005). Person-centered analyses in a representative sample have further confirmed that persistent aggressive and nonaggressive disruptive behaviors tend not to overlap in boys, but the distinction is less clear for girls (e.g., only 12.6 % of boys but 43.3 % of girls with stable high aggressive behaviors were also stably high in nonaggressive behavior problems). Moreover, aggressive disruptive behavior was associated with unique environmental risk factors; among them were poverty, low parental supervision, and parental criminality (Maughan, Pickles, Rowe, Costello, & Angold, 2000).

Classic work by Loeber et al. distinguishes between three subtypes of disruptive behaviors in childhood: overt (e.g., confrontational, such as fighting); covert (e.g., concealing, such as stealing or lying); and "authority conflict" (e.g., disobedience or

defiance) (Loeber et al., 1993). In a prospective study of symptoms of CD, fighting—an overt behavior—was the best predictor of the onset of CD (Loeber et al., 1998). A further distinction in overt aggressive behavior between reactive and proactive aggression appears to have implications for the developmental course of disruptive behavior: proactive aggression appears particularly predictive of later maladjustment and diagnosis of CD (Loeber, Burke, Lahey, Winters, & Zera, 2000; Loeber & Farrington, 2000).

Finally, a seminal body of work by Frick and colleagues that addresses the roots of psychopathy in children's disruptive behavior has looked at callous and unemotional traits among a subgroup of children with disruptive behaviors as a possible causal pathway through which some children develop severe conduct problems (Frick et al., 2003). Callous and unemotional traits include a lack of empathy or concern for others, a lack of guilt over transgressions, and insensitive use of others for personal gain. These traits appear to be relatively stable across childhood and adolescence and are associated with a unique set of temperamental, physiological, and clinical attributes. These attributes include a temperamental style characterized by thrill-seeking and fearlessness, elevated reactivity to others as well as reactive aggression, and more severe conduct and aggression problems (Frick & White, 2008). These traits have also been linked to specific neurodevelopmental differences in the amygdala (Marsh & Blair, 2008).

These pioneering efforts have clearly demonstrated the heterogeneity of presentation of disruptive behaviors. However, despite identifying and focusing on a core feature of disruptive behavior that helps to clarify systematic heterogeneity in essential clinical characteristics (e.g., empathy, persistence), each subtype effort focuses on a single component of disruptive behavior. Thus, none of these frameworks adopts a multidimensional approach that attempts to capture multiple component features nor are developmental shifts in presentation considered.

Ideally, a more complete understanding of disruptive behavior might begin with characterization of normative and emerging developmental processes—of emotion regulation, empathy and conscience development, the balance of autonomy and compliance, and the modulation of aggression. Once normative understanding is established, a next step would be to determine the points at which and what goes awry in the process of development that leads to the combination of dimensions that cause us to conclude that the child's emotional and behavioral presentation is consistent with "disorder" status. We believe that a developmentally sensitive, multidimensional approach is uniquely suited for addressing these gaps.

What Do We Know About Disruptive Behavior in Young Children?

In terms of diagnostic nosology, there has been increasing acknowledgement that disruptive behaviors emerge in early childhood and are of sufficient severity in some children to meet diagnostic criteria (Baillargeon, Zoccolillo, et al., 2007; Carter, Briggs-Gowan, & Davis, 2004). Among preschoolers, diagnostic construct validity

is supported by findings such as that preschoolers meeting DBD symptom criteria are more than 20 times as likely to be impaired by parent report and more than twice as likely to be impaired by teacher report (Keenan et al., 2007). Moreover, DBD symptoms are consistent with observed behavior on developmentally sensitive assessments (Wakschlag, Briggs-Gowan, et al., 2007) and by young child self-report on the Berkeley Puppet Inventory (Kim-Cohen et al., 2005). DBD symptoms also demonstrate stability (Lavigne, Cicchetti, Gibbons, Binns, & DeVito, 2001).

We also know that continuous dimensional measurement can be applied to these disruptive behaviors reliably for toddlers as well as preschoolers (Achenbach & Rescorla, 2004; Carter, Briggs-Gowan, Jones, & Little, 2003). Disruptive behavior problems, when assessed continuously, are relatively stable and heritable (Chacko, Wakschlag, Espy, Hill, & Danis, 2009; Moreland & Dumas, 2008). Although Bennett et al. (1999) have argued that the positive predictive accuracy of these behaviors is relatively low, Baillargeon and colleagues have demonstrated more stability in these behaviors among younger children by correcting for attenuation (Baillargeon et al., 2004); for example, 80 % of children who exhibited physically aggressive behaviors on a frequent basis at 17 months were still doing so at 29 months of age (Baillargeon, Zoccolillo, et al., 2007). However, these differing findings highlight that there is both continuity and discontinuity in these patterns. DBD symptoms have also been shown to be responsive to empirically validated treatments for disruptive behavior (Webster-Stratton & Reid, 2007).

Investigators have approached the issue of distinguishing normative and nonnormative behaviors using both diagnostic and dimensional approaches. Identifying clinical concern in early childhood turns on "deviation from the norm," and increasing evidence from population-based samples and developmental research has helped outline the contours of these norms (Baillargeon, Zoccolillo, et al., 2007; Briggs-Gowan, Carter, Skuban, & Horwitz, 2001; Tremblay & Nagin, 2005). In very early childhood, dimensional work in large representative samples has demonstrated that normative misbehavior can be distinguished from atypical misbehavior through subjective frequency reports, as high frequencies of misbehavior ("often" as opposed to "never" or "sometimes") are atypical (Baillargeon, Zoccolillo, et al., 2007; Carter et al., 2003; Hay, Castle, & Davies, 2000; Tremblay et al., 2004). For example, in parent report of behavior of 17-month-old children in a population-based sample, approximately half of children are "sometimes defiant," whereas only 10 % of children are "often" defiant (Baillargeon, Normand, et al., 2007). In another large sample, less than 10 % of 2-year-olds "often" hit others (Carter et al., 2003). Investigators have defined deviation from the norm both as a chronic deviation, demonstrating a disruptive behavior more frequently than usual over an extended period of time (Tremblay, 2010), and as exhibiting many disruptive behaviors within a single domain (e.g., many aggressive behaviors) on a frequent/severe basis (Baillargeon, Zoccolillo, et al., 2007). For example, 5 % of boys and 1 % of girls in the general population exhibit a number of different physically aggressive behaviors on a frequent basis at 17 months of age (Baillargeon, Zoccolillo, et al., 2007). Similarly, 12.4 % of toddlers exhibit different oppositional defiant behaviors on a frequent basis at this age (Baillargeon, Sward, Keenan, & Cao, 2011).

Moreover, subtypes of disruptive behavior can be identified even before 2 years of age. Baillargeon et al. demonstrated that almost all toddlers with a significant aggression problem also exhibited oppositional defiant behaviors on a frequent basis, but only a minority of toddlers with a significant opposition-defiance problem also exhibited aggressive behaviors on a frequent basis, suggesting that even before 2 years of age, oppositionality and physical aggression are distinct components of disruptive behavior (Baillargeon et al., 2011). Such knowledge has been supported by advancements in measurement that provide the field with increasingly precise and developmentally informed tools for describing and measuring disruptive behaviors in younger children (DelCarmen-Wiggins & Carter, 2004).

Advances in statistical modeling of developmental trajectories have also supported more nuanced pictures of patterns of disruptive behavior into the earlier years of childhood (Nagin & Tremblay, 1999). Supporting a multidimensional approach to disruptive behaviors, trajectories of divergent components of disruptive behavior evidence unique developmental patterns, with, for example, trajectories of early physical aggression looking quite different from trajectories of early opposition-defiance (Tremblay, 2010). These divergences have led Tremblay to argue that the collapse of disruptive behaviors into one construct means the loss of important developmental data.

What Do We Know About Multidimensional Approaches to Disruptive Behavior?

A burgeoning body of work in disruptive behaviors is now focused on identifying the specific dimensions that constitute disruptive behavior in young children. Factor analytic methods among older children by Burke and colleagues have demonstrated two dimensions salient for ODD among boys (negative affect and oppositional behavior) and three dimensions salient for ODD among girls (oppositional behavior, negative affect, and antagonistic behavior) (Burke, Hipwell, & Loeber, 2010). These dimensions among boys and girls predict different diagnostic outcomes, with the negative affect dimension predicting later diagnosis of depression even after controlling for earlier depression. There is also evidence from a twin study that different factor analytically derived dimensions of CD might have unique etiologies, with nonaggressive rule-breaking showing more contribution from family environment and aggressive behavior showing more influence from genetic factors (Tackett et al., 2005).

Working from an a priori theoretical frame, Stringaris et al. have hypothesized three unique dimensions of oppositionality—irritable, headstrong, and hurtful—and have found these dimensions to be related to unique correlates and developmental diagnostic courses of disruptive behaviors among children between the ages of 5 and 16, with irritability predicting depression and anxiety, headstrong predicting ADHD and nonaggressive CD, and hurtful predicting aggressive CD (Stringaris & Goodman, 2009a, 2009b). As an explanation of these divergent trajectories,

Stringaris et al. propose a "convergence-divergence" model in which various etiological factors such as temperamental or biological predispositions to elevated activity and/or emotionality combine with environmental stressors to converge on the ODD diagnosis, and then diverge into distinct distal trajectories (Stringaris, Maughan, & Goodman, 2010). As this work demonstrates, employing a multidimensional model leads to a more nuanced clinical picture that captures the heterogeneity of children with disruptive behaviors relatively early in childhood and can begin to anticipate their developmental trajectories.

Ideally, rather than assuming a priori which dimensions are central to disruptive behaviors and subtyping based on one of these dimensions, children with clinically concerning disruptive behaviors can be subtyped based on their functioning across multiple dimensions that are relevant to the etiology and course of disruptive behaviors. Longitudinal data on large, representative groups of children could be gathered so that subgroups can be based on profiles of trajectories of dimensions found to be central to disruptive behavior. Stringaris et al.'s work highlights the promise of a multidimensional approach for predicting and capturing the heterogeneity of developmental pathways and clinical phenomenology. However, more developmental work is needed to ensure adequate representation of preschool-aged children and to capture the full disruptive behavior syndrome (i.e., expanding the work beyond a focus on ODD). Given the breadth of work on the components of disruptive behaviors, several distinct multidimensional models could be put forth as theoretically sound and based on extant empirical evidence. Thus, future work will be necessary to test the alternative multidimensional models that we anticipate will be proposed.

Advantages to Developmental, Dimensional Approaches to Disruptive Behavior

Although there has been tension between a categorical and dimensional approach to psychopathology for at least 60 years (Quay et al., 1987), there appears to be increasing emphasis on dimensional approaches to psychopathology, including preparations for DSM-V (Hudziak, Achenbach, Althoff, & Pine, 2007; Krueger & Bezdjian, 2009). In our proposed multidimensional model of disruptive behavior, we focus on capturing two axes: (1) Axis I comprises a single continuous dimension that addresses severity, irrespective of the specific disruptive behavior symptoms or the patterning of dimensions and (2) Axis II comprises the multiple interrelated components of disruptive behavior, each measured dimensionally. Both of these axes demand a developmental perspective or normative frame. The normative standards for quantifying severity of disruptive behavior shift across the life span. Consistent with the tenets of developmental psychopathology and expectations for heterotypic continuity within dimensions (Cicchetti & Rogosch, 1996; Rutter & Sroufe, 2000), the specific behaviors that comprise Axis II's core disruptive behavior dimensions and the contexts in which they are optimally assessed will change across the life span (see Table 5.1). Developmentally sensitive assessment of both

Table 5.1 Example of developmental manifestations of disruptive behavior dimensional components

	Early childhood	School age	Adolescent	Adult
Temper loss	Breaks or destroys things during "meltdowns"	Has frequent temper tantrums	Often has outbursts in response to routine requests	Is explosive
Noncompliance	Has a "reflexive no"—i.e., says "no" even before hearing what's asked	Pervasively resists completing schoolwork	Flagrantly disobedient	Is frequently argumentative with supervisors
Aggression	Pinches/hurts other children when adult is not looking	Starts fights with peers when "unprovoked"	Bullies others	Has aggressive relationships

severity and multiple dimensions of disruptive behavior is critical to understanding the etiology, course, and treatment of clinically significant disruptive behaviors.

A Developmental Framework for Conceptualizing Disruptive Behavior

The developmental psychopathology approach defines psychopathology as deviations from normative patterns. This approach necessitates grounding the study of disruptive behaviors within normative developmental expectations. Fundamentally, this requires distinguishing between normative misbehavior (i.e., age-typical manifestations of the components that characterize disruptive behaviors) and clinically significant maladaptive patterns that indicate that the child's development is at risk or of clinical concern (Wakschlag, Briggs-Gowan, et al., 2007). However, to date, this approach has largely been theoretical and has not been systematically applied to clinical classification systems (Wakschlag, Tolan, & Leventhal, 2010).

Adopting a developmental frame is critical to understanding disruptive behavior: behavior that is normal or expected during one developmental stage might be considered clinically of concern at another age, and vice versa (Hudziak et al., 2007). In the relatively adevelopmental categorical framework of DSM, however, as we have previously noted, approximately one-fourth of CD symptoms are *developmentally impossible* (e.g., forcible sexual activity, truancy); approximately one-third of CD symptoms are *developmentally improbable* (e.g., fire-setting, stealing); and the remaining symptoms are largely *developmentally imprecise* due to high normative

base rates of occurrence (e.g., "often loses temper") (Wakschlag, Leventhal, et al., 2007). Reliance on a diagnostic nosology that lacks developmental specificity has meant that clinically significant behaviors in early childhood have often been neglected and heterotypic continuity has been difficult to trace through time.

In contrast, framing core components of disruptive behavior dimensionally and in a developmentally meaningful way across periods has the potential to capture varying developmental manifestations while still tapping into the same fundamental atypical processes. For example, the specific symptoms of truancy, a behavior consistently associated with a clinical diagnosis of CD in adolescence, might be conceptualized as falling into a broader dimension of "non-compliance." At other points in the life span, manifestations might include such behaviors as a "reflexive no" in preschool (i.e., the child who is posed to say no—even before hearing what is being asked of him or her) and/or an inability to take direction from supervisors in adulthood. A true life span approach would empirically test for such continuities over time along multiple dimensions, capturing changes in overall severity (Axis I) as well as continuities within and across each of the dimensional components (Axis II) (Wakschlag et al., 2010). Such a developmentally sensitive multidimensional approach permits assessment of within-dimension and disorder heterotypic continuity that might otherwise be missed if the same criteria are employed through the life span.

Of particular relevance to our understanding of disruptive behavior are the following core developmental processes of early childhood: emotion regulation (particularly anger regulation), empathy and conscience development, the balance of autonomy and compliance, and the modulation of aggression. These developmental processes, all at their root directly implicated in social conflicts and therefore implicated in disruptive behaviors, can each be assessed along a continuum from normative to clinically concerning throughout the life span. Children's cognitive, linguistic, and inhibitory skills develop exponentially across early childhood, and with greater maturation, children are thrust into increasingly demanding social situations that require both increasing autonomy and regulation (Wakschlag & Danis, 2009). It is through these processes that the more diffuse reactivity of early infancy is transformed into the more intentional and directed (mis)behaviors of the toddler period (Hay, 2005).

Advantages to Dimensional Assessment

The advantages to dimensional assessment of the severity of psychopathology have been well enumerated in the literature (Hudziak et al., 2007; Krueger & Bezdjian, 2009). While it is appropriate for a life span approach, conceptualizing psychopathology dimensionally has particular relevance for capturing the full range of clinical manifestations of clinically concerning disruptive behaviors in *early* childhood. First, emergent manifestations may be milder and less likely to be captured by rigid symptom thresholds, particularly because clinical symptoms often emphasize the most severe forms of behavior. Moreover, given the relatively adevelopmental criteria of current diagnostic criteria, children with *early* manifestations of disruptive

behavior (e.g., prolonged temper tantrums that are characterized by intense, angry mood) may not fall under the umbrella of symptom criteria for the categorical diagnoses as currently written. Specifying behavior developmentally and along a continuum from normative misbehavior to clinically at risk to of clinical concern enables a more nuanced examination of the point at which typicality and atypicality are demarcated. Further, as has been noted (Campbell, 2006), since misbehaviors are more common at preschool age than in older childhood, it is the *constellation* of behaviors present as well as their frequency and severity that demarcate the threshold of clinical concern, not just the presence or absence of any one behavior.

Advantages to Assessment of Dimensional Components or Multidimensional Assessment of Disruptive Behavior

To better capture constellations of behaviors, the second axis of our model looks beyond a single severity dimension (Axis I) to identify specific dimensional components of disruptive behavior (Axis II). Focusing on multiple specific dimensional components, rather than looking at the broad disruptive behavior syndrome, enables greater specificity in description. Narrowband dimensions of disruptive behavior can be conceptualized in relation to disruptions in specific developmental processes. For example, in the developmental process of emotion regulation, young children's response to frustration may vary along a continuum from autonomously regulated emotions, to expectable outbursts at times of transition, to highly dysregulated temper tantrums in low demand contexts (Belden, Thompson, & Luby, 2008; Kochanska, Coy, & Murray, 2001).

Defining narrowband components of disruptive behavior developmentally may also provide an empirical basis for testing the construct of heterotypic continuity, the notion of underlying latent traits that take on different expressions across development based on capacities and demands (Rutter & Sroufe, 2000). Though often cited, heterotypic continuity has rarely been systematically demonstrated in studies of clinically significant disruptive behaviors (Maughan, 2005; Wakschlag et al., 2010). To the extent to which subtyping based on multidimensional profiles of disruptive behaviors contributes to a more comprehensive and developmentally attuned understanding of disruptive behaviors, it offers promise as well to capture the heterogeneity of symptom presentation over time. While we know that disruptive behaviors in childhood are predictors of future conduct problems, the diagnostic specificity of this prediction is limited. In a study of 251 nonclinical children in kindergarten and first grade, the positive predictive value of externalizing behaviors to a diagnosis of the low-prevalence CD 30 months later was below 50 %, though the positive predictive value increased when contextual risk factors such as maternal psychopathology were taken into account (Bennett et al., 1999). In other words, simply measuring externalizing behaviors in kindergarten does not meet the standards of prevention science to advocate universal screening and targeted intervention because misclassification is likely to occur.

Part of the explanation for this poor prediction may be that categorical diagnoses may not capture the full range of meaningful behavior or may not capture behavior with adequate specificity. For example, a study of the 5-year predictive validity of CD found that a majority of children diagnosed with CD at age 5 no longer had CD symptoms at age 10. However, these children continued to demonstrate behavioral difficulties and psychoeducational impairment (Kim-Cohen et al., 2009). This finding suggests that the current diagnostic category of CD may not be capturing one set of stable behaviors over time, but may be indicative of a future course that takes on a different, but still impairing form (Kim-Cohen et al., 2009). Further, the lack of stability may also reflect the fact that many children who will later meet diagnostic criteria for CD may be misclassified (i.e., not meeting the diagnostic criteria) at age 5 due to the adevelopmental frame of the current nosology, which would explain the presence of false positives at age 5 contributing to the observed low positive predictive value.

Research on specific components of disruptive behavior shows promise in identifying potential heterotypic manifestations of disruptive behavior. For example, work by Shaw and colleagues documents that fearlessness at age 2 predicted conduct problems in early and middle childhood (Shaw, Gilliom, Ingoldsby, & Nagin, 2003). This same study highlights how careful measurement along the range of a normative developmental process (here, fear/fearlessness) at a particular point in development can aid in identifying youth at risk for later psychopathology. Conceptualizing psychopathology and/or clinically significant behavior problems in terms of deviation from normative processes as well as with respect to extreme or deviant forms of behavior provides an overarching framework that may help to understand the heterogeneity of symptom presentation over the life span. By looking at specific components of disruptive behavior, we are able to increase the specificity with which we describe deviation in these processes.

Advantages to Understanding Etiology and Context Using Multidimensional Assessment

Multidimensional approaches also provide opportunities to consider how contextual factors such as gender, age, or culture might inform different aspects of disruptive behaviors (Krueger & Bezdjian, 2009). It is highly likely that contextual factors will influence different components of disruptive behaviors to a different degree, possibly dependent on the age and developmental level of the individual. Twin studies may be particularly informative in understanding the role of genetic and environmental mechanisms at different points in development. For example, there is evidence that the influence of context varies between subtypes of CD: aggressive behaviors are more influenced by genetic factors, and nonaggressive rule-breaking is more associated with environmental factors (Tackett et al., 2005). Similarly, parenting is not a predictor of callous/unemotional patterns but is strongly linked to other forms of disruptive behavior (Dadds & Salmon, 2003). Weems and Stickle describe the development of disordered behavior as “an interlocking network of

constructs and processes, as opposed to a single disease process or risk" (Weems & Stickle, 2005). These interlocking processes might include individual risks within the child (e.g., child sex, temperament), as well as contextual factors such as family risk (e.g., parental psychopathology, exposure to intimate partner violence) or sociodemographic risk (e.g., exposure to poverty or parental incarceration), all of which interact over time in complicated transactional processes to produce and maintain maladaptive behavior patterns. Multidimensional approaches that incorporate both severity and specific components of disruptive behavior (measured dimensionally) may shed light on clinically significant disruptive behavior by providing further specificity with which to examine their unfolding as well as opportunities to consider recently developed statistical modeling methods (Tremblay, 2010).

That CD and ODD are currently the only diagnoses in the DSM nosology that reflect disruptive behaviors means that many different behaviors and combinations of behaviors are subsumed under these two categories. For example, the categorical diagnosis of CD requires that an individual manifest only 3 of 15 symptoms (with no criteria regarding the types of symptoms required within the broad range of behaviors covered; this is in contrast to other developmental syndromes such as autism). As a result, children with very different symptom profiles, and children whose problems may have differential etiologies (e.g., aggressive versus rule-breaking), receive the same CD diagnosis. Although subsumed within a shared diagnostic classification, these subtypes reflect unique etiologies and courses, which may have critical implications for prevention and treatment (Krueger & Bezdjian, 2009; Tremblay, 2010). Moving beyond a priori subtypes to describe behavior in relation to patterning of multidimensional components or profiles may enhance understanding of etiological and developmental pathways. It is likely that etiological and contextual factors will vary across these dimensional components, just as they do across subtypes such as socialized versus unsocialized delinquent behavior or early versus late onset CD.

Quantitative and Empirical Advantages to Multidimensional Approaches

Multidimensional measurement of disruptive behaviors also offers quantitative advantages. First, even within dimensional components, there is the advantage of assessing along a continuum. Children's behavior is often assessed from a variety of informants, including teachers, parents, and children themselves, whose ratings often show only modest agreement (De Los Reyes, Henry, Tolan, & Wakschlag, 2009). These sources of variance add additional "noise" to the clinical formulation of children—variance that might better be accounted for in dimensional approach rather than a categorical diagnosis of "sick" versus "well" (Hudziak et al., 2007). Looking dimensionally within narrowband components—or looking multidimensionally—offers additional quantitative advantages beyond continuous measurement (Achenbach, 1981). In addition to characterizing core components of disruptive

behavior and identifying individual child profiles of behaviors across multiple dimensions, it is possible to subtype children empirically based on their varying profiles across the multiple dimensions, either at one point in time or through development, by subtyping based on individual profiles of functioning across multiple dimension trajectories (e.g., aggression, noncompliance).

A multidimensional approach is also likely to be critical to efforts to understand neural circuitry and/or genetic risk factors that contribute to particular forms of psychopathology. It is likely that identification of relevant neural circuitry and genes will depend on careful developmental specification of components of clinical behavior as well as concurrent examination of environmental risk factors associated with these components. This strategy has been effective in other genetics research on psychological phenomena, such as reading disability (Petryshen & Pauls, 2009). Dimensional assessments often provide greater statistical power than categorical characterization for elucidating such associations (Hudziak et al., 2007). Thus, rather than seeking a one to one correspondence between disorder status and a particular brain structure or activation pattern or between disorder and one or more genes, identification of brain—and gene—behavior associations will likely be expedited through assessment of developmental phenotypes, which comprise trajectories of specific dimensions in combination with attention to critical contextual factors (i.e., gene by environment interactions).

Emphasis in clinical nosological systems is increasingly on classification of psychopathology based on etiology and pathophysiology (Charney et al., 2002). From the perspective that psychiatric disorders are in fact reflective of perturbations in brain function, developmental neuroscience may offer an alternative perspective to identifying meaningful subgroups of children who evidence clinically significant disruptive behavior. A diagnostic system that is reflective of brain structure and function may seem far afield, but neuroscientific epistemologies can and should inform diagnostic understandings. Elegant work grounding diagnostic classification in neuroscience knowledge has been done in the realm of childhood anxiety, in which neuroscientific understandings of processes like attention, learning, and memory have been used to extrapolate to mechanistic distinctions between diagnostic classifications such as MDD and anxiety (Pine, 2007).

Knowledge from neuroscience seems particularly relevant in seeking out relevant mechanisms along the developmental pathway of disruptive behaviors. As an example, callous/unemotional traits are linked to specific neurodevelopmental differences in the amygdala; children (ages 10–17) with these traits demonstrated reduced amygdala activation while processing fearful expressions in stimuli compared to children with ADHD and control children with no diagnoses (Marsh & Blair, 2008). Further work by Blair has revealed that deficits in processing facial affect, particularly recognition of fear cues, have been demonstrated in adults and youth with psychopathic or callous tendencies across a wide range of samples and methods. Such deficits are theorized to interfere with the internalization of basic rules like inhibiting misbehavior (Kochanska & Aksan, 1995). Thus, youth with deficits in processing facial fear cues may have downstream difficulties with negative arousal and empathy that result in a lack of inhibition and aggression (Blair, 2006; Blair, Peschardt, Budhani, Mitchell, & Pine, 2006). This example demonstrates how

multidimensional approaches may be particularly crucial to fostering discovery of neuroscientific mechanisms of disruptive behaviors—and how a multidimensional perspective enables further specification.

Clinical Advantages to Multidimensional Approaches

Empirically derived multidimensional subtyping offers significant promise for improving treatment effectiveness. Effectiveness of the most widely used empirically based disruptive behavior interventions is modest, and better differentiation and earlier identification may enhance targeting of treatments (Brestan & Eyberg, 1998; Dishion & Patterson, 1992). Given that most intervention studies target children as globally disruptive, little is known about differential treatment response based on differing patterns of disruptive behavior. Evidence from subtype research suggests that labeling components of disruptive behavior and tailoring treatments to match subgroups of children who vary along these components may lead to more effective interventions. For example, boys categorized as callous/unemotional were found to be less responsive to a parent-training intervention than boys without this trait (Hawes & Dadds, 2007). The increased clinical specificity offered by a multidimensional approach that parses the heterogeneity of disruptive behaviors would allow for a more careful tailoring of treatment. Increasing usage of psychopharmacology among preschool children with disruptive behaviors (Gleason et al., 2007) also highlights the need for a stronger empirical basis for clinical discrimination.

A Developmental, Multidimensional Approach to Disruptive Behavior: A Two-Axis Model

In this proposed model of multidimensional assessment, assessment might be thought of as taking into consideration two axes, both dimensional. Axis I is a *severity axis* that cuts across specific dimensions or types of disruptive behavior and focuses on the extent to the set of behaviors the individual presents deviates from normative development with respect to frequency, intensity, persistence within or across contexts; the breadth of behavioral repertoire; and the quality of specific behavioral manifestations. Axis II comprises relevant *components* of disruptive behavior, focusing on the distinct attributes that constitute the disruptive behaviors (e.g., temper loss, noncompliance). Using a multidimensional approach, the core components that comprise the disruptive behavior syndrome can be assessed concurrently to form a profile of an individual's disruptive behavior functioning. This second axis is designed to reflect the full scope of disruptive behaviors, and is conceptually akin to the polythetic nature of DSM/ICD diagnoses. That is, diagnoses are defined by multiple problem areas and this variation is clinically meaningful (Krueger & Bezdjian, 2009). Measuring multiple components of disruptive behavior dimensionally is an attempt to better characterize this variation systematically.

While frequency, intensity, and duration are common ways of characterizing behavior, we have also highlighted the importance of quality of behavior as a critical aspect of clinically significant behavior, particularly in early childhood. Drawing on developmental science, we have operationalized *quality* in terms of the extent to which behavior is modulated, and expectable in context (Cole, Michel, & Teti, 1994; Wakschlag, Briggs-Gowan, et al., 2007). *Modulation* has three components: (1) *intensity*, or a behavior's strength and force; for example, among preschool children, mild aggression is normative, but *intense* aggression is associated with more persistent aggression over time (Brownlee & Bakeman, 1981; Cummings, Iannotti, & Zahn-Waxler, 1989; Hay et al., 2000); (2) *flexibility*, or how stubbornly entrenched a behavior is, as opposed to responding to environmental cues; this has also been shown to be a clinical indicator in disruptive disorders (Angold & Costello, 2000); and (3) *organization*, or the pacing, duration, and predictability of sets of behaviors; for example, tantrums of a few minutes that are not highly dysregulated are normative for preschoolers (Potegal, Kosorok, & Davidson, 2003), but destructive tantrums are more common among children with a range of clinical disorders (Egger, 2003). *Expectable in context*, also an element of quality, refers to the extent to which a behavior is normatively elicited within a particular context. For example, mild aggression may be typical for children in the context of peer disputes or rough and tumble play (Hay, 2005), but aggression directed towards adults is not expectable in context and thus viewed as qualitatively distinct. Research on quality of disruptive behaviors has largely proceeded by examining a specific component of disruptive behavior in isolation (e.g., looking at aggression or noncompliance in isolation), rather than identifying the quality of multiple components of behavior within the same child (Wakschlag & Danis, 2009).

Quality is critical to understanding the severity axis of disruptive behavior. For example, in the domain of temper loss, a tantrum that is highly dysregulated but short in duration is qualitatively more severe than a more regulated and short tantrum, but less severe than a highly dysregulated tantrum that lasts for 20 min. Moreover, quality also informs the range of behavioral elements that are included within the second domain axis in which components are specified. Low base-rate behaviors are often not included in dimensional scales designed to assess the continuum of behavior. However, building a comprehensive model of disruptive behavior that captures the full scope of disruptive behavior will mean including low base-rate, qualitatively distinct behaviors, that when present may be highly informative in terms of both the severity axis and the dimension that they represent.

The Four-Factor Multidimensional Model of Disruptive Behavior Across the Life Span

Some of us have previously (Wakschlag et al., 2010; Wakschlag et al., 2012; Wakschlag et al., 2011) proposed a four-factor dimensional approach to disruptive behavior that is theoretically, developmentally, and empirically grounded.

These four core dimensions of disruptive behavior are: (1) aggression, (2) noncompliance, (3) temper loss, and (4) low concern for others. These four dimensions are theoretically based on: (a) a developmental psychopathology approach, emphasizing individual differences and developmentally based conceptualizations along four core normative developmental processes that are relational in nature: (1) the modulation of aggression, (2) the balance of autonomy and compliance, (3) emotion regulation (particularly anger regulation), and (4) empathy and conscience development; (b) a clinical understanding of the heterogeneous ways early emerging disruptive behavior presents itself; and (c) prior conceptual and empirical work that has looked at characterizing disruptive behavior. This comprehensive four-dimensional model seeks to move beyond aggression as a central organizing frame and to integrate bodies of work that have sought to describe specific components of disruptive behavior (e.g., callous/unemotional) into a unified model that captures the full disruptive behavior spectrum.

The *aggression* dimension characterizes a tendency to respond aggressively across a variety of contexts, ranging from expectable self-protection to severe violence. The *noncompliance* dimension captures failure to comply with directions, rules, and social norms, ranging from developmentally expectable resistance to pervasive and provocative rule-breaking. The *temper loss* dimension encompasses overt expression and management of anger, ranging from mild expressions of frustration to rage and extreme and dysregulated temper loss. The *low concern* dimension captures active disregard of others, including lack of guilt for transgressions and lack of concern for others' feelings. Behaviors along this dimension may include mild insensitivity within expectable contexts to extreme and persistent disregard of others' needs and feelings.

In three independent samples (two early childhood and one adolescent), this four-dimension model has demonstrated a superior fit compared to traditional models including: (a) a DSM-based (ODD/CD) model and (b) a two-dimensional model distinguishing a general disruptive group from a group high on the low concern dimension, along the lines of the callous/unemotional subtype described and extensively studied by Frick and colleagues. The superior model fit was demonstrated across child age and sex. Concurrent and predictive validity were also demonstrated (Wakschlag et al., 2011).

Aggression

Normative aggression appears in infancy as a natural way of expressing anger; attaining "aggressive competence" is viewed as a normative developmental event (Hay, 2005, p. 125) as young children learn to respond to frustration (e.g., loss of a toy to another child) with instrumental aggression that achieves a functional goal (e.g., retrieval of the toy) (Tremblay et al., 2004). While some aggression is normative in early childhood, landmark longitudinal studies of patterns of aggression across early childhood have demonstrated that normative levels of aggression are

low-moderate in early childhood and begin a marked decline in frequency between 36 and 42 months of age (Shaw, Lacourse, & Nagin, 2004; Tremblay et al., 2004). In the current DSM-IV, aggressive behaviors are captured in multiple CD symptoms (e.g., "often initiates physical fights"). These symptoms are intended to be evaluated with respect to normative development, although no specific developmental criteria are offered. Aggression is the most studied of the disruptive behavior dimensions and has often been considered the hallmark of DBDs.

Population-based research on aggression in young children has demonstrated that the quality of aggression may be an important clinical indicator. For example, 19 % of 2-year-olds and 15 % of 3-year-olds are often "aggressive when frustrated," but only 1 % of children at either age "hurt others on purpose" (Carter et al., 2003). Moreover, observed reactive aggression with peers is not associated with high maternal ratings of aggression, but proactive aggression is (Hay et al., 2000). *Normative* manifestations of aggression in toddlers include mild aggression when frustrated and rough and tumble play (Hay, 2005). Clinical manifestations may include intense, driven aggression; dysregulated, destructive aggression; and aggression directed towards adults (Hay, 2005; Zahn-Waxler & Radke-Yarrow, 1990).

A great deal of work in social cognition documents that aggression is associated with hostile attribution bias, i.e., the tendency to attribute hostile intent to others in neutral or ambiguous situations. As deficits in social cue detection fail to provide information that would promote adaptive social problem-solving and diffuse angry/retaliatory responses, hostile attributions may increase rates of aggression (Dodge, 2006). From preschool through adolescence, hostile attribution bias has been associated with disruptive behavior in general and with increased aggression specifically (Coy, Speltz, DeKlyen, & Jones, 2001; Runions & Keating, 2007). Hostile attribution bias also appears to be present in youth prenatally exposed to cigarettes who are at heightened risk for DBDs (Wakschlag et al., 2009). Supporting a causal mediating role in the maintenance of disruptive behavior, interventions designed to reduce hostile attribution bias have resulted in corollary reductions in youth aggression (Hudley & Graham, 2008).

Noncompliance

Like aggression, noncompliance has developmental roots in a normative process, here negotiating rules and directives and a movement towards autonomy. Indeed, learning to say "no" is a normative developmental milestone on this path (Crockenberg & Litman, 1990). Normative assertions of autonomy exist on a dimensional continuum of severity with their clinical counterparts of pervasive and persistent disregard of rules and norms. Using detailed observations, researchers were able to distinguish normative noncompliance (e.g., a child negotiating to get his/her own way) from overt defiance that involves active and definitive refusal, with the latter associated with elevated risk of disruptive behavior (Kuczynski & Kochanska, 1990).

Noncompliance has been examined developmentally as disregard for rules (Petitclerc, Boivin, Dionne, Zoccolillo, & Tremblay, 2009) and as defiance (Baillargeon et al., 2011) in toddlers; as "resistance to control" in young children (Bates, Pettit, Dodge, & Ridge, 1998); and as serious norm violation in delinquent youth (Loeber & Farrington, 2000). In DSM-IV, noncompliance is diagnostically captured in ODD symptoms of defiance and argumentativeness as well as in CD symptoms that reflect rule violation. Normative manifestations in young children include autonomy assertions, negotiated noncompliance, and noncompliance in response to fatigue or limit (Drabick, Strassberg, & Kees, 2001). Possible clinical indicators in young children include intense and insistent noncompliance, a "reflexive no," sneaky misbehavior, and noncompliance that predominates even in positive social contexts (Kuczynski & Kochanska, 1990). There is epidemiological evidence that preschoolers who are very difficult to manage are more likely to present DBDs (Moffitt, Caspi, Rutter, & Silva, 2001).

Authors have also stressed the possible adaptive nature of toddlers' noncompliant behavior for learning the ranges of possible behaviors that are legitimate, or open to him or her (Breger, 1974; Dubin & Dubin, 1963). Noncompliance can be used adaptively to negotiate the boundaries between what is within the toddler's area of personal preferences and choices, and what falls within the purview of socially prescribed norms of interpersonal conduct, moral obligations, and health/safety prescriptions (Nucci, Killen, & Smetana, 1996). It can also be used as a step in the process of internalizing rules of conduct (Hoffman, 1983). In addition, Stifter and Wiggins (2004) refer to "assertive noncompliance" and Wenar (1982) to "healthy/realistic negativism."

Neurocognitively, noncompliance may be related to response perseveration deficits, which reflect a failure to inhibit behavior in response to "punishment" cues because of heightened sensitivity to immediate reward. This inflexible response pattern under conditions of high motivation has been theorized as a neurocognitive substrate of disruptive behavior (Nigg & Casey, 2005; Van Goozen, Cohen-Kettenis, Swaab-Barneveld, & Van Engeland, 2004) and has corollary behavioral manifestations in the intransigent patterns of noncompliance exhibited by children with ODD symptoms. Response perseveration has been associated with youth disruptive behavior in community samples (Goodnight, Bates, Newman, Dodge, & Pettit, 2006) and ODD in clinic samples (Matthys, Van Goozen, Snoek, & Van Engeland, 2004; Van Goozen et al., 2004).

Temper Loss

Temper loss has normative roots in the developing skill of emotion-related behavior regulation (Eisenberg & Fabes, 1992), specifically overt expressions and management of anger (Cole, Martin, & Dennis, 2004). Dimensionally, it might be seen along a spectrum from normative mild-moderate expressions of anger in response to frustration to extreme, dysregulated temper. The developmental emergence of

anger has been studied during infancy in the context of emotion differentiation, emerging even before 4 months of age (Sternberg & Campos, 1990). Anger has also been studied in the context of examining individual differences in temperamental predispositions to reactivity and regulation of negative emotion (Rothbart, Posner, & Hershey, 1995). Anger is also one of the primary components of tantrums (Potegal et al., 2003). Episodes of moderate anger are normative (Calkins & Johnson, 1998), but anger dyscontrol heightens risk for DBDs and serious antisocial behavior across the life span (Bates, Bayles, Bennett, Ridge, & Brown, 1991; Cole, Teti, & Zahn-Waxler, 2003; Eisenberg, 2000; Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002). Within the DSM-IV nosology, temper loss is reflected in multiple ODD symptoms (e.g., loses temper, angry/resentful). It is not specific to ODD, and may be a marker of multiple DSM-IV disorders (e.g., irritability in depression) (Leibenluft, Cohen, Gorrindo, Brook, & Pine, 2006; Stringaris et al., 2010).

Normative manifestations in young children include intermittent tantrums and temper loss in response to frustration (Potegal et al., 2003). Parent ratings of the frequency of distinct anger-related behaviors indicate marked variability in early development. For example, for children at 17 months of age, only 22.1 % of boys and 18.7 % of girls are described by parents as "having a hot temper or temper tantrums" (Baillargeon et al., 2011). Clinical indicators of temper loss for preschool disruptive behavior include destructive and prolonged tantrums, multiple daily tantrums and easily precipitated temper loss (Egger, 2003; Needleman et al., 1991; Wakschlag et al., 2011). Whereas episodes of moderate anger are normative (Calkins & Johnson, 1998), anger dyscontrol heightens risk for DBDs and serious antisocial behavior across the life span (Bates et al., 1991; Cole et al., 2003; Eisenberg, 2000; Gilliom et al., 2002). There is limited evidence from epidemiological studies that temper loss predicts to antisocial acts further down the developmental trajectory, for example, that frequent and/or severe temper tantrums at age 3 years predict violent crimes at 23–24 years of age (Stevenson & Goodman, 2001). Notably, though, destructive tantrums are not specific to DBDs. Rather, they are a clinical indicator for several disorders in the preschool period (including separation and other anxiety disorders) (Egger, 2003). Therefore, dimensional assessment of destructive tantrums, or anger, is likely to contribute to the severity axis but will need to be examined as part of a multidimensional profile that includes additional disruptive behavior related behaviors to obtain prediction of disruptive behaviors with high specificity and sensitivity.

Neurocognitively, temper loss has correlates in deficits in effortful or "inhibitory" control (i.e., the ability to inhibit a prepotent or dominant response in accordance with rules or instructions) (Aksan & Kochanska, 2004; Carlson & Wang, 2007), which have been associated with young children's difficulties regulating negative emotions and to predict disruptive behavior (Brophy, Taylor, & Hughes, 2002; Eisenberg, Fabes, Nyman, Bernzweig, & Pinuelas, 1994; Kochanska & Knaack, 2003; Rueda, Posner, & Rothbart, 2005; Spinrad et al., 2007). Effortful attentional shifting and response inhibition importantly underlie distress regulation (Rueda et al., 2005); thus, children with impaired effortful control are more likely to exhibit the core temper loss features of ODD, particularly difficulty modifying or

inhibiting the expression, intensity, and temporal features of negative emotion in response to environmental demands (Carlson & Wang, 2007; Cole et al., 2003; Spinrad et al., 2007).

Low Concern

Dimensionally, low concern for others reflects variations in responsiveness to the feelings of others, including modifying behavior based on negative response from others, extent of remorse after angering or displeasing others, and sensitivity to others' feelings. It ranges normatively from mild insensitivity within contexts of stress or conflict to extreme and persistent callous disregard of others across a range of social interactions and contexts (Wakschlag et al., 2010). In developmental studies, this dimension has been studied in multiple streams of research including the development of prosocial behavior such as empathy and attentiveness to others' feelings (Hay & Cook, 2007) and multiple facets of conscience, including early moral emotions (i.e., discomfort following wrongdoing/guilt) that influence responsiveness to punishment (Kochanska & Aksan, 2006). Although these various facets have been studied as separate, interrelated behaviors developmentally, here we propose that from a clinical perspective they are considered as elements of a single low concern for others' dimension that coalesces in a coherent set of behaviors reflecting active disregard of others' feelings, in keeping with the extensive work on callousness in older youth (Frick et al., 2003).

Concern for others develops in the first years of life, including the emergence of empathic responses to others' distress and spontaneous prosocial behaviors (Carter et al., 2003; Chase-Lansdale, Wakschlag, & Brooks-Gunn, 1995; Eisenberg & Fabes, 1998; Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992). For instance, in the study by Baillargeon, Normand, et al. (2007), 62.4 % of children—the same percentage for boys and girls—were estimated, at 17 months of age, to have comforted a child who is crying, at least on an occasional basis. Extensive work by Kochanska and colleagues on the development of conscience has demonstrated its emergence even in very young toddlers (Kochanska & Aksan, 2006). For example, even very young children have internalized basic rules, such as inhibiting misbehavior and refraining from prohibited activities even when an adult is not present (Kochanska & Aksan, 1995). Further, young children also exhibit remorse including guilt about misbehavior, apologizing, gaze aversion, and attempts to restore good feelings (Kochanska, 1994). Lack of concern has been widely studied in older youth by Frick and others within the framework of "callous/unemotional traits" (Frick et al., 2003; Kotler & McMahon, 2005) but has not been a focus of attention in studies of preschool disruptive behavior. Consistent with this argument, Frick et al. have reported links between callous/unemotional features and proactive aggression in a small sample of preschoolers (Kimonis et al., 2006). Laboratory observations of preschool children's lack of concern for others' simulated distress has also been shown to moderate the stability and severity of preschool disruptive behavior in

developmental studies (Hastings, Zahn-Waxler, Robinson, Usher, & Bridges, 2000). In DSM-IV, low concern is reflected in ODD (e.g., spitefulness, blaming) and CD (e.g., bullying, cruelty) symptoms. Normative manifestations in young children may include mild insensitivity to peer distress, occasional blaming of others to avoid negative consequences, and refusing to share and mild taunting or teasing (Wakschlag et al., 2012). We hypothesize that clinical manifestations may include indifference to punishment or consequences, being unfazed by parental anger, disinterest in pleasing others, and taking pleasure in others' distress.

Neurocognitively, low concern may be related to processing of fear cues. Deficits in processing facial affect, particularly recognition of fear cues, have been demonstrated in adults and youth with psychopathic or callous tendencies across a wide range of samples and methods (Marsh & Blair, 2008). Such deficits are theorized to interfere with internalization, because others' fear and distress are negatively arousing, elicit empathy, and lead to inhibition of aggression (Blair, 2005; Kochanska, Gross, Lin, & Nichols, 2002).

Critical Next Steps for Advancement

Working from a bottom-up, developmental psychopathology framework to build multidimensional understandings of disruptive behaviors will require the use of a variety of research designs and methods. To disentangle normative misbehavior from clinically significant manifestations of disruptive behavior will require epidemiological, population-based, longitudinal studies that begin in early childhood. While much advancement has been made in this field (Baillargeon, Normand, et al., 2007; Briggs-Gowan et al., 2001; Tremblay et al., 2004), developmental specification of dimensional manifestations of disruptive behaviors will require greater knowledge about normative manifestations of a broad range of these behaviors in longitudinal, multi-method, population-based studies. In many ways, this descriptive work has only begun and multi-method studies that include observational methods across multiple contexts are needed.

Relatedly, as we have argued, looking at behaviors in a dynamic and organized manner to consider *quality* is crucial to describing the full spectrum of disruptive behaviors. Studying clinical or clinically enriched populations may be extremely helpful in characterizing the severe end of the spectrum of disruptive behaviors. Further research on the quality of disruptive behavior, done from a developmental perspective, will help to distinguish what is typical from what is atypical across the life span.

In addition to work that seeks to locate the early childhood roots of these dimensions, a life span conceptualization demands looking beyond early childhood to understand the unfolding of these potentially linked behavior patterns across time and context (i.e., examining heterotypic continuity). Further work on the trajectories of early disruptive behaviors—and on the children early identification may currently be *missing*—will help to enhance the sensitivity and specificity of our measurement. Although we are advocating a multidimensional approach, we

concurrently believe that categorical diagnoses will continue to serve useful functions, especially in relation to clinical practice and public health initiatives. Moreover, once disruptive behaviors are characterized by multiple dimensions, we will need to document the relation of these dimensions to diagnosis as well as how the specificity and sensitivity of disruptive behaviors change with age within the general population. For instance, due to the rapid decline in frequency, biting peers may be a perfectly sensitive behavior for assessing physical aggression in children under 2 years of age, but may not be a sensitive marker among 4- to 5-year-olds.

Moreover, if we are truly attempting to capture the spectrum of behavioral manifestations of disruptive behavior, more sensitive work that evaluates the influence of context is required. As Dodge has argued, "any assessment of behavior always represents the individual in context" (Dodge, 1993). Indeed, disruptive behaviors are conceptualized as existing *only* within a relational framework—one cannot be "defiant" without an *other* to defy. Thus far, our only real diagnostic conceptualization of context is that we require the presence of a behavior or behaviors within a dimension to occur across multiple contexts to determine that the behavior is pervasive, an indicator of severity. Although we do not routinely assess the degree to which contexts such as school and home are varied with respect to the demands placed on the individual, we presume that the occurrence of disruptive behaviors across contexts reflects both pervasiveness and inflexibility of response. For example, if a child is defiant across multiple contexts—at school, at home, with peers—his behavioral response pattern is more rigidly maladaptive and therefore perhaps more "severe" (De Los Reyes et al., 2009).

The question of contextual manifestations of disruptive behavior also has implications for diagnosis and assessment, which highlights the critical importance of assessment tools. According to the current diagnostic formulation of ODD, defiant behaviors need only occur in one context to meet criteria for diagnostic categorization. If one is inflexibly defiant with a parent, for example, one is eligible for the same diagnosis as if one is inflexibly defiant with a parent, at school, and in unfamiliar situations. However, these clinical profiles could require distinct assessment as well as intervention. Novel approaches to diagnostic assessment of young children that take the varied demands of interactional context as well as the rigidity and pervasiveness of behavior into account are needed. For example, new research from the Disruptive Behavior—Diagnostic Observation Schedule (DB-DOS) (Wakschlag et al., 2008), an observational assessment of disruptive behavior that includes both examiner and parent contexts, reveals that while scenarios with an unfamiliar adult are the most diagnostically informative for boys, it is with *parents* that girls with DBDs are demonstrating diagnostically informative disruptive behavior (Sarah et al., 2012); thus, the same lab assessment, without both parent and examiner contexts, would not capture the underlying disruptive behavior of boys and girls. This surprising finding reminds us that our knowledge of the varied landscape of disruptive behavior is only as specific as the tools with which we measure it.

The above-cited finding about sex differences in contextual manifestations of disruptive behavior fits into a large body of theorizing in which questions are raised regarding whether the current diagnostic conceptualization of disruptive behaviors, which have largely grown out of research on boys, is appropriate for capturing the

varied ways that young *girls* may be demonstrating impairing and maladaptive disruptive behaviors (Zoccolillo, Tremblay, & Vitaro, 1996). Current knowledge of disruptive behavior dimensions draws largely on studies of male youth; however, burgeoning evidence suggests sex difference in expressions and patterns of disruptive behavior even in early childhood (Baillargeon, Zoccolillo, et al., 2007; Crick, Ostrov, & Werner, 2006; Hipwell et al., 2007; Moffitt et al., 2001). Consistent with early studies of young children that attempted downward extensions of adult and older child assessment tools, studies that *have* included girls have often sought to confirm the fit of male models for girls rather than working from an a priori frame that assumes that female manifestations may look different (Ostrov, 2008). Thus, building up a body of knowledge that creates space for female-typical manifestations of disruptive behavior—and how the specificity and/or sensitivity of the relation of dimensions of disruptive behaviors to disruptive disorders vary between boys and girls at a given age—will be a crucial part of characterizing the full spectrum of disruptive behavior dimensions.

In addition to a focus on boys, literature on disruptive behavior has focused perhaps disproportionately on aggression. The large role that aggression has played in clinical research on disruptive behaviors means that our knowledge base is more expansive in that domain. Moving forward, it will be important to increase our understanding of each of the salient component dimensions that constitute the full range of disruptive behaviors (e.g., temper loss, noncompliance) in order to build a consistent knowledge base.

Finally, disruptive behavior cannot be understood without looking at homo- and heterotypic comorbidity, or co-occurring problems within and across diagnoses. Comorbidity has been postulated to relate to the severity of disruptive behaviors. It may also be reflective of unique etiological processes; for example, it has been found consistently that the presence of comorbid ADHD and CD is associated with earlier onset of disruptive behavior than a diagnosis of CD alone (Loeber et al., 2000). Moreover, it has been hypothesized that the specific dimensions of ADHD (e.g., impulsivity, hyperactivity, inattention) may uniquely relate to dimensions of disruptive behavior. For example, among 13-year-olds, aggressiveness when combined with motor restlessness predicted more strongly to adult criminal behavior than either alone (Magnusson, 1998). As this finding suggests, comorbidity may also relate to heterotypic continuity. Looking multidimensionally, the developmental relationship between the severity and domains of comorbid psychopathology (e.g., inattention, hyperactivity, depression) and the severity and domains of disruptive behavior (aggression, temper loss) is a field ripe for exploration.

Conclusion

Multidimensional approaches, which we have conceptualized here as incorporating two axes (one axis addressing severity and a second axis that comprises multiple components that reflect the most salient features of disruptive behavior), offer many

advantages to the study of disruptive behavior. Given an interest in early manifestations of disruptive behaviors, a central advantage is increased developmental specificity, particularly in terms of charting heterotypic shifts in the behaviors that comprise disruptive behaviors through time. In addition, dimensional approaches typically offer greater statistical power than categorical approaches and, due to their focus on more narrow sets of behavior, are also more likely to shed light on neural circuitries and/or genes that are linked to these behaviors

Building on prior work, this chapter highlights a life span multidimensional model with four core disruptive dimensions. This model is based on preexisting developmental science, focusing on the four normative and relational developmental processes of (1) emotion regulation, (2) empathy and conscience development, (3) the balance of autonomy and compliance, and (4) the modulation of aggression. The four proposed domains of disruptive behavior include the range of normative presentations and the ways in which these processes go awry—in temper loss, low concern for others, noncompliance, and aggression.

Critical to the advancement of dimensional approaches to disruptive behavior will be continuing to chart the normative developmental course of these domains as well as deepening understanding of how normative development shifts towards and away from psychopathology. Attention to age and gender differences in their typical and atypical expression is also crucial. Often overlooked in current research is attention to how the quality intersects with frequency, duration, and intensity of disruptive behaviors, which is likely critical for understanding the full manifestation of disruptive behaviors over development and capturing heterotypic continuity. Multimethod, longitudinal studies that begin with representative sampling of both boys and girls and that assess core dimensions through parent and teacher reports and observation are needed. However, such studies will be limited unless researchers begin to also link individual variation in profiles determined based on trajectories of multiple disruptive behavior dimensions to neurocognitive, genetic, and broader familial and community contextual risk factors. As our current intervention strategies leave considerable room for improvement, we can hope that elucidating mechanisms of change over time will yield important clues for enhancing preventive and targeted interventions.

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