Research Review: ‘Ain’t misbehavin’: Towards a developmentally-specified nosology for preschool disruptive behavior

Lauren S. Wakschlag,1 Patrick H. Tolan,2 and Bennett L. Leventhal3

1Institute for Juvenile Research, Department of Psychiatry, University of Illinois at Chicago, USA; 2University of Virginia, USA; 3New York University, USA

There is increasing consensus that disruptive behavior disorders and syndromes (DBDs) are identifiable in preschool children. There is also concomitant recognition of the limitations of the current DBD nosology for distinguishing disruptive behavior symptoms from the normative misbehavior of early childhood. In particular, there appears to be substantial insensitivity to heterotypic manifestations of this developmental period and problems in identifying meaningful heterogeneity. As a result, the developmental basis for much of the current nosology may be called into question. To address these and other critical issues, this paper reviews the foundational elements of clinical and developmental science pertinent to developmental differentiation of disruptive behavior in the preschool period as paradigmatic for developmental specification across the lifespan and generates an agenda for future research. We begin by reviewing evidence of the validity of DBD in preschool children. This is followed by an outline of key developmental concepts and a review of the corollary evidence from developmental science. These provide a basis for conceptualizing disruptive behavior in reference to developmental deviation in four core dimensions hypothesized to mark the core features of disruptive behavior syndromes. Finally, we propose a program of research to establish an empirical basis for determining the incremental utility of a developmentally specified nosology. Central to this approach is a contention that the benefits of developmental specification are extensive and outweigh any disadvantages. This is because a developmentally specified approach holds substantial promise for increasing sensitivity and specificity for differentiating disruptive behavior from normative misbehavior and from other related syndromes as well as for improving prediction. Further, more precisely defined, developmentally based phenotypes are likely to elucidate distinct mechanisms within translational studies and to serve as a catalyst for the generation of novel treatments. Keywords: Disruptive behavior, conduct disorder, development, preschool children, antisocial behavior.

Over the past few decades, it has become increasingly clear that psychopathology is evident early in life (Angold & Egger, 2007). There is also broad-based consensus that clinical phenomenology is best understood in terms of (a) neurodevelopmental processes and related behavioral patterns (NIMH National Advisory Mental Health Research Council Workgroup, 2008; Nelson et al., 2002; Nigg & Casey, 2005); (b) the extent to which developmental course is influenced by context (Rutter, 1997; Sameroff, 2000; Tolan, 2001); and (c) diversity of outcomes reflecting the interplay of multi-factorial transactional processes (Cicchetti & Sroufe, 2000; Rutter, 2006). This developmental psychopathology framework has been theoretically articulated and extensively applied (Cicchetti & Toth, 2009; Rutter & Sroufe, 2000). In particular, it has contributed to elucidation and specification of what differentiates psychopathology from normal variation, developmental unfolding of symptom patterns and what person-situation characteristics are most pertinent for guiding developmentally-based intervention and prevention.

Despite the ascendancy of a developmental view of psychopathology, however, the challenge of incorporating this into psychiatric classification systems has been substantial (Angold & Costello, 2009; Cicchetti & Sroufe, 2000). As has been noted (Wakefield, Pottick, & Kirk, 2002), DSM caveats about defining age-related aspects of DBD symptoms (e.g., ‘must be inconsistent with developmental level’) are poorly specified and offered as afterthoughts. Thus, in practice, they are only weakly relevant to determination of clinical significance. In fact, the APA Task Force on DSM-V has identified insufficient incorporation of developmental considerations as a critical gap in current psychiatric classification systems, particularly at either end of the lifespan (Helzer & Hudziak, 2002; Kupfer, First, & Regier, 2002; Narrow, First, Sirotvaka, & Regier, 2007). For example, the current DBD taxonomy is relatively aedevmental, devoid of age-related and setting considerations and absent developmental phraseology in characterizing symptoms. Thus, functionally, the syndrome is a descriptive list of heterogeneous symptoms, which is not organized in terms of developmental variations or etiologic heterogeneity. There has been a reliance on viewing childhood disorders as ‘downward extensions’ of adult or...
adolescent disorders, which is aptly criticized as facile. This approach impedes, if not forecloses, consideration of age- or developmental period-specific symptoms and seems counter to recognition of the developmental nature of behaviors and clinical patterns. Rather, we contend that clinical formulations should proceed from study of clinical symptoms defined in relation to progressive organization of behavior as age increases and related considerations of deviations from normative developmental patterns.

There is nascent recognition that mental disorders are identifiable and valid in preschool children. This is combined with awareness that diagnosis in early childhood entails a particular set of challenges for psychiatric classification due to the high level of behavioral variation and the rapid changes in organization of behavior, compliance demands and expansion of the social world beyond the family that occurs during this developmental period (Angold & Egger, 2007; Task Force on Research Diagnostic Criteria: Infancy and Preschool, 2003; Wakschlag & Danis, 2009). These challenges might lead to the conclusion that it is premature to identify disordered behavior patterns in early childhood. However, we suggest that variation during early childhood is not so extraordinary. Rather, its distinct pattern of behavioral change represents expectable developmental variation relative to patterns at subsequent developmental periods (i.e., later childhood, adolescence and adulthood). This expectable variation across development includes normative differences in rapidity of change, contextual expectations of behavioral control and maturation of relevant brain systems that enable self-regulation of emotion and behavior (C. Blair et al., 2007). Measurement advances over the past decade now provide methods for assessing early childhood clinical patterns within the context of this developmentally expectable variability (Carter, Briggs-Gowan, & Davis, 2004; Egger & Angold, 2006; Wiebe, Espy, & Charak, 2008; Wakschlag et al., 2007a).

Thus, taken together, measurement and scientific advances in early childhood provide a novel opportunity to broaden the developmental information that can be used to refine psychiatric taxonomies for children and the tools with which to test them. Relatedly, neuroscientific advances pertinent to syndrome identification point to an increasing need for precise characterization of clinical phenotypes within developmental context, which is the level of specification essential for translational science (Beauchaine, 2003; Nigg, Willcutt, Doyle, & Sonuga-Barke, 2005; Pine, 2007). Fundamentally, this implies the need to move from disorders defined by descriptive lists of symptoms to more narrowly defined phenotypes or subtypes that can be directly linked to specific developmental disruptions in basic neural and psychological processes (Dickstein & Leibenluft, 2006).

A developmental perspective may be particularly informative for preschool disruptive behavior disorders and syndromes (DBDs). Within DSM-IV, DBDs are comprised of two interrelated disorders reflecting a persistent pattern of antisocial behavior (American Psychiatric Association, 1994). Oppositional defiant disorder (ODD) is defined by irritable disposition and related interactions with authority figures. Conduct disorder (CD) is characterized by disregard for social norms and rules and for the rights and well-being of others and related serious aggression. Thus, it seems there is substantial overlap between the essential features of disruptive behavior and the normative misbehaviors of early childhood (Wakschlag, Leventhal, & Thomas, 2007b). For example, tantrumming and physical aggression are considered markers of disruptive behavior, yet 75% of 2-year-olds exhibit some form of these behaviors (Potegal & Davidson, 2003; Tremblay, 1999). As a result, determination of clinical significance can seem markedly different from older ages when the mere occurrence of such behaviors can be clinically informative. As these examples illustrate, the meaning and form of expression of a given behavior normatively varies across developmental periods. This argues against an emphasis on continuity in symptom presentation to mark DBDs across ages.

Section I: A developmental approach to preschool disruptive behavior disorders/syndromes

Psychopathology as deviation from typicality

At the core of developmental psychopathology is a conceptualization of disorders as deviations from typicality in degree and kind (Garber, 1984; Offer & Sabshin, 1974; Rutter & Sroufe 2000; Sameroff, 2000; Sroufe & Rutter, 1984). Deviations in degree reflect both (a) departure from age-appropriate norms and (b) exaggeration of normative developmental processes. In terms of deviations from age-appropriate norms, one class of DBD symptoms is comprised of behaviors that are normatively common but not frequent in young children (e.g., ‘loses temper and defies adults’). Thus, for this set of behaviors the challenge is to identify meaningful cutpoints for early childhood, which mark the level at which the frequency of the behavior moves from within the range of normal variation to clinical significance. In regard to the second criterion, another set of disruptive behavior symptoms are pathological only to the extent that they occur in exaggerated form, such as extreme intensity, being easily triggered, and/or predominating across settings and interactions (e.g., ‘easily annoyed,’ ‘often angry and resentful’). Thus, theoretically, it is the quality of these behaviors, not their occurrence, which marks deviation. Deviations in kind represent interference with the normal progression of development (Garber,
Disruptive behaviors such as physical cruelty and vindictiveness do not occur normatively and thus, their very occurrence is pathognomonic. For example, the ‘callous disregard for needs and feelings of others’ (Frick et al., 2003) reflected in this class of symptoms suggests deficits in the normative acquisition of empathy for others, core elements of which are typically in place by the first years of life (Baillargeon et al., 2007; Chase-Lansdale, Hill, Danis, & Espy, 2009; Task Force on Research Diagnostic Criteria: Infancy and Preschool, 2003; Moreland & Dumas, 2008). This includes multiple sources of evidence of the validity of preschool DBDs as follows: (1) Preschoolers meeting DBD symptom criteria by parent report are more than twenty 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); (2) Prevalence rates and correlates of DBDs in preschoolers are roughly similar to those in older children (Egger & Angold, 2006); (3) DBD symptoms are associated with developmentally based assessments of disruptive behavior, including observed disruptive behavior (Wakschlag & Keenan, 2001) and self-reported antisocial behaviors on a puppet interview (Kim-Cohen et al., 2005); (4) DBD symptoms demonstrate moderate stability (Moreland & Dumas, 2008); and (5) Preschool DBDs are responsive to empirically validated interventions for disruptive behavior (Webster-Stratton & Reid, 2007).

At the same time, there has been scant attention to the validity of the differentiation of ODD and CD among preschool children. Only a handful of studies of preschoolers have studied CD as a separate disorder. Further, among those studies where ODD and CD are both assessed, the vast majority of preschoolers meeting CD criteria also meet ODD criteria (Egger & Angold, 2006; Keenan et al., 2007). To our knowledge only one study has directly tested the distinctness of ODD and CD in preschoolers (Sterba et al., 2007). Using a sequence of inferential nested $X^2$ difference tests, this study demonstrated a better fit for a combined DBD construct than for diagnostic distinction of ODD and CD.

**Developmental analysis of DSM-IV DBD symptoms**

These early childhood studies have built consensus about the importance of detecting and characterizing DBDs among preschool children. What they lack is a formulation that moves beyond the downward extension of this categorical differentiation of a list of symptoms (which primarily reflect manifestations for adolescent boys) to one which considers clinical patterns as developmentally differentiated. For example, a review of DSM-IV DBD nosology (Wakschlag et al., 2007b) indicates that approximately 1/4 of CD symptoms are *developmentally impossible* in early childhood (e.g., forcible sexual activity, truancy). Approximately 1/3 of CD symptoms are *developmentally improbable* (e.g., fire-setting, stealing with confrontation) for preschoolers. While they may be within the capability of preschool children, they are so unlikely as to be relatively uninformative for clinical identification in this age group (Chacko et al., 2009). The remaining DBD symptoms are largely *developmentally imprecise* (e.g., ‘often loses temper,’ ‘often defies’) for this age period. For example, defiance is a normative expression of autonomy assertion during early childhood (Dix, Stewart, Gershoff, & Day, 2007). Typically, however, normative defiance is fairly modulated and embedded within a repertoire of strategies for adaptive conflict resolution strategies (e.g., verbal negotiation) that also emerge during this age period (Forman, 2007; Kochanska et al., 1998). Thus, while its occurrence is normative, its quality (e.g., flexibility) is particularly pertinent for clinical discrimination (Drabick, Strassberg, & Kees, 2001; Wakschlag et al., 2007a). As a result, the push for application of a uniform symptom set to early childhood may falsely suggest continuity, whereas, in fact, it has poorly identified early childhood disruptive behavior because its determination rests either on extreme, rarely occurring behaviors or commonly occurring normative misbehaviors.

**A multidimensional model of disruptive behavior as a developmentally informed heuristic**

As a framework for a developmentally informed understanding of disruptive behavior, we have proposed a multidimensional model that defines the core dimensions of DBDs as *Temper Loss, Aggression, Noncompliance* and *Low Concern for Others* (Wakschlag et al., 2009) (see Table 1). This multidimensional model is grounded in extensive theoretical and empirical work on disruptive behavior across developmental periods (Briggs-Gowan et al., 2006; Broidy et al., 2003; Frick & White, 2008; Loeber, Farrington, & Van Kammen, 1998; Moffit, 2003; Shaw et al., 2003; Tolan &
Henry, 1996; Tremblay et al., 2004), evidence that different components of disruptive behavior have distinct developmental trajectories and correlates (Burt & Mikolajewski, 2008; Frick & White, 2008; Maughan, 2005; Timmerman, Van Lier, & Koot, 2008), scientific delineation of normal developmental processes and capacities in early childhood (Cole, Martin, & Dennis, 2004; Hay et al., 2000; Kochanska, 1997; Mangelsdorf, Shapiro, & Marzolf, 1995) and clinical presentation of young disruptive children (Tolan, Gorman-Smith, & Henry, 2004; Wakschlag & Danis, 2009). For example, there is substantial support for etiologic distinctions between aggressive and non-aggressive rule-breaking (non-compliance) behaviors and a large body of work supporting a callous subtype of disruptive behavior (Burt, 2009; Frick & White, 2008). This framework also builds on evidence that multidimensional approaches enhance characterization of clinical heterogeneity and contribute to developmental coherence of taxonomies (Clercq, Fruyt, & Widiger, 2009; Frick et al., 1993; Stringaris & Goodman, 2009a). It extends this earlier work by (a) simultaneously focusing on multiple dimensions of disruptive behavior that are clinically meaningful and distinct, rather than focusing predominantly on the distinction between aggressive vs. non-aggressive forms and/or a particular subtype; (b) defining dimensions in a manner that captures the clinical heterogeneity of disruptive behavior in a manner designed to link dimensions to normative developmental processes; and (c) defining relevant behaviors in developmentally meaningful terms for early childhood.

We have recently demonstrated evidence of the fit and validity of this four-dimension model in two independent samples of preschoolers (Wakschlag et al., 2009). In particular, we demonstrated (a) the superior fit of this multidimensional model for explaining and differentiating disruptive behavior in preschoolers when compared to uni-dimensional and two-dimensional models; (b) stability of the dimensions over time; and (c) the unique incremental value of each dimension for diagnostic differentiation of disruptive and non-disruptive preschoolers (Wakschlag et al., 2009).

With this preliminary empirical evidence as foundation, we here utilize this theorized four-dimensional approach as a heuristic framework within which to organize our discussion of the developmentally specified approach to disruptive behavior that follows. We emphasize the dimensionality and multifaceted nature of disruptive behavior as the foundation for a developmentally specified approach for several reasons. First, considering these multiple facets in concert serves as the basis for conceptualizing the defining features of DBDS in relation to developmental variation in presentation and meaning and, ultimately, for capturing clinically meaningful component phenotypes that differentiate heterogeneous patterns reflecting distinct etiologies and intervention needs. Second, the application of a dimensional approach enables conceptualization of a continuum of behavioral tendencies from normative to atypical within developmental context, rather than a more narrow focus on a few extreme behaviors as ‘symptomatic.’ As a result, the question of whether our four theorized dimensions per se are the prototypical elements of DBD and testing these against strong competing alternatives is an important empirical question but not one on which the...
validity of the developmentally-specified approach rests.

Section II: Application of core developmental concepts to conceptualization of preschool disruptive behavior

Developmental concept 1: Organized and coherent patterns of typical development provide critical markers for defining clinical patterns

Despite popular notions of early childhood as a period of unpredictability and upheaval, there is substantial evidence of expectable patterns of behavioral development as early as the first years of life (Kochanska, Tjebkes, & Forman., 1998; Tremblay, 2004). The predictability of these patterns does not imply uniformity – in fact, individual variability is an essential element of this predictability. Rather, the organization and coherence of developmental patterning provides parameters for defining a range of expectable behavior. In the preschool period, this predictability provides a framework within which to identify early deviation from normative patterns as markers of the emergence of psychopathology.

Application to developmental conceptualization of aggression. To illustrate, we draw on developmental research on aggression in early childhood, which is by far the most studied dimension of disruptive behavior (Maughan, 2005). The Aggression Dimension reflects a tendency to respond aggressively including multiple forms, triggers and targets. Contrary to popular conceptualizations just a decade ago, aggression is not primarily a learned behavior. Rather, aggression emerges in the first year of life as a natural way of expressing anger and frustration and becomes increasingly varied and sophisticated during the second year (Hay, 2005; Tremblay, 2003). The decrease in the use of aggression that normatively occurs by the end of the preschool period reflects a developmental progression that includes the increased role of cognitive control in governing behavior, the acquisition of alternative problem-solving strategies and the influence of socialization (Tremblay & Nagin, 2005). There are three defining characteristics of ‘normative’ aggression during early childhood:

Normative aggression during early childhood is common but not frequent. Although aggression is common among preschool children, it is not characteristic. Nearly 3/4 of children have demonstrated some aggression by the age of 2 (Tremblay, 1999). Yet, data from multiple independent samples indicate that less than 10% of 2–3-year-old children are reported by their parents to ‘often’ hit others, even during the phase of early childhood when aggression is at its peak (Baillargeon et al., 2007; Carter, Briggs-Gowan, Jones, & Little, 2003; NICHD, 2004). Observational studies are consistent with this, reporting that aggression is the exception rather than the rule in young children’s interactions with peers (Hay, 2005).

Normative aggression exhibits a predictable developmental progression across the preschool period. Multiple independent studies have assessed the developmental trajectories of aggression in young children. In these studies, aggression is typically assessed via maternal checklist ratings of the subjective frequency (‘never,’ ‘sometimes,’ ‘often’) of a small number of aggressive behaviors. There is convergence of evidence across these and smaller studies using direct observation that: (a) aggression normatively increases in the second year of life and declines across the preschool period beginning at around age 3–3½ (Cote, Vaillancourt, LeBlanc, Nagin, & Tremblay, 2006; Hay, 2005; NICHD Early Childcare Research Network., 2004); and (b) that stably high rates of aggression across the preschool period are not normative (Alink et al., 2006; Shaw, Gilliom, Ingoldsby, & Nagin, 2003; Tremblay, 2003). Thus, there is clear and consistent evidence that both high and escalating rates of aggression are not developmentally expectable during the age period in which the majority of preschool DBD studies have been conducted (Cote, Vaillancourt, LeBlanc, Nagin, & Tremblay, 2006). Further evidence of the atypicality of high and escalating trajectories of aggression and other disruptive behaviors across early childhood is found in their association with well-established early risk markers for disruptive behavior including young maternal age-at-first-birth, prenatal smoking, parental antisocial behavior and coercive parenting (Edwards, Das Eiden, Colder, & Leonard, 2006; Shaw, et al., 2003; Tremblay et al., 2004; Wakschlag, Leventhal, Pine, Pickett, & Carter, 2006), and in their predictive utility for serious antisocial behavior (Cote, et al., 2006).

Distinct forms of aggression are evident even in young children. Reactive aggression reflects affectively driven aggressive outbursts that are ‘reactive’ to frustration, provocation or threat and is often associated with anger (Blair, 2006; Dodge, 1991). In contrast, proactive aggression is goal-directed, planned aggression (e.g., to get back at or dominate someone) (Hay, Castle, & Davies, 2000; Vitato, Gendreau, Tremblay, & Olligny, 1998). Difficulty in making the reactive/proactive distinction is present even in older youth (Blair, 2004). This problem is amplified in the case of young children because of the difficulty of detecting whether aggression is premeditated vs. in response to provocation. Nonetheless, there is evidence that the reactive/proactive distinction is salient in toddlers as young as 18 months of age (Hay et al., 2000). This distinction is also supported by evidence of distinct etiologic
mechanisms (Blair, 2005; Vitaro, Brendgen, & Tremblay, 2002).

In young children, reactive aggression, assessed in terms of aggression in response to frustration, is reported to be a common response within the context of conflict with peers. Its frequency typically declines as verbal and cognitive sophistication increases and alternative conflict resolution strategies emerge (Hay, 2005; Zahn-Waxler, Iannotti, Cummings, & Denham, 1990). Detailed observational studies indicate that young children do not typically initiate conflicts with aggression and reactive aggression is typically used only after alternative strategies have been tried (Hay, 2005; Rubin, Hastings, Chen, Stewart, & McNichol, 1998). In studies of young children, proactive aggression has been measured in terms of ‘aggression out of the blue’ and/or purposefully hurting others. It is rare based on both community surveys and observational studies of young children (Hay, 2005; Rubin et al., 1998). In the Connecticut Early Development Project, reports on the ITSEA indicates that 19% of 2-year-olds and 15% of 3-year-olds are often ‘aggressive when frustrated’ whereas only 1% of children at either age are reported to ‘hurt others on purpose’ (Carter, Briggs-Gowan, McCarthy, & Wakschlag, 2009). Further, observed proactive aggression is associated with maternal ratings of disruptive behavior whereas observed reactive aggression is not (Hay et al., 2000). These findings suggest that assessing multiple forms of aggression rather than aggression more generally may have particular utility for distinguishing clinical symptoms from normative misbehavior during early childhood. Early childhood clinical manifestations may include frequent and multiple forms of aggression, intense, hostile aggression and aggression towards adults (Hay, 2005; Zahn-Waxler et al., 1990; Wakschlag & Danis, 2009).

Developmental concept 2: Features of behavior beyond frequency are critical for distinguishing typical and atypical patterns

There is evidence from normative samples of young children that qualitative distinctions in normative misbehaviors are detectable as early as the second year of life and have predictive significance (Hay et al., 2000; Kochanska, Aksan, & Koenig, 1995). To explicate the implications of this concept for DBD differentiation, we here focus on two of the DBD dimensions, Noncompliance and Temper Loss.

Application to developmental conceptualization of Noncompliance. The Noncompliance Dimension reflects resistance to, and failure to comply with, directives, rules, and social norms. Conceptually it is linked to previous dimensional work on rule-breaking with a broader emphasis on multiple forms of relevance in younger children (e.g., defiance, ignoring, sneakiness) rather than illegal behavior. It is postulated to reflect disruptions in normative internalization of rules (Drabick, Strassberg, & Kees, 2001; Kochanska, Tjebkes, & Forman, 1998; Willoughby, Kupersmidt, & Bryant, 2001).

Compliance begins with a parental directive that is not initially the child’s goal and/or when a parent attempts to limit or guide a child’s action (Forman, 2007). It requires both cognitive comprehension of the request/rule and motivation to comply with standards of conduct (Kochanska & Aksan, 2006). The capacity for externally controlled compliance is present by the second year of life (Kochanska, Coy, & Murray, 2001). Noncompliance, however, actually increases from the toddler to the preschool period (Forman, 2007). This is explained as noncompliance being a manifestation of age-appropriate expressions of emerging independence (Crockenberg & Litman, 1990; Forman, 2007). With increasing sophistication of language (e.g., capacities for symbolizing and reciprocal conversation) and cognition (e.g., capacities for symbolizing, understanding intentionality and perspective taking), qualitative shifts occur in the form and skillfulness of noncompliant behaviors (Kuczynski & Kochanska, 1990). Thus, direct defiance normatively decreases as preschoolers acquire more mature forms of self-assertion (e.g., verbal negotiation). Relatedly, developmental studies have focused on quality of noncompliance as a key distinction between typical and atypical manifestations (Crockenberg & Litman, 1990; Dirks, Henry, Hill, & Wakschlag, 2009; Drabick et al., 2001; Kuczynski & Kochanska, 1990). Normative manifestations of noncompliance have been conceptualized as socially ‘skillful’ and/or ‘assertive’ noncompliance. Assertive noncompliance is defined as a goal-directed, relatively regulated attempt to negotiate or choose an alternative to parental directives. It often involves adaptive behaviors such as verbal negotiation, is affectively positive or neutral and is responsive to redirection. In contrast, problematic noncompliance has been defined as ‘unskilled/defiant,’ i.e., active resistance to control and refusal that is often associated with negative affect (Bates, Petit, Dodge, & Ridge, 1998; Crockenberg & Litman, 1990). This includes ‘doing the opposite’ of what was asked, intransigence, a ‘reflexive no’ that is elicited automatically, and noncompliance in the context of angry outbursts (Wakschlag & Danis, 2009). This distinction has been supported in developmental studies: (a) assertiveness and defiance are negatively associated; and (b) defiance is associated with child disruptive behavior and problematic parenting whereas assertiveness is associated with developmental competencies and promotive parenting (Crockenberg & Litman, 1990; Dix, Stewart, Gershoff, & Day, 2007; Drabick et al., 2001; Kuczynski & Kochanska, 1990). We have also demonstrated the incremental utility of behavioral quality for distinguishing normative misbehavior from disruptive behavior patterns in the preschool period using direct
observations on the Disruptive Behavior Diagnostic Observation Schedule (DB-DOS; Wakschlag et al., 2008a, 2008b). Quality of behavior is operationalized on the DB-DOS in terms of its modulation, i.e., its intensity, flexibility to environmental input and organization (Wakschlag et al., 2007a). Problems in Behavioral Regulation (i.e., noncompliant behavior that is provocative, inflexible and stubbornly defiant) observed on the DB-DOS predict disruptive behavior symptoms and impairment in our clinically enriched sample. For example, observed problems in Behavioral Regulation during interactions with an examiner incrementally increase odds of persistent impairment over and above DSM-IV DBD symptoms (Adjusted Odds Ratio \( AOR = 4.5 \)) (Wakschlag et al., 2008b).

Application to developmental conceptualization of Temper Loss. The Temper Loss Dimension reflects problems in regulation of anger including intensity, frequency and modulation (Cole, Zahn-Waxler, Fox, Usher, & Welsh, 1996; Eisenberg et al., 2000). Problems in regulation of negative emotion have long been identified as core aspects of disruptive behavior (Cole et al., 1996; Eisenberg et al., 2000; Lewis et al., 2008).

As a discrete behavioral manifestation of the DBD Temper Loss dimension, tantrums are perhaps its most studied form. As socially-directed expressions that communicate frustration, anger and distress, tantrums actually reflect a developmental ‘advance’ compared to the diffuse reactivity of infancy (Hay, 2005; Eiron & Potegal, 1994). Temper tantrums have been defined as ‘discrete episodes of excessive temper, frustration or upset manifested by shouting, crying, stamping and/or violence or attempts at damage directed against self, other or property’ (Egger & Angold, 2004). To our knowledge, there are no large-scale longitudinal studies of tantrums in representative samples of preschoolers. In fact, much of what is known about the developmental course of tantrums is derived from small, observational studies conducted between the 1920s and 1960s (Goodenough, 1931) and telephone surveys (Eiron & Potegal, 1994; Potegal, Kosorok & Davidson, 2003). Despite limitations of measurement, these studies provide some basic information on quality of tantrums of relevance to delineation of clinically salient features. Normative tantrums are relatively brief in duration. In Potegal’s sample of 18–60 month-olds, most tantrums lasted less than 1 minute and 75% of tantrums were less than 5 minutes long (Potegal & Davidson, 2003). Poorly modulated tantrums, including intensity of anger expressions, destructive tantrums and difficulty recovering, have been linked to clinical problems in young children (Belden, Thompson, & Luby, 2008; Needleman, Stevenson, & Zuckerman, 1991; Potegal, 2000). Observed Problems in Anger Modulation (i.e., temper loss problems including anger displays on the DB-DOS that are easily elicited, intense and difficult to recover from) are also clinically discriminative. For example, when observed during interaction with the parent, they incrementally increase odds of concurrent impairment above and beyond DSM-IV DBD symptoms and observed problematic parenting (\( AOR = 2.8 \)) (Wakschlag et al., 2008b).

Developmental concept 3: Importance of well-characterized heterotypic continuity

Heterotypic continuity assumes that there is an underlying stability of latent traits across developmental periods combined with a discontinuity in their expression as a result of varying developmental capacities and demands across time (Rutter & Sroufe, 2000). This central tenet of developmental psychopathology is critical to a conceptualization of disorders that is both developmentally meaningful and coherent (Buuka & Gilman, 2002). Yet its consideration in clinical science has been largely theoretical. For example, the current DBD taxonomy has the same symptom set from early childhood through adolescence. Recently developmental scientists have emphasized the need for operationalizing heterotypic continuity by defining disruptive behaviors in a more developmentally meaningful manner (Maughan, 2005; Nagin & Tremblay, 2005; Tremblay, 2000; Tremblay, 2000; Wakschlag et al., 2007b).

Application to developmental conceptualization of Low Concern for Others. For our discussion of the heterotypic continuity construct, we will focus on the dimension of Low Concern for Others. While this dimension has received virtually no attention in studies of preschool DBDs, it is conceptually related to callousness, which has been a central focus in studies of DBDs in older youth and of antisocial personality in adults (Frick et al., 2003; Kotler & McMahon, 2005). At their core, callous affect and disregard of others in directing one’s own behavior (particularly aggression) reflect lack of empathy and the absence of guilt over transgressions (Blair, 2005; Frick & White, 2008). Considerable work by Frick, Blair and others has provided evidence that callous traits are identifiable in youth (Blair, 2006; Frick & White, 2008; Kotler & McMahon, 2005; Obradovic, Pardini, Long, & Loeber, 2007). In particular, callousness is associated with a particular developmental course of DBDs that is likely to be early-onset (Frick et al., 2003; Lynam et al., 2005), more heritable than other forms (Viding, Jones, Paul, Moffitt, & Plomin, 2008), relate to distinct pathophysiology reflecting amygdalar dysfunction and comitant deficits in processing of others’ fear and distress cues (Blair, 2005; Marsh & Blair, in press), and to be marked by reduced responsiveness to alterations in parenting behavior (Wootton, Frick, Shelton, & Silverthorn, 1997). Despite these seminal studies, debate continues in regard to the utility of
callousness for identifying DBDs in youth. Whereas one view stresses the critical importance of early identification of the ‘fledgling psychopath’ (Lynam, 2002), others warn against the foreclosure of consideration of contextual and developmental variation in apparently callous behaviors during the developmental transitions and transformations of adolescence (Seagrave & Grisso, 2002). Similarly, there is worry that this view overemphasizes a set of unchangeable characteristics, as in psychopathy, which may contribute to over-focus on punishment and segregation responses rather than therapeutic efforts for youth (Tolan & Titus, in press). These concerns are amplified in regard to preschool children, as it is difficult to conceive of preschool versions of callous behaviors as they are construed within the context of DSM CD symptoms since many of these are developmentally impossible or improbable.

Thus, conceptualized as a downward extension of severe abnormality such as ‘psychopathy,’ callousness has deterministic connotations that are aversive to many researchers studying young children (Tremblay, 2000). In contrast, we propose a developmental conceptualization of Low Concern for Others as a core disruptive behavior dimension, drawn from examination of behaviors that are linked to normal developmental tasks and capabilities (e.g., empathy and internalization of rules and responsibility to others) and differentiated along a continuum from normative to psychopathological (Fowles & Kochanska, 2000; Wakschlag and Danis, 2009).

We have defined the Low Concern for Others Dimension in terms of disregard of others’ needs and feelings ranging from mild insensitivity to others’ needs and feelings at times of stress to active and pervasive disregard including attempts to cause others distress. Thus, fundamentally, manifesting Low Concern for Others as an indicator of disruptive behavior first requires that its developmental substrates be in place. That is, it requires that children be developmentally capable of internalized knowledge of rules, intentional behavior and sensitivity to others. Of particular relevance to a developmental understanding of Low Concern, Kochanska and colleagues have proposed a differentiated model of conscience in young children comprised of two factors, ‘rule-compatible conduct’ (i.e., abiding by rules and standards independently) and ‘moral emotion’ (i.e., experiencing empathic distress for others’ distress and guilt over rule transgressions) (Aksan & Kochanska, 2005; Kochanska & Aksan, 2006).

Using a series of observational tasks with mothers and young children, they have demonstrated cross-situational consistency and moderate longitudinal stability of these early forms of conscience across early childhood (Kochanska & Aksan, 2006). This work is important for demonstrating that basic capacities for fairly sophisticated rule-governed behavior are in place by the early phase of the preschool period. Thus, persistent social and moral rule violations in young children do not merely reflect inability to inhibit behavior or lack of awareness of fundamental rules and standards, and the developmental substrates of conscience are clearly present in early childhood.

The other key developmental substrate, empathic concern, emerges in its earliest form during infancy and is solidified across early childhood (Zahn-Waxler, Radke-Yarrow, Wagner, & Chapman, 1992). Responsiveness to others’ distress is stably in place by toddlerhood – rates of responding are similar to those of adults (Hay & Cook, 2007). For example, more than half of children as young as 17 months old are reported to ‘sometimes or often’ comfort another child in distress (Baillargeon et al., 2007). Developmentally, this progresses from empathic distress during infancy to instrumental attempts to comfort in toddlers, to representations of ‘how to help another’ by preschool age (Hay & Cook, 2007). With the increased capacity for perspective taking in the preschool period, this is transformed into ‘sympathetic distress’ in which the focus shifts from feeling parallel distress to expressing concern for, or trying to comfort, the other (Hoffman, 2007). Active expressions of concern are also normative in toddlers, including spontaneous sharing and cooperative play (Hay, Castle, Davies, Demetriou, & Stimson, 1999; Zahn-Waxler et al., 1992). Over the course of the preschool years, these expressions of concern become increasingly deliberate and morally informed and emphasize mutual coordination of goals. They also transition from predominant expression within adult–child relations to include peer interactions (Brownell, Ramani, & Zerwas, 2006; Hay & Cook, 2007).

Thus, there is robust evidence from developmental research that preschool age children actively express and act on concern for others and have well-internalized standards for conduct including moral understanding and the capacity for intentional, rule-governed behavior. Yet linkages to clinically significant disruptive behavior in preschoolers have not yet been made empirically. Recently, there has been some work focused on testing downward extensions of callousness to young children (Cornell & Frick, 2007; Dadds, Fraser, Frost, & Hawes, 2005; Kimonis et al., 2006). For example, using minor developmental modifications to the callous/unemotional sub-scale of the widely used Antisocial Process Screening Device (Frick, Bodin, & Barry, 2000), Frick and colleagues assessed the relation of callousness to patterns of aggression in a small sample of preschoolers. In this preschool sample, callousness was distinctly associated with proactive aggression, a pattern consistent with that found in older youth (Kimonis et al., 2006). Within our multidimensional framework, we have suggested that related constructs in early childhood can be captured within the dimension of Low Concern for Others. This dimension is designed to more closely
tap into relevant developmental processes and is conceptualized along a continuum. As conceptualized in early childhood, at the normative end manifestations may include intermittent insensitivity to others (e.g., refusing to share) and/or contextually expectable expressions (e.g., saying mean things to others during a toy dispute). At the extreme end, it represents active disregard for others’ needs and feelings (e.g., ‘takes pleasure in others’ distress,’ ‘does not try to behave after being punished,’ and ‘does nasty things to others “out of the blue”‘; Wakschlag et al., 2007b, 2008a, see Table 1). We have preliminarily examined the reliability and validity of this developmentally-defined Low Concern dimension within both clinically enriched and community samples of preschoolers. Across these two samples, the Low Concern dimension is internally consistent, demonstrates a good fit within a multidimensional model of preschool disruptive behavior, and contributes unique variance to discrimination of disruptive behavior (Wakschlag et al., 2009).

Developmental concept 4: Specification of disruptive behavior heterogeneity is critical for elucidating individual differences in developmental course

Individual differences in behavioral expression, and the interrelation of these behavioral patterns with children’s functioning, are fundamental aspects of establishing the developmental meaning and prognostic significance of clinical patterns (Cicchetti & Rogosch, 1996). Because heterogeneity in the phenomenology and course of disruptive behavior is substantial, there has been considerable interest in DBD subgroups (Maughan, 2005; Nagin & Tremblay, 2005). Unfortunately, however, the current DBD nosology casts a broad and undifferentiated net that is inadequate for specifying variations in mechanisms and targeting treatment for subgroups that may exist within this broad categorization. Here we will focus on three aspects pertinent to meaningful heterogeneity: developmental variations in patterns across time, across contexts and in clustering of symptoms.

Heterogeneity in patterning over time. Developmental timing, including the period in which atypical behavior emerges and relating patterning of disruptive behavior across subsequent developmental periods, has been linked to substantial variation in clinical severity, chronicity and etiology (Moffitt, 1993). ‘Age of onset’ has long been considered important in understanding individual differences in antisocial behavior pathways, with earlier age of onset considered as a critical marker of continuity and chronicity (Tolan & Thomas, 1995). The developmental taxonomy based on onset timing as the marker of differential patterns proposed by Moffitt and colleagues has been particularly influential as a framework for predicting stability and course (Moffitt, 2003; Odgers et al., 2007a). This differentiation of ‘early’ (prior to age 10) versus ‘late’ onset represents the primary sub-types of CD in DSM-IV (American Psychiatric Association., 1994). However, because many DBD symptoms are exaggerations of behaviors that typically onset in early childhood, age of onset as a clinical indicator has limited utility for preschool disruptive behavior (Tremblay, 1999).

It is also of note that, while stability is greater for early-onset groups, discontinuity is more likely than continuity. For example, while disruptive behavior onset during the preschool years is associated with elevated risk of later disruptive behavior (e.g., an age 5 diagnosis of CD is associated with twenty times greater risk of CD at age 7 (Kim-Cohen et al., 2005), only $\frac{1}{2}$ of preschoolers who meet DSM-IV DBD criteria continue to do so 12–24 months later (Kim-Cohen et al., 2005; Wakschlag et al., 2008b). Similar patterns have been reported in studies employing dimensional measures of disruptive behavior in young children (Briggs-Gowan, Carter, Bosson-Hennan, Guyer, & Horwitz, 2006; Campbell et al., 2006; Moreland & Dumas, 2008).

In addition, while conceptualizing stability in terms of relative position to others is informative for predicting relative risk within a group, it is less useful for characterizing intra-individual variation in patterns over time (Tremblay, 2000). Thus, while stability across time and predictive validity have been considered a critical aspect of validating childhood disorders (Moffitt et al., 2007), stability has not typically been measured in a manner that enables the identification of individual differences that have important implications for understanding continuity or discontinuity in specific symptoms. First, it has typically been assessed via correlations between behaviors over time, which provides information about relative tendency rather than an indication of intra-individual change or of the stability of the extent to which such relative tendencies are associated with impaired functioning at a particular point in time (Tremblay, 2000). Second, it does not take into account ‘discontinuous’ forms of disruptive behavior disorders, such as those that onset and remit and perhaps reappear (Angold & Egger, 2007; Moffitt et al., 2007). Different forms of disruptive behavior may have differential stability and intra-individual variation (Briggs-Gowan, Carter, Jones, Wakschlag, & Wagniller, 2008). The limitations of the above approaches are illustrated by reports of inter-individual stability and intra-individual change for discrete disruptive behaviors in a large community sample of toddlers from 17 to 29 months of age (Baillargeon et al., 2007). This study demonstrated both significant stability of inter-individual differences in relative level of problem behaviors and substantial intra-individual discontinuity. For example, many toddlers who frequently
demonstrated a particular disruptive behavior at 17 months were no longer doing so at 29 months and, conversely, toddlers who exhibited a particular disruptive behavior frequently at 29 months often had not done so a year earlier (Baillargeon et al., 2007). It may be that this discontinuity in rate and form reflect imprecise developmental specification of common symptoms and the underlying dimensions they represent. Better specification might lead to discovery of as yet unrecognized developmental patterns over the life course including disorders that: (a) manifest early and continue in the same basic form over time; (b) appear early but then remit; (c) may begin early or onset later, and fluctuate; (d) occur in early life but show substantial increases in prevalence over time; and (e) are rare or nonexistent in early life and onset in later childhood, adolescence or adulthood (Angold & Egger, 2007). Most essentially, it may provide a method to determine if the current a developmental framework overemphasizes stability at the cost of masking meaningful variation in clinical patterns within and across developmental periods.

Heterogeneity in expression across contexts. As noted by Dodge, any assessment of behavior ‘always represents the individual in context’ (Dodge, 1993, p. 286). His seminal work in this area elucidates the situational dependency of disruptive behavior, including distinct association of these patterns to variations in information processing (DeRosier, Cillessen, Coie, & Dodge, 1994; Dodge et al., 2002). We have also previously demonstrated that classroom norms influence manifestations of aggressive behavior in older youth (Henry et al., 2000). Recently, aggressive peer contexts have even been shown to moderate expression of aggressive behavior in genetically vulnerable kindergartners (Van Lier et al., 2007). Considerations of the variation by, and influence of, settings and contexts in which disruptive behavior occurs are not currently incorporated into the DBD nosology. As with older children, there is evidence that cross-situational pervasiveness is associated with severity and persistence of preschool disruptive behavior over time (Campbell, Shaw, & Gilliom, 2000; Wakschlag & Keenan, 2001).

Contextual variation is of particular concern for preschool DBDs because: (a) of concerns that parent–child relationship problems will be ‘misidentified’ as DBDs; (b) contextual variability in behavior is high during this developmental period; and (c) the interactional context in which behaviors occur may be particularly important for determining its ‘developmental expectability’ (Egger & Angold, 2004; Wakschlag et al., 2007a). Exhibiting behaviors in contexts in which they are not ‘expectable’ is associated with disruptive behavior in preschoolers (Dirks et al., 2009). For example, tantrums are developmentally expectable at home with parents during early childhood (Belden et al., 2008). Compared to both typically developing and depressed preschoolers, disruptive preschoolers are more likely to have tantrums in unexpectable contexts, such as at school and in public (Belden et al., 2008). Thus, while cross-context consistency may mark risk and predict continuation, more specific and richer understanding of the meaning of cross-contextual patterns is likely to be illuminating.

We have recently explored patterns of variation in preschoolers’ observed disruptive behavior across interactional contexts using the DB-DOS method (De Los Reyes, Henry, Tolan & Wakschlag, 2009). First, significant variability is common in the extent to which disruptive behavior is displayed with parent, with examiner or both, even in this relatively brief laboratory assessment. For example, of those children exhibiting high levels of disruptive behavior, 55% displayed it only in interaction with their parent, 28% only with the examiner and 17% with both parent and examiner. Thus, for ¼ of those children who displayed disruptive behavior, this behavior depended on the interactional partner they were with. In addition, variations in observed disruptive behavior using the DB-DOS predicted cross-informant discrepancies in parent and teacher reports of disruptive behavior (De Los Reyes et al., 2009). We also have emerging evidence from the DB-DOS that there are sex differences in the clinical meaning of contextual variation in expression of disruptive behavior in young children (Wakschlag et al., 2009a). Observed disruptive behavior during interactions with the parent sensitively discriminate clinically significant disruptive behavior in girls. In contrast, displays of disruptive behavior during interaction with the examiner are most clinically discriminating for boys. In addition, these differences in contextual manifestations of disruptive behavior have differential utility for discriminating children with DBDS and predicting later impairment, even with observed problematic parenting controlled (Wakschlag et al., 2008b). Thus, while cross-context consistency may mark severity, more careful delineation of contextual variations may elucidate individual differences in developmental patterning that point to meaningful subgroups.

Heterogeneity in dimensional clustering. There is increasing consensus that ‘parsing the heterogeneity of conduct problems’ (Lynam et al., 2005) is needed in order to distinguish sub-types with varying etiologies and requiring differential treatment (Tackett, Krueger, & Iacono, 2005). The pattern or ‘constellation’ of disruptive behaviors has been conceptualized as critical to distinguishing normative misbehavior from disruptive behavior in preschoolers (Campbell, 2002) and as a parameter for defining clinical syndromes more broadly (Garber, 1984). However, the limited work to distinguish sub-types in young children has focused predominantly on patterns of comorbidity (e.g., with ADHD or with internalizing
Section III: Towards a developmentally-specified nosology

Thus, taken together, clinical and developmental science provide a reasonable basis for the conclusion that preschool children ‘ain’t [just] misbehavin’ when they exhibit atypical patterns of Temper Loss, Aggression, Noncompliance and Low Concern for Others. However, considerable uncertainty remains about the boundaries of symptoms and misbehavior during this developmental period. The integration of clinical and developmental science provides valuable direction for a re-conceptualization of young children’s disruptive behavior that will rest on empirically derived parameters for making such typical-atypical distinctions.

While there have been important advances in imbuing a developmental approach through studies of older children with the identification of onsetting and related stability and severity patterns, these findings are less directive when the interest is in behavior in early development and initial emergence of symptoms. In addition, preliminary empirical analyses and conceptual advances in normative developmental studies and in clinical characterization of preschoolers suggest much value in a refined conceptualization of disruptive behavior that considers four dimensions or aspects of misbehavior to differentiate emergent psychopathology from normative variation in emotional and behavioral regulation and control. We suggest that such an approach can provide a developmentally-specified nosology that advances understanding and lessens gaps in linkage between studies of normative development, key symptoms across the lifespan that mark DBDs and, potentially important new clinical subgroups. Drawing on the developmental framework elaborated in the preceding sections, below we propose a program of research necessary for putting this theory to the test empirically.

Developmental concept 1: Organized and coherent patterns of typical development provide critical markers for defining clinical patterns.

While there has been some work to characterize epidemiological patterns of behaviors that are thought to represent disruptive behavior, there has been limited mapping of these developmentally. Increasingly, developmental psychopathology is understood as reflecting extremes of normally distributed phenomena (Angold & Costello, 2009). Thus, a fundamental empirical step in demonstrating the utility of this principle is to document the distributional characteristics of behaviors during the preschool period (including typical emergence and desistance when appropriate) as a basis for determining developmentally atypical form and frequency. While one could rely simply on counts of behaviors, such an approach neglects that there are aspects of the behavior other than its topographical appearance that are informative, particularly during a period in which the occurrence of the behavior is common. Without this level of empirical analysis, it will be nearly impossible to determine the developmental patterns of these features and to relate them well to key theorized causes and discrimination of differential course into later childhood and beyond. Most practically, such work could provide the needed benchmarks for what is ‘just misbehaving’ and what warrants more concern during this developmental period. This would provide a badly needed empirical basis for healthcare practitioners to advise parents about their young children’s behavior in a manner that thoughtfully navigates the balance between the risk of over-reaction to expectable developmental upheaval on the one hand and the risk of missed opportunities for early recognition and appropriate intervention on the other.

We agree with Moffitt and colleagues that merely ‘down-aging’ criteria for older children may promote over-diagnosis (Moffitt et al., 2007). In contrast, we theorize that developmental specification would reduce the likelihood of over-identification that would occur when normative misbehaviors are identified as symptoms. In particular, a basic contention of this review is that the four-dimensional, developmentally specified model proposed here will lead to increased reliability of clinical identification (i.e., enhanced sensitivity and specificity). Further, we believe this approach may provide important sensitivity to gender, age, and other demographic variations in typicality that might not be evident in single dimension approaches (e.g., Bennett et al., 1999). We hypothesize that providing a standard developmentally-determined threshold for determining the clinical significance of a behavior will reduce the developmental ambiguities currently inherent in diagnostic identification of preschoolers (Wakschlag & Danis, 2009). For example, by applying advances in benchmarking (e.g., Angold & Costello, 2009; Risi et al., 2006), such an approach may clarify the limited continuity found in current studies including: (a) that only 25–50% of preschoolers identified as meeting clinical criteria for disruptive behavior persist 1–2 years later (Kim-Cohen et al., 2005; Wakschlag et al., 2008b); and (b) in community samples, rates of positive predictive accuracy of disruptive behavior identified in young children are...
as low as 27%, which is unacceptably low for targeted preventions (Bennett, Lipman, Racine, & Offord, 1998).

**Developmental concept 2: Features of behavior beyond frequency are critical for distinguishing typical and atypical patterns**

The important goal of identifying continuities can also lead to overemphasis on single dimensions and discrete separate aspects of behavior (e.g., only physical aggression measured through counts per unit time). While this apparent precision in reliability can be very important for some scientific purposes, it may also obscure that disruptive behavior problems share features with other forms of psychopathology and are clinically distinguished by multiple aspects. As suggested here, to advance understanding of developmental patterns beyond mere frequency counts requires systematically delineating putative qualitative markers of atypicality for each dimension of disruptive behavior based on extant developmental science and clinical observational methods (Wakschlag et al., 2008b). We hypothesize that inclusion of qualitative indicators will increase the likelihood that ‘true’ disruptive behavior in preschoolers will be captured (i.e., reduce false negatives). Children with milder forms of disruptive behavior that are not pervasively present are particularly likely to be ‘missed’ based on frequency alone. The addition of qualitative indicators may also increase specificity because it would address the issue of restricted range of clinical criteria resulting from the developmental impossibility and improbability of many of the current symptoms. This is consistent with the notion that clinical determination in early childhood requires a more diverse and broader symptom net because of the high rates of behavioral variability (Weems & Stickle, 2005).

In addition, the consideration of this developmentally specified, four-dimensional model should improve differentiation from other syndromes. Sole reliance on presence/absence or frequency criteria for a broadly defined behavior (e.g., ‘often loses temper’) is likely to hamper consideration of other qualities that differentiate etiology and clinical presentation demarcating from other syndromes (Crowe & Blair, 2008). For example, multiple childhood-onset psychopathologies have irritability (a defining aspect of our Temper Loss dimension) as a central feature including ODD, ADHD, depression, anxiety and bipolar disorder (Baroni et al., 2009). Thus, in preschoolers, high rates of tantrums appear to be a non-specific risk factor as they similarly increase odds of conduct problems, anxiety and depression more than tenfold (Egger, 2003). Determining if this reflects a shared etiology and syndromic overlap or reflects imprecise measurement is critical for advancing identification, intervention, and eventual understanding of cause (Baroni et al., 2009). Thus, our multidimensional approach recognizes shared or even general processes affecting psychopathology risk, but contends that it is the nexus of these four specific aspects of behavior that mark the presence of disruptive behavior disorders and distinguishes DBDs from other psychopathologies that might have overlapping features. In fact, by comparing carefully measured aspects of multiple dimensions of behavior in a developmentally meaningful fashion, extent of overlap and distinctions and commonalities can be empirically established.

**Developmental principle 3: Importance of well-characterized heterotypic continuity**

Empirical demonstration of heterotypic continuity in the face of variation in form and presentation of symptoms at different life stages is an important task in testing the validity of a developmentally conceived understanding of disruptive behavior or any disorder (see also Viding et al., 2005, 2008; Weems & Stickle, 2005). One critical basis for the approach presented here is that downward extension of symptoms that characterize disruptive behavior in adolescence and perhaps even late childhood overlooks, and may even prevent, due consideration of different presentations and key symptoms at varying points in the life course. Thus, while we are suggesting that our proposed developmentally-specified, four-dimensional approach to preschool disruptive behavior has utility for a lifespan approach, we are cognizant that strict ‘upward extension’ of this approach may have similar limitations. To empirically test for the lifespan coherence of the model, the continual related explanatory value of each dimension needs to be demonstrated. For example, noncompliance would need to be characterized developmentally across each of multiple developmental periods to test whether there is underlying clinical continuity between behaviors such as a ‘reflexive no’ at preschool age and inability to ‘take direction’ from supervisors in adulthood. Further, this more narrowly specified approach should provide stronger relation to distinct neurodevelopmental mechanisms postulated to represent etiological differences between disruptive behavior and other disorders and to make useful phenotypic distinctions (Dickstein & Leibenluft, 2006). For example, callousness in youth (related to our Low Concern dimension) is associated with deficits in forming stimulus–response associations (Blair et al., 2006). In contrast, deficits in the ability to inhibit pre-potent responses in the face of shifting environmental contingencies have been associated with problems in regulation of temper (Carlson & Wang, 2007). Key to the empirical testing of this hypothesis are the requisite developmental specification of the dimensions across developmental periods and demonstration of consistent associations to particular mechanisms across developmental periods.
Developmental concept 4: Specification of disruptive behavior heterogeneity is critical to elucidating individual differences in developmental course

Here we hypothesize that the developmentally specified, multidimensional approach will enhance ability to reliably characterize and differentiate subgroups with distinct etiologies and developmental courses by parsing the very heterogeneous group which currently falls within the broad DBD syndrome. Supporting this are recent data in which a multidimensional characterization of oppositional behavior was applied to a school-age sample. Stringaris and Goodman (2009b) have recently demonstrated enhanced utility for predicting which variations in oppositionality relate to greater probability of later ADHD, CD, and internalizing disorders. If coherence of multidimensional configurations of disruptive behavior is demonstrated across developmental periods starting in early childhood, person-based configural identification has the potential to substantially improve differentiation of likely course from very early in life with strong corollary implications for prevention.

These subgroup distinctions should also deepen understanding of differential responsiveness to treatment for the current empirically-validated interventions that are applied to the broad range of children with DBDs. While parenting interventions are among the most efficacious for disruptive behavior starting in early childhood, success rates are often limited and little is known about differential effectiveness (e.g., Fernandez & Eyberg, 2009; Gorman-Smith et al., 2002). At its core, the proposed developmentally specified approach is defined as deviation from normative developmental processes that enables mapping of narrowly defined dimensions to causal heterogeneity. As a result, it provides a strong basis for hypothesis-driven generation of differential mechanisms based on configurations of dimensional scores that could be related to variations in intervention needs and response.

Two recent studies with older children provide a glimpse of this with relevance to our Low Concern and Temper Loss dimensions. Boys identified as callous/unemotional (akin to Low Concern in our model) were less responsive to parent training (independent of parental success at treatment implementation; Hawes & Dadds, 2007). This differential response pattern was hypothesized based on deficits in forming stimulus–response associations linked to callousness in another study (Blair et al., 2007). This could also mean that different treatment emphasis is needed when Low Concern is evident. For example, children high on the dimension of Low Concern for Others might be responsive to the reward elements of parent management interventions but not its disciplinary components (Hawes & Dadds, 2007). In contrast, children high on Aggression might be more responsive to cognitive behavioral approaches that employ techniques such as social problem-solving to reduce hostile attribution biases (Lewis et al., 2008). Testing the value of this developmentally specified four-dimensional model in explaining moderation of intervention effects compared to current and other conceptual models is an essential component of demonstrating incremental utility of developmental-specification.

Conclusion

As has been aptly noted, a compelling case that is empirically grounded and clinically relevant must be made in order to justify substantive changes to existing classification systems (Moffitt et al., 2007). However, there is also widespread agreement that existing systems are insufficiently informed by developmental principles, imprecise in regard to discriminating underlying dimensions, minimally informative about the relation and boundaries between the broad range of normative misbehaviors and psychopathological forms of disruptive behavior, and of limited utility in explaining variation and continuity over the lifespan and in response to intervention (Helzer & Hudziak, 2002; Nigg et al., 2005; Pine, 2008). The substantial overlap of normative misbehavior and defining features of disruptive behavior during early childhood provides a particularly advantageous opportunity to examine whether a nosology that is defined in relation to deviation from normative developmental course is achievable. It also provides the opportunity to test for incremental advances in understanding of differential presentation, pathways, and etiology and whether such developmental specification provides the theorized sharpening of distinctions between disruptive behavior syndromes and typical behavior and between disruptive behavior and other syndromes with related features. We contend that the substantial work necessary to test the value of developmental specification is likely to have considerable yield – one that extends to a broad range of disorders across the lifespan (Angold & Egger, 2007; Pine, Cohen, Cohen, & Brook, 1999; Seagrave & Grisso, 2002; Weems & Stickle, 2005).

The premise of this paper is that the basis for such a substantial shift can be identified by linkage of normative developmental studies to clinical research and formulations grounded in developmental psychopathology. This will enable undertaking of the necessary work for testing a four-dimensional, developmentally specified model of disruptive behavior beginning at preschool age. Clearly the evidence linked here is disparate and contains substantial gaps in how reconcilable it is or in how directive it is about our four theorized dimensions specifically. Thus, it is not intended as a fully coherent and complete framework. Rather it is
meant as a starting point from which to catalyze a program of research that can help move beyond theoretical debate about the utility of developmentally based approaches to a scientific basis for evaluating this critical issue. Ultimately, the true test of the added value of this, or any, developmentally specified nosology for DSM-V and beyond will be measured in terms of its capacity for improved sensitivity and specificity, early reliable identification, and stronger and more direct linkage to distinct mechanisms that can be efficiently translated to the development of novel, targeted prevention and treatment.

Acknowledgements

The writing of this paper has been supported by NIMH grants R01MH68455 to Dr. Wakschlag, R21MH07478001 to Dr. Leventhal, CDC grant U49/CE 000732, NICHD grant RO1HD042030 and NIDA grant RO1DA020829 to Dr. Tolan and the Walden & Jean Young Shaw and Children’s Brain Research Foundations. This work has been importantly shaped by collaborations and critical discussions with our colleagues, R. James, R. Blair, Margaret Briggs-Gowan, Alice Carter, Edwin Cook, Jr., Barbara Danis, Helen Egger, Kimberly Espy, Nathan Fox, Deborah Gorman-Smith, David Henry, Carri Hill, Kate Keenan, Ellen Leibenluft, Catherine Lord, Daniel Pine, Chaya Roth, and Michael Schoeny, and our students, Anil Chacko, Melanie Dirks, Andres De Los Reyes, and Miwa Yasui.

Key points

• The adevelopmental nature of the current DBD nosology hampers accurate identification of preschool disruptive behavior. This is because of the difficulty distinguishing the normative misbehavior of this developmental period from disruptive behavior symptoms.

• Developmental science provides a method to specify expectable patterns of normative misbehaviors during early childhood, and clues about features of behavior that may serve as clinical indicators based on deviations from developmentally typical patterns.

• Integration of development and clinical science is a critical foundation for generating and testing a developmentally specified nosology.

• The benefits of developmental-specification include its promise for precise phenotypic characterization, elucidating causal heterogeneity and serving as the basis for novel, targeted interventions.

References


Cornell, A., & Frick, P. (2007). The moderating effects of parenting styles in the association between behavioral inhibition and parent-reported guilt and


review and a research agenda. In B. Lahey, T. Moffitt, & A. Caspi, (Eds), Cause of conduct disorder and juvenile delinquency (pp. 49–75). New York: Guilford Press.


Manuscript accepted 28 August 2009