

Developmental Emergence of Disruptive Behaviors Beginning in Infancy

Delineating Normal–Abnormal Boundaries to Enhance Early Identification

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Disruptive behavior is one of the earliest-onset psychopathologies, whose serious form is nearly always expressed in some manner before age 5 years (Shaw, 2013; Tremblay, 2008). It is also common and predictive of diverse problems across the lifespan (Keenan et al., 2011; Odgers et al., 2008). Over the past decade, advances in developmental science, and their application in clinical studies, have achieved broad-based consensus that clinically significant disruptive behavior is present and can be reliably and validly identified at preschool age (Bufferd, Dyson, Hernandez, & Wakschlag, 2016). These advances have changed the nature of scientific discourse from *whether* early childhood disruptive behavior exists to *how* it manifests and *what* developmental atypicalities subserve it (Bufferd et al., 2016). This is the theme of this chapter, following a neurodevelopmental roadmap we have recently delineated (Wakschlag, Petitclerc, Estabrook, Burns, et al., 2017).

This neurodevelopmental approach integrates principles of developmental psychopathology and novel conceptualizations of the underpinnings of mental disorder, such as the Research Domain Criteria (RDoC) (Bufferd et al., 2016). In broad terms, “neurodevelopmental” is defined as the developmental unfolding of behavior underpinned by brain maturation, through interactions among brain systems (Mittal & Wakschlag, 2017). *Neurodevelopmental*

mental disorders connote deviations or delays in behavioral and psychological function due to delays or deviations in brain development (Casey, Oliveri, & Insel, 2014; Mittal & Wakschlag, 2017). Although the majority of early childhood psychopathology research has focused on the preschool period, here we expand our lens to include the infant–toddler period given increasing evidence that emergent disruptive behavior risk is detectable even earlier in development (Carbonneau, Boivin, Brendgen, Nagin, & Tremblay, 2016; Hay et al., 2014; Lorber, Del Vecchio, & Slep, 2015). This subverts the goal of targeting prevention at the earliest possible phase of the clinical sequence to root out chronic mental disorder pathways at their origins (Casey et al., 2014). Increased effectiveness of prevention in early life emanates from the amelioration of adverse developmental cascades that amplify risk and leveraging of the heightened experience-dependent neuroplasticity of early childhood (Bornstein, Hahn, & Suwalsky, 2013; Luby, 2012). We and others have recently called for identification of disruptive behavior as a neurodevelopmental syndrome across the lifespan (Raine, 2018; Wakschlag et al., 2018).

The defining features of disruptive behavior are problems in modulation of irritability, and resistance and/or insensitivity to social rules and considerations (Frick & Nigg, 2012; Wak-

schlag, Tolan, & Leventhal, 2010). In its early childhood-onset form, it is a neurodevelopmental condition that is clinically expressed in early life and associated with impaired developmental capacities across the life course, and an atypical neurodevelopmental course (Wakschlag et al., 2018; White, Moffitt, Earls, Robins, & Silva, 1990). Consistent with the broad class of early childhood-onset neurodevelopmental conditions (Pine & Fox, 2015), it reflects abnormalities in salient behavior and physiology that manifest early and portend developmental impairments in multiple systems, and have perinatal roots, multifactorial origins, and clear genetic components (Massey et al., 2017; Rhee et al., 2016; Van Goozen, Snoek, Fairchild, & Harold, 2007). Self-regulation, internalization of rules, and social problem-solving are the core developmental tasks of the early childhood period. These developmental capacities are gradually consolidated across early childhood via push-pull transactions with the environment and are particularly tenuous in the face of demands and transitions, as well as frustration with frequent limit-testing and “setbacks” (Brownell & Kopp, 2007; Wakschlag et al., 2010). Normative misbehaviors typically emerge after the first birthday, when developmental progression enables autonomous function motorically and communicatively, and when differentiated thought processes enable comprehension of intentionality of action and means-ends relationships (Hay, 2005). The intentionality and directedness of these misbehaviors represent developmental progression from the more diffuse reactivity of early infancy (Hay, 2005).

As a result, the normative misbehaviors that are a hallmark of early childhood (i.e., aggression, temper tantrums and noncompliance) are also defining symptoms of the disruptive behavior disorders in clinical classification systems (Wakschlag, Leventhal, & Thomas, 2007). Thus, the normal-abnormal distinction is the major challenge to accurate clinical identification in this age period. Fortunately, advances in developmental measurement, as well as the integration of clinical, developmental, and neuroscientific methods, have led to major breakthroughs in this area over the past decade.

Key to a developmentally resonant understanding of early childhood disruptive behavior is the conceptualization of a dimensional, developmental phenotype, with risk for impairment and persistence varying along this normal-abnormal continuum (Wakschlag et

al., 2015). Dimensional approaches to psychopathology are increasingly embraced across the lifespan (Cuthbert, 2005), but they are particularly crucial in early childhood. This is because the defining features of early development (i.e., rapid change and extensive normative variation) require an approach emphasizing probabilistic risk and accounting for the likelihood of developmental recovery and growth. This is necessary to distinguish transient perturbations from early expression of atypicality that mark high risk for a chronic clinical pattern (Sroufe, 1990; Wakschlag et al., 2010). Explicating this more nuanced developmental approach for conceptualization of early childhood disruptive behavior is the major thrust of the chapter.

The much-discussed conundrum for early identification of disruptive behavior is as follows: On the one hand, its serious and chronic form virtually always appears by the age of 5 years with severe and negatively cascading effects, making its early prevention and amelioration of substantial importance to public health across the lifespan (Shaw & Taraban, 2017; Tremblay & Japel, 2003). On the other hand, the nondevelopmental nature of traditional classification systems impedes accurate identification, with the risk of overidentification (e.g., oppositional defiant disorder [ODD] is developmentally imprecise) and underidentification (e.g., many conduct disorder [CD] symptoms are developmentally impossible). The historical controversy regarding the validity of preschool psychopathology has centered around the significant challenge of differentiating atypical markers from complex features of early development (Campbell, 2002; Cole, Luby, & Sullivan, 2008; Wakschlag et al., 2010).

Decades of foundational work using broad behavioral checklists and a DSM approach have been crucial for establishing that clinical syndromes exist and are identifiable in young children, despite lack of clinical sensitivity and specificity in the former, and the nondevelopmental approach in the latter (Chacko, Wakschlag, Hill, Danis, & Espy, 2009; Wakschlag, Briggs-Gowan, et al., 2007). Modest strides have been made over the past decade in accounting for developmental features of disruptive behavior phenotypes in the DSM. For example, DSM-IV cautioned against diagnosis of ODD in early childhood because of the difficulty in distinguishing normative misbehavior from clinical symptoms (American Psychiatric Association, 2000). With robust evidence that

disruptive behavior can be reliably and validly identified in preschoolers, DSM-5 no longer excludes ODD diagnoses in young children. Although symptoms remain unchanged (presenting the “imprecision” challenge due to the high overlap of tantrums and defiance in normative misbehavior), a developmental modification is the higher-frequency threshold for clinical identification in children under age 5 (i.e., behaviors occur on most days vs. weekly in older children; American Psychiatric Association, 2013; Frick & Nigg, 2012). Of note, however, the new disruptive mood dysregulation disorder (DMDD), which essentially reflects cross-cutting irritability symptoms, such as tantrums that have high overlap with ODD, continues to exclude children under 6, despite the fact that temper tantrums are a defining feature of clinical presentation in young children (Belden, Thompson, & Luby, 2008; Carlson, Danzig, Dougherty, Bufferd, & Klein, 2016; Keenan & Wakschlag, 2000). Furthermore, there has not been meaningful progress in DSM-5’s developmental conceptualizations of CD. In DSM-5, CD symptoms continue to be reflective of the adolescent phenotype of antisocial behavior (e.g., truancy, vandalism), precluding identification of the early phase of this clinical sequence that clearly has roots in early childhood. For example, observed disregard for others in young toddlers predicts adolescent CD symptoms (Rhee et al., 2013), and pathophysiological substrates of callous pathways (e.g., fear processing deficits) are detectable in very young children (Mills-Koonce et al., 2015; White et al., 2016).

Another step forward in the conceptualization of an early childhood disruptive behavior phenotype that more closely reflects clinical presentation in young children lies within the recently revised *Diagnostic Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood* (DC:0–5; Zero to Three, 2016). In DSM, oppositional defiant behaviors have traditionally been conceptualized as a developmental precursor to more severe antisocial patterns as represented by CD (Loeber & Burke, 2011). However, rather than an ordered emergence of increasingly severe phenomenology, this pattern may well reflect a methodological artifact. Specifically, CD symptoms largely reflect a male adolescent delinquency phenotype, with symptoms that are mostly developmentally impossible or improbable (Wakschlag, Leventhal, et al., 2007). Research at

younger ages fails to support this traditional developmental sequence, as noncompliance, aggression, and tantrums commonly co-occur as the presenting features of early childhood disruptive behavior (Sterba, Egger, & Angold, 2007; Wakschlag, Leventhal, et al., 2007). Reflecting this pattern, DC:0–5 proposes a unitary “dysregulated anger and aggression disorder of early childhood,” that includes more developmentally oriented features of irritability, non-compliance, and proactive–reactive forms of aggression. This is an important step forward, as it has clearly defined symptoms in a more developmentally meaningful manner (e.g., defiance takes comprehension into account). However, although clearly informed by clinical and developmental knowledge, it lacks empirical grounding. For example, frequency criteria (e.g., “more days than not”) are not empirically derived. These developmental modifications of nosological systems are a step in the right direction.

We believe that advances at the interface of developmental–clinical science now call for a fundamental paradigm shift toward a developmental specification approach (for detailed discussion of the developmental specification approach, see Wakschlag, Petittlerc, Estabrook, Roberts, et al., 2017). We emphasize this paradigm shift in this chapter (for reviews of preschool disruptive behavior within the DSM framework, see Bufferd et al., 2016; Dougherty et al., 2015; Egger & Angold, 2006). The crux of the developmental specification approach is pinpointing those features that enhance normal–abnormal distinctions within a developmental period (Wakschlag et al., 2010). In particular, the following developmental features have proven challenging for early identification: (1) the rapid pace of developmental change and skills acquisition (measured in weeks and months, not years); (2) the extensive normative variation, which includes transient perturbations that are self-righting; and the (3) overlap of normative misbehavior with symptoms. Below we highlight a burgeoning science base that explicates how developmental features such as these may be harnessed to improve clinical identification of early childhood disruptive behavior.

To do so, we draw on a multidimensional framework we have developed and validated across multiple, independent samples. We draw on a developmentally sensitive toolkit specifically designed to differentiate early childhood

normative misbehavior from emergent disruptive behavior, that is, the Multidimensional Assessment Profile of Disruptive Behavior (MAP-DB) survey, and the Disruptive Behavior Diagnostic Observation Schedule (DB-DOS) standardized clinical observation (Wakschlag et al., 2014; Wakschlag, Briggs-Gowan, et al., 2008; Wakschlag, Hill, et al., 2008). Both measures are derived from a shared developmental specification framework emphasizing features that more effectively enable normal–abnormal distinctions within developmental context (e.g., frequency, (dys)regulation, and developmental expectability in context; Bufferd et al., 2016; Wakschlag, Briggs-Gowan, et al., 2007; Wakschlag, Petittclerc, Estabrook, Burns, et al., 2017). “Regulation” refers to the intensity, flexibility, and organization of behavior. “Expectability in context” assesses whether a context typically elicits particular types of responses (Cole, Martin, & Dennis, 2004; Goldsmith & Davidson, 2004). The MAP-DB and DB-DOS were originally developed for preschool-age children, but now include an infant–toddler version, as well as a version for older children. The MAP-DB has the advantages of the efficiency of a survey (including short forms), enabling population level norms. In contrast, the DB-DOS is a more intensive, performance-based assessment designed for laboratory administration. Table 24.1 provides examples of informa-

tion derived from the MAP-DB and DB-DOS for irritability and noncompliance.

The DB-DOS was developed to provide an efficient clinical tool to increase the likelihood that disruptive behaviors will actually be observed during clinical assessment. It is a standardized method of clinical observation that provides unique information about contextual variation in the child’s capacity to regulate behavior across varying demands (e.g., fun, waiting, frustration) and social contexts (e.g., with parental and nonparental adults). Interactions with parent and examiner are observed to maximize ecological validity while the extent to which systematic scaffolding enables regulation is also observed (Wakschlag et al., 2005). Examiner/clinician behavior is loosely standardized (e.g., a hierarchy of prompts is used for responding to disruptive behavior to ascertain the minimal level of support a child needs to reestablish equilibrium), with emphasis on examiner use of the self and astute clinical observation (Danis, Hill, & Wakschlag, 2009). Behaviors are coded along a qualitative continuum (0–3) ranging from normative/expectable to clinically concerning, along domains of problems in anger modulation (e.g., extent to which irritability is easily elicited and difficult to recover from) and behavioral regulation (e.g., pervasiveness, recalcitrance, and intensity of noncompliance), with coded behaviors based

TABLE 24.1. Illustrative Reported and Observed Irritable and Noncompliant Behaviors

MAP-DB items (parent report) “How often over the past month did your child . . . ?”	DB-DOS (observed behaviors) Parent and examiner contexts coded separately
<u>Irritability</u>	
<u>Temper Loss Scale</u>	<u>Anger Modulation Factor</u>
<i>Have temper tantrums . . .</i> at clean up, during routines, that were destructive, out of the blue	<i>(Dys)regulation of irritability</i> (e.g., rapid escalation, difficulty recovering, coping strategies, pervasiveness across contexts)
<i>Irritable mood . . .</i> act irritable, stay angry a long time, have a short fuse	
<u>Noncompliance</u>	
<u>Noncompliance Scale</u>	<u>Behavioral Regulation Factor</u>
<i>Resist directions . . .</i> say no, act stubborn, ignore, refuse, automatically resist	<i>(Dys)regulation of noncompliance</i> (e.g., passive noncompliance, active noncompliance, provocativeness, behavioral inflexibility, pervasive across contexts)
<i>Disobey provocatively . . .</i> break rules when you were watching, show off while misbehaving, misbehave dangerously	

on global ratings from normative to clinically concerning.

The MAP-DB translates many of the qualitative constructs and importance of contextual variation gleaned from the DB-DOS into a survey tool. For each MAP-DB dimension, the survey includes both normative misbehaviors (e.g., has a temper tantrum) and dysregulated behaviors (e.g., tantrums until exhausted). Behaviors are queried across a range of contexts (e.g., with parents, with other adults), and eliciting triggers (e.g., “when tired, hungry or sick,” “out of the blue”). The MAP-DB framework emphasizes a dimensional approach that characterizes behavior across an ordered spectrum from normative, commonly occurring behaviors to severe, rarely occurring behaviors using item response theory (IRT) methods. Dimensions reflect the defining features of disruptive behavior, that is, Temper Loss, Noncompliance, Aggression, and Low Concern for Others characterized in terms of deviation from normative developmental processes (Wakschlag, Henry, et al., 2012).

Conceptualizing Disruptive Behaviors along a Dimensional Spectrum

There is increasing consensus that clinical phenomenology is best conceptualized in dimensional terms. Dimensional approaches are based on the assumption that risk cannot be defined by a single extreme threshold, but rather is expressed along a spectrum of probabilistic risk. This is especially important during early childhood given the well-established challenges to clinical identification. While dimensional approaches have long been a cornerstone of the developmental psychopathology approach (Achenbach, 1997), assessments have typically

been counts of problem behaviors rather than characterization along an ordered spectrum. One novelty of the MAP-DB is the inclusion of both normative and problem behaviors so as to capture the full behavioral spectrum of expression. This requires conceptualization of atypicality as deviation from expectable patterns within the early childhood period, and operationalization of age-typical expression.

This multidimensional framework is defined in terms of four core dimensions of developmental processes: Temper Loss and regulation of frustration; Noncompliance and internalization of rules; Aggression and capacity to modulate aggressive tendencies, and Low Concern for Others and the development of empathy and conscience (for explication of these developmental processes and how they go awry, see Bufferd et al., 2016; Wakschlag, Henry, et al., 2012; Wakschlag et al., 2010). Using IRT, we have demonstrated the validity of this MAP-DB multidimensional model and the developmental continuum (Wakschlag et al., 2014). Table 24.2 provides illustrative items across the severity spectrum by dimension. These psychometric findings confirm our theory that dysregulation and developmental expectability are major differentiators of atypicality in young children. For example, having a tantrum is expectable when a child is exhausted, but inconsolable tantrums are not. Similarly, saying “no” when asked to do something is a hallmark of young children’s autonomy struggles, but provocative misbehavior is not developmentally typical.

We have also demonstrated clinical and neurodevelopmental validity for the dimensions. For example, we have shown a linear increase in clinical risk along the dimensional spectrum of irritability. Young children with Temper Loss scores typically considered normative (i.e., one

TABLE 24.2. Exemplars of Behaviors across the Normal–Abnormal Continuum for MAP-DB Disruptive Behavior Dimensions

	Developmentally expectable (mild)	Moderate	Severe
Temper loss	Tantrums when tired/hungry/sick	Has difficulty calming down when angry	Has tantrums until exhausted
Aggression	Aggressive when frustrated	Hit someone with an object	Hurt someone on purpose
Noncompliance	Say no	Does exactly what you said not to do	Shows off/laughs while misbehaving
Low concern for others	Does not care about others’ feelings when upset	Seems indifferent to pleasing others	Enjoys making others mad

Note. Patterns derived from IRT analyses. Severe behaviors are above the 95th percentile threshold (Wakschlag et al., 2014).

standard deviation from the population mean) had a 67% probability of clinically impairing symptoms, a risk that increased to 83% at two standard deviations above the mean (Wakschlag et al., 2015). Evidence of the clinical and neurodevelopment utility of narrow-band disruptive behavior phenotypes is most extensive for irritability and early callous behavior, which we use as examples here (for review, see Wakschlag, Petclerc, Estabrook, Roberts, et al., 2017).

A major driver of our multidimensional approach is our clinically and theoretically derived hypotheses that parsing early childhood disruptive behavior features would uncover differential patterns of developmental atypicality (Garber, 1984; Wakschlag et al., 2010). In particular, we theorized that some features of early childhood disruptive behavior that reflect normative misbehaviors represent differences in degree, which are exaggerations of expectable early childhood behaviors. This is consistent with the notion that it is not whether disruptive behavior is present, but when and how it is expressed that is key for clinical differentiation in early childhood (Buss, 2011). Thus, commonly occurring misbehaviors that most young children engage in as part of their normative push to autonomous action (e.g., tantrums and noncompliance) must occur very often to be clinically concerning. In contrast, behaviors that reflect fundamental insensitivity to the needs and feelings of others are differences in kind, but their presence per se is pathognomonic. Callous behaviors exemplify this pattern, as typical responsiveness to others' distress is evident in the neonate. Psychometric findings across two large independent samples in the MAP-DB study confirm this theory psychometrically (for details, see Wakschlag, Petclerc, Estabrook, Roberts, et al., 2017). For example, many MAP-DB Temper Loss behaviors have occurred in the past month in more than 50% of preschoolers (83.7% had a tantrum). Furthermore, many developmentally expectable behaviors (e.g., tantrum during daily routines) were below the psychometrically derived 95th percentile severity threshold (Wakschlag, Choi, et al., 2012). Those irritable behaviors at the high end of the severity spectrum (e.g., aggressive or destructive tantrums) were dysregulated and rarely occur. However, daily tantrums are not normative and occur in less than 10% of preschoolers (Wakschlag, Choi, et al., 2012). In contrast, callous behaviors, as captured within the MAP-DB Low Concern for Others scale,

rarely occur. On the MAP-DB, none of them was endorsed in more than 50% of preschoolers over the past month, and all exceed the 95th percentile severity threshold (Wakschlag et al., 2014). Despite this, a severity spectrum is evident, with contextually bound expressions of low concern being milder and more common (e.g., not caring about others when frustrated, angry, or upset) versus proactive cruelty toward others (e.g., doing things to humiliate others) being most severe.

Irritability

There is a long and extensive history of research identifying infant temperamental features such as “difficultness” and “negative affectivity” as risk factors for psychopathology (Krieger & Stringaris, 2015; Lengua, West, & Sandler, 1998; Rothbart, Posner, & Hershey, 1995). However, these are neither sensitive nor specific because temperament measures are designed to capture the range of normative variation rather than the full normal–abnormal continuum, and they often capture a range of features that comprise multiple syndromes (e.g., negative affectivity may include not only a predisposition to respond to frustration with anger but also an anxious temperament and a withdrawn mood). The burgeoning of clinically oriented irritability research also rests on an extensive developmental literature on typical and atypical emotion regulation processes in early childhood. Irritable mood and behavior are normatively heightened during early childhood as increased capacity leads to enhanced frustration with environmental limits (Deater-Deckard & Wang, 2012). Emotion regulation, which involves both top-down arousal processes and bottom-up control processes, is the key developmental capacity undergirding modulation of irritability (Deater-Deckard, Petrill, & Thompson, 2007; Nigg, 2016). Early executive function capabilities support self-regulation of anger and modulation. These capabilities become increasingly sophisticated across the preschool period (Blair, Zelazo, & Greenberg, 2005; Perlman, Huppert, & Luna, 2016), most likely due to growth during early childhood of cortical structures mediating anger regulation, with most rapid growth from birth to 2 years, and 90% of adult brain volume achieved by age 6 years (Bullins, Jha, Knickmeyer, & Gilmore, 2017).

Via more clinically oriented irritability measures, at least 10 independent studies have

demonstrated clinical and predictive utility of preschool irritability (Wakschlag, Petittclerc, Estabrook, Burns, et al., 2017). Early irritability has specific and incremental utility for later mood and disruptive disorders and impairment, above and beyond DSM symptoms (Wakschlag et al., 2015). There is also evidence that dimensional variation in irritability is associated differentially with prefrontal cortex (PFC)-driven regulation. In particular, work led by Perlman and colleagues has demonstrated differences along a dimensional spectrum, with differential neural regulatory abilities based on level of irritability and impairment. For example, preschool children who are dispositionally, but not clinically, irritable display increased lateral PFC activation during a task requiring cognitive flexibility relative to nonirritable children (Li, Grabbell, Wakschlag, Huppert, & Perlman, 2017). One particularly intriguing finding highlights the utility of dimensions for explicating complex neural patterns. Specifically, variation in irritability severity is linked to reward processing in an inverted-U pattern (Grabbell et al., 2018). In particular, both low irritable and severely irritable preschoolers have lower levels of dorsolateral PFC (DLPFC) recruitment during frustration, whereas dispositionally irritable preschoolers who are not impaired recruit DLPFC more heavily. This inverted U-pattern points to the possibility that developmentally typical versus atypical reward processing may be a pathophysiological mechanism associated with the transition from vulnerability to clinical disorder in young children at risk for irritability-related psychopathology (Grabbell et al., 2018).

Callous Behavior

In contrast, callous features of disruptive behavior have been understudied in early childhood psychopathology research, due in part to the developmentally impossible and improbable nature of CD symptoms (Wakschlag, Leventhal, et al., 2007). This is unfortunate because this marker of more severe antisocial behavior pathways reflects fundamental deficits in another core developmental task of early childhood (i.e., the development of conscience), and severe and chronic disruptive behavior pathways are virtually always expressed before age 5 years (Kochanska, Koenig, Barry, Kim, & Yoon, 2010; Shaw, 2013; Wakschlag et al., 2010). More recently, there has been an explosion of studies

on the clinical and predictive validity of early callous behavior (Wakschlag et al., 2018).

Callous behavior reflects diminished responsiveness to the distress of others (Alegria, Radua, & Rubia, 2016; Blair, 2005). Its early emergence is a marker of antisocial behavior persistence and severity, and may serve as a developmental substrate of psychopathy (Blair, 2006). As these patterns are not delineated in a developmentally meaningful manner for young children, this has precluded their clinical evaluation in young children (Wakschlag, Leventhal, et al., 2007). Importantly, callous behaviors probabilistically increase the risk of severe antisocial behavior and psychopathy, but most youth with these traits do not develop psychopathic tendencies. Thus, early callous behaviors represent a pattern of insensitivity to others, which predisposes youth to severe antisocial behavior. However, whether severe psychopathy develops likely depends on genetic risk, environment, learning, and opportunity (Blair, 2006; Waller et al., 2014).

While not surprising given the adolescent-oriented nature of DSM CD symptoms, the dearth of investigation of callous features in early childhood psychopathology pathways is ironic given extensive evidence from developmental science that the roots of empathy and other-oriented behavior are present in the first months of life. Rudimentary concern for others is present at birth (Davidov, Zahn-Waxler, Roth-Hanania, & Knafo, 2013). Neonates are negatively aroused by the distress of others, reflecting overlap in the neural circuitry underlying perception of own versus others' emotions (Decety & Meyer, 2008). Infants in the first year of life also demonstrate prosocial versus antisocial preferences and empathic concern (Bartal, Decety, & Mason, 2011; Kochanska et al., 2010; Van De Vondervoort & Hamlin, 2016). Moreover, toddlers exhibit stable dispositional empathy, internalization of rules, and perform prosocial *acts* to ameliorate others' distress (Kochanska et al., 2010). Thus, sensitivity to others' feelings and capacity to follow social norms manifest in the first years of life (Davidov et al., 2013). Moral emotions (e.g., guilt) are also identifiable in nascent forms, as exhibited via bodily tension and gaze aversion following transgression in toddlers, and via expressions of remorse and reparation in preschoolers (Kochanska, Gross, Lin, & Nichols, 2002). Both concern for others and guilt inhibit antisocial behavior that will cause others

distress (Decety, Bartal, Uzefovsky, & Knafo-Noam, 2016).

Drawing on both observation and survey methods, at least 20 independent studies have demonstrated that callous behavior can be assessed in a reliable and developmentally meaningful manner beginning as early as 14 months of age (for review, see Wakschlag et al., 2018). Evidence of developmental validity includes data suggesting a dimensional spectrum and associations with developmental impairments in guilt, moral regulation, and empathy (Wakschlag et al., 2014; Waller, Hyde, Grabbell, Alves, & Olson, 2015). Early callous behaviors are associated with increased risk of childhood disruptive behavior and later CD. For example, toddlers' observed disregard for others explains unique variance in adolescent CD symptoms (Rhee et al., 2016). Conversely, observed indicators of an emergent conscience derived from seminal work by Kochanska and colleagues (2010) predict reduced risk of conduct problems in adolescence. Early childhood callous behaviors also predict more treatment-resistant forms of disruptive behavior (e.g., escalating externalizing problems) through adolescence (Song, Waller, Hyde, & Olson, 2016). A large effect size of early callous behaviors on severity of preschool age conduct problems ($r = .39, p < .001$) has also been demonstrated via meta-analytic review (Longman, Hawes, & Kohlhoff, 2016).

Early indications of associated pathophysiology highlight developmental coherence in underlying atypicalities. Neurodevelopmentally, such social-emotional deficits impair responsiveness to socialization because attunement to others' distress and displeasure inhibits other-directed negative behavior via transgression and empathy-related arousal, and undergirds the development of conscience (Blair & Colledge, 2001; Kochanska & Aksan, 2006). In terms of emotion processing deficits, we have demonstrated a specific association between MAP-DB Low Concern for Others and decrements in fear processing, net effects of impulsivity, aggression, and irritability in the preschool years (White et al., 2016). Other pathophysiological indicators of early callousness include impaired eye contact (during performance-based and social interaction paradigms; Dadds et al., 2014) reduced cardiac and behavioral arousal in response to distress-eliciting stimuli, and increased fearlessness in contrast to irritable infants (Willoughby, Waschbusch, Moore, & Propper, 2011). The progression of early childhood callous behaviors to later externalizing

problems is moderated by theory-of-mind deficits, underscoring the role of social processing deficits in these pathways (Song et al., 2016). Evidence of heritability of callous traits in an adoption sample is also consistent with biological plausibility (Hyde et al., 2016).

Accounting for Developmental Variation and Change

Empirically Derived Frequency Thresholds

Traditionally, symptom thresholds have been defined via subjective frequency ("often loses temper"). As a result, clinicians assessing young children have long been vexed by the question "How often is too often?" since presence-absence is not clinically informative for behaviors that are common in an age period. To address this, the MAP-DB uses a 6-point objective frequency scale (from *never in past month* to *many times per day*) to psychometrically derive frequency thresholds demarcating abnormality. This has proven useful for debunking the myth that it is all "the terrible twos." In particular, data from two large community samples of diverse preschoolers indicate that while misbehavior is common (i.e., most young children do it), it does not predominate (Wakschlag et al., 2018). In particular, daily tantrums are not common for preschoolers regardless of age, sex, racial/ethnic or poverty status (Wakschlag, Henry, et al. 2012). It is also clear that the vast changes in capacities for self-regulation across the early childhood period make consideration of developmental differences in infants, toddlers, and preschoolers important for determining thresholds of abnormality. Early data from the MAP-DB Infant-Toddler version suggest that rates of misbehavior are higher in the younger age group (Figure 24.1). For example, more than three times as many infants/toddlers (20%) are reported to disobey their parent at least daily relative to only 6% of preschoolers, which suggests that a higher frequency threshold may be needed for the younger children. The use of objective frequency thresholds is promising as a discrete and easily reported screening indicator, which has long eluded pediatricians and caregivers within this developmental period.

Accounting for Change over Time

While *interindividual* differences are fairly stable longitudinally, *intraindividual* behavior is more unstable. Understanding these intra-

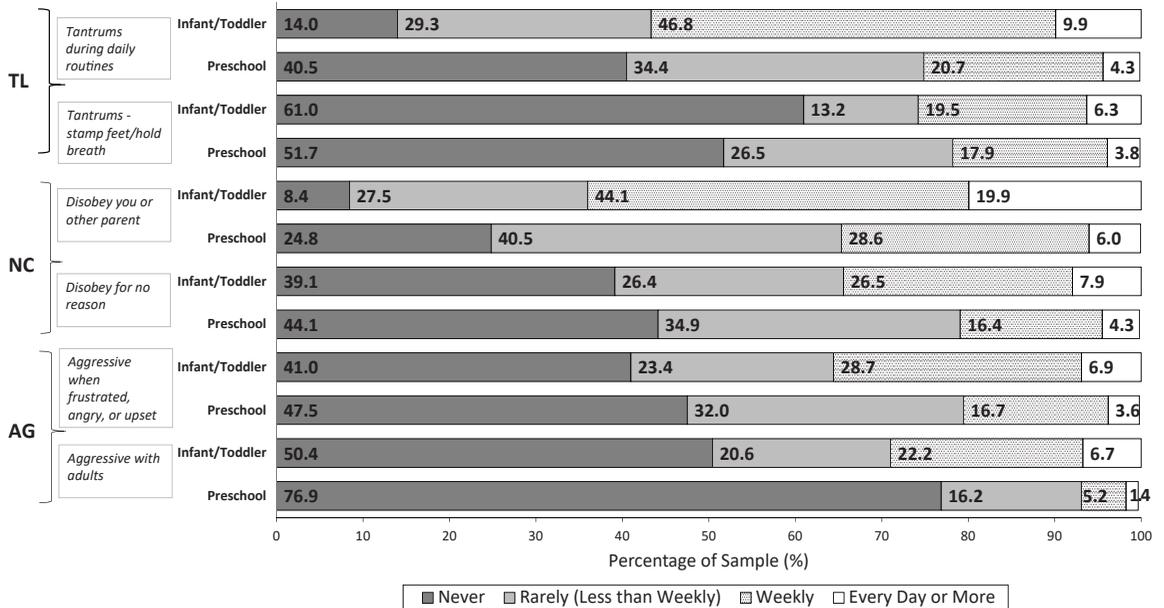


FIGURE 24.1. Past-month frequency of normative and dysregulated early childhood behaviors across developmental periods.

individual changes (i.e., variations in developmental growth and change) is key to achieving reliable earlier identification of disruptive behavior. Of great importance is the examination of developmental patterns of behavior over time. For example, the majority of toddlers who exhibit frequent oppositional behaviors at 17 months are not doing so at 29 months (Baillargeon et al., 2007). Approximately one-third of preschoolers show substantial variation (>1 *SD* from their own mean) in their level of disruptive behavior even within a 1-year period, and similar patterns are shown with behaviors reflecting low concern (Wakschlag et al., 2018). Furthermore, whether these patterns are stable or unstable is not determined by their position along the dimension (i.e., preschoolers who fell at either extreme and those who fell in the “gray area” of risk all had equal likelihood of stability or change; Wakschlag et al., 2015).

A key indicator of developmental change is progress across multiple domains of development. Normative variation is far more extensive in this time of life than any other childhood period, and brain growth is so rapid that 90% of adult volume is achieved by the end of early childhood (Bullins et al., 2017). Furthermore, during a period of emergent skills and consolidation, acquisition of competence in one

domain may radically alter behavior in another (e.g., locomotion dramatically increases capacity for autonomous behavior). Self-regulation is a central, multifaceted developmental task of early childhood—skills acquisition in one facet radically alters behavior in another (Kochanska, Coy, & Murray, 2001). One area of increasing interest for earlier identification of disruptive behavior is its intersection with language development (Roberts et al., 2017). For example, the acquisition of sophisticated language strategies and the capacity to use linguistic strategies to inhibit behavior are likely to result in both qualitative and quantitative shifts in regulation of behavior. In contrast, language delays may increase disruptive behavior risk. We have recently shown that the relative risk of dysregulated tantrums is significantly elevated for young children with slower language development (relative risk of 2.54 for younger toddlers and 1.79 for older toddlers; Manning et al., 2017).

Issues of developmental change and growth have not been systematically considered in clinical assessment of disruptive behavior of young children. To our knowledge, *no* studies within any framework have systematically tested the relevance and essential features of duration criteria for disruptive behavior in young

children. This too is a conundrum (Wakschlag, Leventhal, et al., 2007). On the one hand, it is abundantly clear that transient developmental perturbations must be accounted for to enable normal–abnormal distinctions during this age period. Yet traditional duration criteria are either too lengthy (e.g., 6 months may represent a quarter of a young child’s life) or too brief (given that change occurs in weeks and months rather than years in this period). On the other hand, it is possible that duration criteria per se are not the most informative way to make clinical determinations during this period. For example, it is common for parents of young children with disruptive behavior to report that he or she has “always been this way.”

We have suggested that a single static assessment is inadequate for reliably determining whether behavioral patterns are truly maladaptive or merely perturbations as skills are being consolidated, given the pace of growth and level of instability in early childhood (Bufferd et al., 2016). This is supported by findings that accounting for longitudinal variation across the preschool period enhances clinical prediction (Bufferd et al., 2016; Wakschlag et al., 2015). However, practical parameters for resolving these issues (what and how often to assess in order to have confidence in clinical judgment) is crucial. In our ongoing When to Worry Study (W2W) of irritable toddlers, our goal is to generate a science base to address these challenges via a novel, developmentally tuned study design. W2W employs bimonthly assessments for fine-grained capturing of longitudinal variation in irritable behavior jointly with developmental milestone acquisition, language, and life events. These closely spaced intervals will provide nuanced data on longitudinal variation to enable us to specify the number of time points sufficient for sensitive and specific prediction within a “context” of changing developmental skills, as well as environmental factors that may cause transient perturbations.

Measuring Phenotypic Expression in Developmentally Meaningful Terms

As noted earlier, our developmental specification framework and its operationalization within the MAP-DB survey have been richly described and tested across more than 3,000 diverse preschoolers ages 3–5 years (Wakschlag, Henry, et al., 2012; Wakschlag et al.,

2010, 2018). The vast majority of clinically oriented studies of early childhood disruptive behavior have focused on the preschool period, with evidence of DSM disruptive behavior as young as age 2 (Egger & Angold, 2006). However, burgeoning empirical evidence indicates that disruptive behavior patterns can be identified beginning at 1 year of age (Briggs-Gowan, Carter, Bosson-Heenan, Guyer, & Horwitz, 2006; Lorber et al., 2015; Van Zeijl et al., 2006). Thus, to advance the clinical imperative to identify and prevent emergent patterns of mental disorder as early in the clinical sequence as is reliably possible, our W2W study tests the validity of our dimensional framework for generating normal–abnormal distinction, beginning at age 12 months, with primary emphasis on abnormal irritability.

We recognize that some features of disruptive behavior (e.g., atypical irritability) could conceivably be detected in nascent form even in the first year of life. For clinical identification, we have begun this developmental extension of our work down to infancy (12 months forward) because a number of key milestones that occur at about this age (e.g., locomotion and intentional communication) undergird the capacity for autonomous action that is foundational to disruptive behavior as currently conceptualized. As tools and classification systems become more neurodevelopmentally oriented, we foresee the possibility that even earlier clinical detection may be within reach in the future (Wakschlag et al., 2018).

Drawing on our collective expertise in clinical and developmental research, a guiding principle for generating the MAP-DB Infant–Toddler version was the continuity of items whenever developmentally appropriate (and exclusion of those items not within the capacity of a much younger child). We also expanded the dimensions to add items theorized as key for capturing earlier developmental expression of behaviors within our disruptive behavior dimensional framework. Thus, for example, on the Temper Loss scale, many temper tantrum items were retained, but items with the descriptors “grumpy” or “fussing” were also added. Similarly, “arguing” items were omitted for the MAP-DB Infant–Toddler Noncompliance scale, since this rests on more sophisticated verbal capacities, and items such as “resists changing activities,” and “needs a lot of coaxing to comply” were added (Wakschlag, Petitclerc, Estabrook, Roberts, et al., 2017).

Preliminary comparison of frequency distributions for infant/toddlers from the W2W Study and preschoolers from the MAPS Study are shown in Figure 24.1. These data show that mild expressions of Temper Loss, Aggression, and Noncompliance are more common in infants–toddlers than in preschool-age children. Interestingly, even the severe expressions of Noncompliance and Aggression more commonly occur in infants–toddlers than in preschool-age children. Conversely, severe expression of Temper Loss is more commonly exhibited in the preschool sample.

Quality of Behavior

We have long theorized that a major driver of normal–abnormal distinction of disruptive behavior in early childhood is “quality of behavior,” which we have defined as the extent to which behavior is modulated and responsive to environmental intervention (Wakschlag, Briggs-Gowan, et al., 2007; Wakschlag et al., 2010). This is because disruptive behavior symptoms are highly overlapping with the normative misbehavior of early childhood, and as a result, presence or absence of behavior is not discriminating (Wakschlag, Leventhal, et al., 2007).

Qualitative features of noncompliance highlight this approach, since the capacity to say, “No,” is one of the foremost exemplars of the popular concept of the “terrible twos.” Emergent capacities for compliance arise early in life, including the ability to comply with demands, inhibit in the absence of external controls, and generalize rules and standards across contexts (Kochanska et al., 2001). These capacities develop in concert with emergent autonomy: A degree of noncompliance is normative, as it is not adaptive for children to rigidly comply regardless of context or individual goals (Dix, Stewart, Gershoff, & Day, 2007). In fact, noncompliance actually increases from toddler to preschool age, reflecting burgeoning independence (Forman, 2007). Normative manifestations of noncompliance are goal-directed, flexible, contextually expectable, and tempered by a desire to please others (Drabick, Strassberg, & Kees, 2001; Willoughby, Kupersmidt, & Bryant, 2001). For example, simple refusals, saying “no” without strong affect, and assertive negotiation and persuasion increase are considered skillful noncompliance, and are associated

with positive developmental outcomes and contexts (Crockenberg & Litman, 1990; Kuczynski & Kochanska, 1990). In contrast, clinical manifestations are characterized by recalcitrant and dysregulated defiance and deliberate rule breaking. For example, differentiation of “skillful” (e.g., reasonable, calm) versus “unskilled” (e.g., dysregulated and confrontational) noncompliance in the Response Style Questionnaire (RSQ) demonstrates that the same behavior (e.g., defiance) at preschool age may be adaptive or maladaptive depending on its quality (Drabick et al., 2001).

Observed quality of noncompliance (e.g., stubborn, pervasive, and inflexible) during interactions with an examiner on the DB-DOS adds incremental utility to prediction of persistent disruptive behavior and impairment beyond DSM symptoms (adjusted odds ratio = 4.53; Wakschlag, Briggs-Gowan, et al., 2008; Wakschlag, Hill, et al., 2008). Observed rule-compatible conduct (with and without external regulation) across the toddler–preschool period is also associated with reduced risk of school-age conduct problems (Kochanska et al., 2010).

To operationalize the full normal–abnormal continuum of noncompliance, the MAP-DB includes a range of noncompliant behaviors that vary in quality. As theorized, common expressions across early childhood include expectable resistance to demands (e.g., saying “no” and acting stubborn), whereas severe and atypical manifestations are provocative and inflexible (e.g., showing off while misbehaving, automatically resisting what is asked, and stomping around while misbehaving; Wakschlag et al., 2014; Wakschlag, Petitclerc, Estabrook, Burns, et al., 2017). Similar qualitative distinctions are found in distinguishing the normal–abnormal continuum of irritability (e.g., severe forms, including difficulty recovering from tantrums, recalcitrance to environmental support, and destructive tantrums) across the early childhood period (Belden et al., 2008; Wakschlag, Choi, et al., 2012).

Contextual Variation

In contrast to attention-deficit/hyperactivity disorder (ADHD), disruptive behavior syndromes have typically not taken contextual variation into account in clinical determination. In addition, when diagnostic systems *do* take context into account, this is generally concep-

tualized in terms of pervasiveness (agnostic to which context). However, there is increasing evidence that source-specific variation is systematic and prognostically distinct (Dirks, De Los Reyes, Briggs-Gowan, Cella, & Wakschlag, 2012).

From a developmental–clinical perspective, it has been theorized that variation in expression of behavior across contexts will elucidate clinically informative individual differences in early childhood (Buss, 2011; Wakschlag, Briggs-Gowan, et al., 2007). Determination of the clinical significance of contextual variation is guided by the principle of “developmental expectability”—that is, whether a context typically elicits particular types of responses (Cole et al., 2004; Goldsmith & Davidson, 2004; Wakschlag, Briggs-Gowan, et al., 2007). The DB-DOS is a particularly informative method for testing this theory because it systematically contrasts behavior across interactional contexts in a manner designed to “press for” clinical variation within the early childhood period (Wakschlag et al., 2005). The informativeness of DB-DOS contextual variation has been demonstrated in multiple, independent samples (Bunte et al., 2013; Frost, Jelinek, Bernard, Lind, & Dozier, 2017; Petitclerc et al., 2015; Tseng et al., 2015; Wakschlag, Briggs-Gowan, et al., 2008; Wakschlag, Hill, et al., 2008) as follows:

1. *Variations in observed disruptive behavior (with parent, with examiner, and with both) map to real-world differences in disruptive behavior.* In our Chicago Preschool Project study (Wakschlag, Briggs-Gowan, et al., 2007), contextual variation in observed disruptive behavior corresponds to informant concordance–discordance (De Los Reyes, Henry, Tolan, & Wakschlag, 2009). In particular, observed disruptive behavior specific to the DB-DOS parent and examiner contexts was uniquely related to parent- and teacher-reported disruptive behavior, respectively, whereas disruptive behavior observed pervasively across contexts was associated with parent–teacher concordance (De Los Reyes et al., 2009). These patterns were longitudinally stable and were not accounted for by impairment (De Los Reyes et al., 2009). In the independent MAPS sample, we have similarly demonstrated correspondence of DB-DOS contextual variation in disruptive behavior to PAPA-based impairment (parent context to home-based impairment and examiner context to preschool-based impairment including

expulsion; Petitclerc et al., 2015). Contextual variation in expression of disruptive behavior has also demonstrated differential predictive utility, with stronger prediction from disruptive behavior that occurs during interactions with the examiner (Wakschlag, Briggs-Gowan, et al., 2008; Wakschlag, Hill, et al., 2008). This is not surprising given that misbehavior is more normative with parents than with nonparental adults (Belden et al., 2008; Petitclerc et al., 2015).

2. *Contextual variation is informative for detecting sex differences in clinical patterns.* Data from the Chicago Preschool Project also indicate sex differences in contextual variation (Gray et al., 2012). In particular, disruptive boys show equivalent levels of disruptive behavior on the DB-DOS regardless of their interactional partner, whereas disruptive girls displayed heightened levels of disruptive behavior with their parent but were better able to regulate their behavior with the examiner (a pattern parallel to that of nondisruptive boys; Gray et al., 2012). It is quite striking that even within this largely referred population, severely impaired disruptive girls displayed this heightened sensitivity to context, consistent with established developmental research (Chaplin & Aldao, 2013). Girls’ greater capacity to inhibit disruptive behavior in the DB-DOS examiner context has also been demonstrated in an independent sample of preschoolers (Frost et al., 2017). As a result, the examiner context is more clinically discriminating for boys, but the reverse is true for girls (Gray et al., 2012).

3. *Observed contextual variation is also linked to differences in inhibitory control.* The capacity to shift behavior across shifting contexts is a fundamental element of self-regulation, a primary adaptive achievement of the preschool years (Nigg, 2017). In contrast, clinical patterns of disruptive behavior reflect deficits in self-regulation, particularly in motivational contexts (Schoemaker et al., 2012). Preschoolers with lower observed contextual differences scores on the DB-DOS (i.e., the extent to which their behavior significantly varies from parent to examiner context) demonstrated lower inhibitory control on a go/no-go task (Petitclerc et al., 2015); that is, children with better inhibitory control were better able to adaptively shift their behavior in a developmentally expectable manner (greater inhibition with an unfamiliar adult).

Although direct observations are of special importance for normal–abnormal distinction in early childhood (Wakschlag et al., 2005), the importance of assessing the clinical significance of young children’s disruptive behavior “in context” is also underscored via parent report. This is particularly salient for aggression, which is not easily elicited in a brief laboratory context (Wakschlag, Briggs-Gowan, et al., 2008; Wakschlag, Hill, et al., 2008). The MAP-DB severity spectrum indicates that aggression is milder and more expectable when directed toward parents (vs. nonparental adults) and siblings (vs. peers), a contextual pattern that is evident even in the infant–toddler period (Dirks et al., 2017; Wakschlag, Petittclerc, Estabrook, Burns, et al., 2017).

In addition to interactional context, parental report of situational and setting variations are clinically informative for young children. Developmentally expectable contexts (i.e., those in which disruptive behavior is typically elicited as expression of normative misbehavior of early childhood) include when at home, at times of transition, when under duress (e.g., tired, frustrated, hungry, sick), during daily routines, and when limits are set (Wakschlag, Henry, et al., 2012; Wakschlag et al., 2014). In contrast, disruptive behavior that occurs during fun activities, “out of the blue,” and in public settings is clinically concerning (Belden et al., 2008; Wakschlag, Petittclerc, Estabrook, Burns, et al., 2017).

Although a major reason for clinical referral of young children and an indicator of early childhood disruptive behavior severity, aggressive behaviors occur much less frequently than tantrums and noncompliance (Keenan & Wakschlag, 2000). For example, on the MAP-DB, more than three-fourths of preschoolers are reported never to have acted aggressively toward other children in the past month, but this pattern is reversed for tantrums (e.g., had a tantrum) and noncompliance (e.g., saying “no” when asked to do something) (Wakschlag et al., 2014). Direct clinical assessments are even more constrained for normal–abnormal distinction of this low base-rate behavior, as aggression is rarely observed under brief clinical or standardized conditions. For example, even during a standardized paradigm such as the DB-DOS, which is explicitly designed to elicit higher rates of misbehavior, less than 2% of children displayed aggression (Wakschlag, Briggs-Gowan, et al., 2008; Wakschlag, Hill, et al., 2008).

Conclusions and Future Directions

There have been dramatic strides in the capacity for clinical identification of disruptive behavior in young children over the past few decades. These include the generation of developmentally sensitive assessment instruments and prevalence rates roughly parallel to those in older children. The application of DSM and other categorical classification systems in this age group underscores the very real presence of clinically salient disruptive behavior at young ages. Unfortunately, these have been predominantly employed in the research realm, and their use in routine clinical assessment remains aspirational. Validation of preschool disruptive behavior clinical instruments for use in real-world practice is an important next step with particular emphasis on multi-informant, clinic-based methods (e.g., direct clinical observations, such as the DB-DOS, that would increase the likelihood that clinicians actually observe the behavior within the clinic). This requires an algorithm for reconciling discrepant patterns derived from varied instruments and informants (Shernoff, Hill, Danis, Leventhal, & Wakschlag, 2014). In the short term, the take-home messages for the practicing clinician is determination of the extent to which normative misbehaviors are impairing, predominate even in contexts in which they would not be expected, and dysregulated. Furthermore, the rapidity and extent of developmental and clinical change over time in this age group suggest that even a short-term follow-up visit (1–2 months) would strengthen clinical confidence that disruptive behaviors are more than a transient developmental perturbation.

Looking toward the future, we believe there is an imperative to “do better” by directing the full strength of development science and neuroscience toward more sensitive and specific early identification of disruptive behavior. The developmental specification approach outlined here holds promise for doing so. This paradigm shift should enable a clinical focus that begins in the first year of life and takes a probabilistic approach (Bufferd, Dougherty, & Olino, 2017; Wakschlag et al., 2015). Although beyond the scope of this chapter, this includes a strong neurodevelopmental science base, suggesting that the brain and behavior atypicalities that underlie disruptive behavior across the lifespan are detectable even in very young children (for review, see Camacho, Wakschlag, & Perlman, in press; Wakschlag et al., 2018).

The critical next step for the field is the systematic application of these research-based findings into a comprehensive, well-validated system for clinical assessment and treatment planning. We postulate that a tiered approach that includes algorithms for clinical integration of multimethod approaches in young children and a dimensional continuum for clinical decision making at this age period will be needed (Bufferd et al., 2016). An integrated neurodevelopmental approach would sharpen accuracy of clinical identification at this age because accounting for developmental change and joint atypicalities across brain and behavioral development shows promise for identifying those young children at highest risk for persistent problems (Gaffrey, 2017; Healey, Marks, & Halperin, 2011; Wakschlag et al., 2018).

These clinical next steps must also include empirical parameters for reliable pediatric screening to identify when young children's disruptive behavior warrants a mental health referral. For example, we have shown that just two items from the MAP-DB Temper Loss scale (i.e., *is frequently easily frustrated* and *destructive tantrums*) have high sensitivity and specificity for irritability-related syndromes in preschoolers (i.e., ODD, DMDD, and depression; Wiggins et al., 2017). This suggests the possibility that this developmentally specified approach could be efficiently applied to address the W2W conundrum that bedevils pediatric clinical decision making about young children's behavior. Major strides have been made in clinical identification over the past few decades, primarily in preschoolers. Generation of developmentally based, empirically derived parameters, toolkits, and algorithms for sensitive and specific identification of the earliest phase of the disruptive behavior clinical sequence, beginning in infancy, can be realized if research progress can be harnessed for the scientific endeavors needed to undergird applied clinical use.

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REFERENCES

- Achenbach, T. (1997). What is normal? What is abnormal?: Developmental perspectives on emotional and behavioral problems. In S. Luthar, D. Burack, D. Cicchetti, & J. Weisz (Eds.), *Developmental psychopathology: Perspectives on adjustment, risk, and disorder* (pp. 93–114). New York: Cambridge University Press.
- Alegria, A., Radua, J., & Rubia, K. (2016). Meta-analysis of fMRI studies of disruptive behavior disorders. *American Journal of Psychiatry*, *73*(11), 1119–1130.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: Author.
- Baillargeon, R. H., Normand, C. L., Séguin, J. R., Zoccolillo, M., Japel, C., Pérusse, D., et al. (2007). The evolution of problem and social competence behaviors during toddlerhood: A prospective population-based cohort survey. *Infant Mental Health Journal*, *28*(1), 12–38.
- Bartal, I. B.-A., Decety, J., & Mason, P. (2011). Empathy and pro-social behavior in rats. *Science*, *334*, 1427–1430.
- Belden, A., Thompson, N., & Luby, J. (2008). Temper tantrums in healthy versus depressed and disruptive preschoolers: Defining tantrum behaviors associated with clinical problems. *Journal of Pediatrics*, *152*, 117–122.
- Blair, C., Zelazo, P., & Greenberg, M. (2005). The development of executive function in young children. *Developmental Neuropsychology*, *28*, 561–571.
- Blair, R. (2005). Responding to the emotions of others: Dissociating forms of empathy through the study of typical and psychiatric populations. *Cognition*, *14*, 698–718.
- Blair, R. J. R. (2006). The emergence of psychopathy: Implications for the neuropsychological approach to developmental disorders. *Cognition*, *101*, 414–442.
- Blair, R., & Colledge, E. (2001). A selective impairment in the processing of sad and fearful expressions in children with psychopathic tendencies. *Journal of Abnormal Child Psychology*, *29*(6), 491–498.
- Bornstein, M. H., Hahn, C. S., & Suwalsky, J. T. (2013). Developmental pathways among adaptive functioning and externalizing and internalizing behavioral problems: Cascades from childhood into adolescence. *Applied Developmental Science*, *17*(2), 76–87.
- Briggs-Gowan, M., Carter, A., Bosson-Heenan, J., Guyer, A., & Horwitz, S. (2006). Are infant-toddler social-emotional and behavioral problems transient?

- Journal of the American Academy of Child and Adolescent Psychiatry*, 45, 849–858.
- Brownell, C. A., & Kopp, C. B. (Eds.). (2007). *Socio-emotional development in the toddler years: Transitions and transformations*. New York: Guilford Press.
- Bufferd, S., Dyson, M., Hernandez, I., & Wakschlag, L. (2016). Explicating the “developmental” in preschool psychopathology. In D. Cicchetti (Ed.), *Developmental psychopathology: Maladaptation and psychopathology* (3rd ed., Vol. 3, pp. 152–186). Hoboken, NJ: Wiley.
- Bufferd, S. J., Dougherty, L. R., & Olino, T. M. (2017). Mapping the frequency and severity of depressive behaviors in preschool-aged children. *Child Psychiatry and Human Development*, 48(6), 934–943.
- Bullins, J. N., Jha, S. C., Knickmeyer, R. C., & Gilmore, J. H. (2017). Brain development during the preschool period. In J. L. Luby (Ed.), *Handbook of preschool mental health: Development, disorders, and treatment* (2nd ed., pp. 73–100). New York: Guilford Press.
- Bunte, T. L., Laschen, S., Schoemaker, K., Hessen, D. J., van der Heijden, P. G. M., & Matthys, W. (2013). Clinical usefulness of observational assessment in the diagnosis of DBD and ADHD in preschoolers. *Journal of Clinical Child and Adolescent Psychology*, 42(6), 749–761.
- Buss, K. (2011). Which fearful toddlers should we worry about: Context, fear regulation and anxiety risk. *Developmental Psychology*, 47, 804–819.
- Camacho, C. M., Wakschlag, L. S., & Perlman, S. B. (in press). Early childhood irritability: Using a neurodevelopmental framework to inform clinical understanding. In A. K. Roy, M. A. Brotman, & E. Leibenluft (Eds.), *Irritability in pediatric psychopathology*. New York: Oxford University Press.
- Campbell, S. (Ed.). (2002). *Behavior problems in preschool children: Clinical and developmental issues* (2nd ed.). New York: Guilford Press.
- Carbonneau, R., Boivin, M., Brendgen, M., Nagin, D., & Tremblay, R. E. (2016). Comorbid development of disruptive behaviors from age 1½ to 5 years in a population birth-cohort and association with school adjustment in first grade. *Journal of Abnormal Child Psychology*, 44, 677–690.
- Carlson, G. A., Danzig, A. P., Dougherty, L. R., Bufferd, S. J., & Klein, D. N. (2016). Loss of temper and irritability: The relationship to tantrums in a community and clinical sample. *Journal of Child and Adolescent Psychopharmacology*, 26(2), 114–122.
- Casey, B., Oliveri, M., & Insel, T. (2014). A neurodevelopmental perspective on the research domain (RDoC) framework. *Biological Psychiatry*, 76, 350–353.
- Chacko, A., Wakschlag, L., Hill, C., Danis, B., & Espy, K. (2009). Viewing preschool disruptive behavior disorders and ADHD through a developmental lens: What do we know and what do we need to know? *Child and Adolescent Psychiatric Clinics of North America*, 18, 627–643.
- Chaplin, T. M., & Aldao, A. (2013). Gender differences in emotion expression in children: A meta-analytic review. *Psychological Bulletin*, 139(4), 735–765.
- Cole, P. M., Luby, J., & Sullivan, M. W. (2008). Emotions and the development of childhood depression: Bridging the gap. *Child Development Perspectives*, 2(3), 141–148.
- Cole, P., Martin, S., & Dennis, T. (2004). Emotion regulation as a scientific construct: Methodological challenges and directions for child development research. *Child Development*, 75, 317–333.
- Crockenberg, S., & Litman, C. (1990). Autonomy as competence in 2-year-olds: Maternal correlates of child defiance, compliance, and self-assertion. *Developmental Psychology*, 26(6), 961–971.
- Cuthbert, B. (2005). Dimensional models of psychopathology: Research agenda and clinical utility. *Journal of Abnormal Psychology*, 114(4), 565–569.
- Dadds, M. R., Allen, J. L., McGregor, K., Woolgar, M., Viding, E., & Scott, S. (2014). Callous-unemotional traits in children and mechanisms of impaired eye contact during expressions of love: A treatment target? *Journal of Child Psychology and Psychiatry*, 55(7), 771–780.
- Danis, B., Hill, C., & Wakschlag, L. (2009). In the eye of the beholder: Critical components of observation when assessing disruptive behaviors in young children. *Zero to Three*, 29(3), 24–30.
- Davidov, M., Zahn-Waxler, C., Roth-Hanania, R., & Knafo, A. (2013). Concern for others in the first year of life: Theory, evidence, and avenues for research. *Child Development Perspectives*, 7(2), 126–131.
- De Los Reyes, A., Henry, D., Tolan, P., & Wakschlag, L. S. (2009). Linking informant discrepancies to observed variations in young children’s disruptive behavior. *Journal of Abnormal Child Psychology*, 37, 637–652.
- Deater-Deckard, K., Petrill, S., & Thompson, L. (2007). Anger/frustration, task persistence, and conduct problems in childhood: A behavioral genetic analysis. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 48(1), 80–87.
- Deater-Deckard, K., & Wang, Z. (2012). Anger and irritability. In M. Zentner & R. L. Shiner (Eds.), *Handbook of temperament* (pp. 124–144). New York: Guilford Press.
- Decety, J., Barta, I. B.-A., Uzefovsky, F., & Knafo-Noam, A. (2016). Empathy as a driver of prosocial behaviour: Highly conserved neurobehavioural mechanisms across species. *Philosophical Transactions of the Royal Society of London B: Biological Sciences*, 371, 20150077.
- Decety, J., & Meyer, M. (2008). From emotion resonance to empathic understanding: A social developmental neuroscience account. *Development and Psychopathology*, 20(4), 1053–1081.
- Dirks, M. A., De Los Reyes, A., Briggs-Gowan, M., Cella, D., & Wakschlag, L. S. (2012). Annual research review: Embracing not erasing contextual variability in children’s behavior—theory and utility

- in the selection and use of methods and informants in developmental psychopathology. *Journal of Child Psychology and Psychiatry*, 53(5), 558–574.
- Dirks, M. A., Recchia, H. E., Estabrook, R., Howe, N., Petittler, A., Burns, J., et al. (2017). *He hit me first: Differentiating normal from abnormal sibling aggression during the preschool years*. Manuscript under review.
- Dix, T., Stewart, A., Gershoff, E., & Day, W. (2007). Autonomy and children's reactions to being controlled: Evidence that both compliance and defiance may be positive markers in early development. *Child Development*, 78, 1204–1221.
- Dougherty, L. R., Leppert, K. A., Merwin, S. M., Smith, V. C., Bufferd, S. J., & Kushner, M. R. (2015). Advances and directions in preschool mental health research. *Child Development Perspective*, 6(2), 1–6.
- Drabick, D. A. G., Strassberg, Z., & Kees, M. R. (2001). Measuring qualitative aspects of preschool boys' noncompliance: The Response Style Questionnaire (RSQ). *Journal of Abnormal Child Psychology*, 29(2), 129–140.
- Egger, H. L., & Angold, A. (2006). Common emotional and behavioral disorders in preschool children: Presentation, nosology, and epidemiology. *Journal of Child Psychology, Psychiatry and Allied Disciplines*, 47, 313–337.
- Forman, D. (2007). Autonomy, compliance and internalization. In C. A. Brownell & C. B. Kopp (Eds.), *Socioemotional development in the toddler years: Transitions and transformation* (pp. 261–284). New York: Guilford Press.
- Frick, P., & Nigg, J. (2012). Current issues in the diagnosis of attention deficit hyperactivity disorder, oppositional defiant disorder, and conduct disorder. *Annual Review of Clinical Psychology*, 8, 77–107.
- Frost, A., Jelinek, C., Bernard, K., Lind, T., & Dozier, M. (2017). Longitudinal associations between low morning cortisol in infancy and anger dysregulation in early childhood in a CPS-referred sample. *Developmental Science*. [Epub ahead of print]
- Gaffrey, M. (2017). Integrating translational developmental neuroscience into early intervention development for preschool psychopathology: A proposed model and example. In J. L. Luby (Ed.), *Handbook of preschool mental health: Development, disorders, and treatment* (2nd ed., pp. 374–402). New York: Guilford Press.
- Garber, J. (1984). Classification of childhood psychopathology: A developmental perspective. *Child Development*, 55, 30–48.
- Goldsmith, H., & Davidson, R. (2004). Disambiguating the components of emotion regulation. *Child Development*, 75, 361–365.
- Grabell, A. S., Li, Y., Barker, J. W., Wakschlag, L. S., Huppert, T. J., & Perlman, S. B. (2018). Evidence of non-linear associations between frustration-related prefrontal cortex activation and the normal: Abnormal spectrum of irritability in young children. *Journal of Abnormal Child Psychology*, 46(1), 137–147.
- Gray, S., Carter, A., Briggs-Gowan, M., Hill, C., Danis, B., Keenan, K., et al. (2012). Preschool children's observed disruptive behavior: Variations across sex, interactional context, and disruptive psychopathology. *Journal of Clinical Child and Adolescent Psychology*, 41, 499–507.
- Hay, D. F. (2005). The beginnings of aggression during infancy. In R. E. Tremblay, W. W. Hartup, & J. Archer (Eds.), *Developmental origins of aggression* (pp. 107–132). New York: Guilford Press.
- Hay, D., Waters, C., Perra, O., Swift, N., Kairis, V., Phillips, R., et al. (2014). Precursors to aggression are evident by 6 months of age. *Developmental Science*, 17, 471–480.
- Healey, D., Marks, D., & Halperin, J. (2011). Examining the interplay among negative emotionality, cognitive functioning, and attention deficit hyperactivity disorder symptom severity. *Journal of the International Neuropsychological Society*, 17, 502–510.
- Hyde, L. W., Waller, R., Trentacosta, C. J., Shaw, D. S., Neiderhiser, J. M., Ganiban, J. M., et al. (2016). Heritable and nonheritable pathways to early callous-unemotional behaviors. *American Journal of Psychiatry*, 173(9), 903–910.
- Keenan, K., Boeldt, D., Chen, D., Coyne, C., Donald, R., Duax, J., et al. (2011). Predictive validity of DSM-IV ODD and CD in clinically-referred preschoolers. *Journal of Child Psychology and Psychiatry*, 52, 47–55.
- Keenan, K., & Wakschlag, L. (2000). More than the terrible twos: The nature and severity of behavior problems in clinic-referred preschool children. *Journal of Abnormal Child Psychology*, 28, 33–46.
- Kochanska, G., & Aksan, N. (2006). Children's conscience and self-regulation. *Journal of Personality*, 74, 1587–1617.
- Kochanska, G., Coy, K., & Murray, K. (2001). The development of self-regulation in the first four years of life. *Child Development*, 72, 1091–1111.
- Kochanska, G., Gross, J., Lin, M., & Nichols, K. (2002). Guilt in young children: Development, determinants and relations with a broader system of standards. *Child Development*, 73, 461–482.
- Kochanska, G., Koenig, J., Barry, R., Kim, S., & Yoon, J. (2010). Children's conscience during toddler and preschool years, moral self, and a competent, adaptive developmental trajectory. *Developmental Psychology*, 46, 1320–1332.
- Krieger, F. V., & Stringaris, A. (2015). Temperament and vulnerability to externalizing behavior. In T. P. Beauchaine & S. P. Hinshaw (Eds.), *The Oxford handbook of externalizing spectrum disorders* (pp. 170–183). New York: Oxford University Press.
- Kuczynski, L., & Kochanska, G. (1990). Development of children's noncompliance strategies from toddlerhood to age five. *Developmental Psychology*, 26, 398–408.

- Lengua, L., West, S., & Sandler, I. (1998). Temperament as a predictor of symptomatology in children: Addressing contamination of measures. *Child Development, 69*(1), 164–181.
- Li, Y., Grabbell, A. S., Wakschlag, L. S., Huppert, T. J., & Perlman, S. B. (2017). The neural substrates of cognitive flexibility are related to individual differences in preschool irritability: A fNIRS investigation. *Developmental Cognitive Neuroscience, 25*, 138–144.
- Loeber, R., & Burke, J. D. (2011). Developmental pathways in juvenile externalizing and internalizing problems. *Journal of Research on Adolescence, 21*(1), 34–46.
- Longman, T., Hawes, D. J., & Kohlhoff, J. (2016). Callous-unemotional traits as markers for conduct problem severity in early childhood: A meta-analysis. *Child Psychiatry and Human Development, 47*(2), 326–334.
- Lorber, M. F., Del Vecchio, T., & Slep, A. M. S. (2015). The emergence and evolution of infant externalizing behavior. *Development and Psychopathology, 27*(3), 663–680.
- Luby, J. (2012). Dispelling the “they’ll grow out of it” myth: Implications for intervention. *American Journal of Psychiatry, 169*(11), 1127–1129.
- Manning, B., Roberts, M., Estabrook, R., Petittlerc, A., Burns, J., Briggs-Gowan, M., et al. (2017). *What’s a toddler to do?: Exploring the links between expressive language delay and temper tantrums in a large population-based sample*. Manuscript submitted for publication.
- Massey, S. H., Hatcher, A. E., Clark, C. A. C., Burns, J. L., Pine, D. S., Skol, A. D., et al. (2017). Does MAOA increase susceptibility to prenatal stress in young children? *Neurotoxicology and Teratology, 61*, 82–91.
- Mills-Koonce, W., Wagner, N., Willoughby, M., Stifter, C., Blair, C., Granger, D., et al. (2015). Greater fear reactivity and psychophysiological hyperactivity among infants with later conduct problems and callous-unemotional traits. *Journal of Child Psychology and Psychiatry, 56*(2), 147–154.
- Mittal, V. A., & Wakschlag, L. S. (2017). Research domain criteria (RDoC) grows up: Strengthening neurodevelopmental investigation within the RDoC framework. *Journal of Affective Disorders, 216*, 30–35.
- Nigg, J. (2016). *Self-control, executive function, self-regulation, emotion-regulation, impulsivity, and related constructs: Toward a coherent taxonomy of functions to guide theory and research*. Manuscript submitted for publication.
- Nigg, J. T. (2017). Annual Research Review: On the relations among self-regulation, self-control, executive functioning, effortful control, cognitive control, impulsivity, risk-taking, and inhibition for developmental psychopathology. *Journal of Child Psychology and Psychiatry, 58*(4), 361–383.
- Odgers, C. L., Moffitt, T. E., Broadbent, J. M., Dickson, N., Hancox, R. J., Harrington, H., et al. (2008). Female and male antisocial trajectories: From childhood origins to adult outcomes. *Development and Psychopathology, 20*(2), 673–716.
- Perlman, S. B., Huppert, T. J., & Luna, B. (2016). Functional near-infrared spectroscopy evidence for development of prefrontal engagement in working memory in early through middle childhood. *Cerebral Cortex, 26*(6), 2790–2799.
- Petittlerc, A., Briggs-Gowan, M. J., Estabrook, R., Burns, J. L., Anderson, E. L., McCarthy, K. J., et al. (2015). Contextual variation in young children’s observed disruptive behavior on the DB-DOS: Implications for early identification. *Journal of Child Psychology and Psychiatry, 56*(9), 1008–1016.
- Pine, D., & Fox, N. A. (2015). Childhood antecedents and risk for adult mental disorders. *Annual Review of Psychology, 66*, 459–485.
- Raine, A. (2018). Antisocial personality as a neurodevelopmental disorder. *Annual Review of Clinical Psychology*. [Epub ahead of print]
- Rhee, S. H., Friedman, N. P., Boeldt, D. L., Corley, R. P., Hewitt, J., Knafo, A., et al. (2013). Early concern and disregard for others as predictors of antisocial behavior. *Journal of Child Psychology and Psychiatry, 54*(2), 157–166.
- Rhee, S., Friedman, N. P., Corley, R., Hewitt, J. K., Hink, L., Johnson, D., et al. (2016). An examination of the developmental propensity model of conduct problems. *Journal of Abnormal Psychology, 125*(4), 550–564.
- Roberts, M., Curtis, P., Estabrook, R., Norton, E., Davis, M., Burns, J., et al. (2017). *Talking tots and the terrible twos: Generating developmental understanding of the relationship between early language and disruptive behavior in toddlers*. Manuscript under review.
- Rothbart, M., Posner, M., & Hershey, K. (1995). Temperament, attention, and developmental psychopathology. In D. Cicchetti & D. Cohen (Eds.), *Developmental psychopathology* (pp. 315–340). New York: Wiley.
- Schoemaker, K., Bunte, T., Wiebe, S. A., Espy, K. A., Deković, M., & Matthyss, W. (2012). Executive function deficits in preschool children with ADHD and DBD. *Journal of Child Psychology and Psychiatry, 53*(2), 111–119.
- Shaw, D. S. (2013). Future directions for research on the development and prevention of early conduct problems. *Journal of Clinical Child and Adolescent Psychology, 42*(3), 418–428.
- Shaw, D. S., & Taraban, L. E. (2017). New directions and challenges in preventing conduct problems in early childhood. *Child Development Perspectives, 11*(2), 85–89.
- Shernoff, E. S., Hill, C., Danis, B., Leventhal, B. L., & Wakschlag, L. S. (2014). Integrative consensus: A systematic approach to integrating comprehensive

- assessment data for young children with behavior problems. *Infants and Young Children*, 27(2), 92–110.
- Song, J.-H., Waller, R., Hyde, L. W., & Olson, S. L. (2016). Early callous–unemotional behavior, theory-of-mind, and a fearful/inhibited temperament predict externalizing problems in middle and late childhood. *Journal of Abnormal Child Psychology*, 44(6), 1205–1215.
- Sroufe, L. A. (1990). Considering normal and abnormal together: The essence of developmental psychopathology. *Development and Psychopathology*, 2(4), 335–348.
- Sterba, S., Egger, H., & Angold, A. (2007). Diagnostic specificity and nonspecificity in the dimensions of preschool psychopathology. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 48, 1005–1013.
- Tremblay, R. (2008). Understanding development and prevention of chronic physical aggression: Towards experimental epigenetic studies. *Philosophical Transactions of the Royal Society of London B: Biological Sciences*, 363, 2613–2622.
- Tremblay, R. E., & Japel, C. (2003). Prevention during pregnancy, infancy, and the preschool years. In D. P. Farrington & J. W. Coid (Eds.), *Early prevention of adult antisocial behaviour* (pp. 205–242). Cambridge, UK: Cambridge University Press.
- Tseng, W., Guyer, A., Briggs-Gowan, M., Axelson, D., Birmaher, B., Egger, H., et al. (2015). Behavior and emotion modulation deficits in preschoolers at risk for bipolar disorder. *Depression and Anxiety*, 32(5), 325–334.
- Van de Vondervoort, J. W., & Hamlin, J. K. (2016). Evidence for intuitive morality: Preverbal infants make sociomoral evaluations. *Child Development Perspectives*, 10(3), 143–148.
- Van Goozen, S., Snoek, H., Fairchild, G., & Harold, G. (2007). The evidence for a neurobiological model of childhood antisocial behavior. *Psychological Bulletin*, 133, 149–182.
- Van Zeijl, J., Mesman, J., Stolk, M., Alink, L. R. A., van IJzendoorn, M. H., & Bakermans-Kranenburg, M. J. (2006). Terrible ones?: Assessment of externalizing behaviors in infancy with the Child Behavior Checklist. *Journal of Child Psychology and Psychiatry*, 47(8), 801–810.
- Wakschlag, L., Briggs-Gowan, M., Carter, A., Hill, C., Danis, B., Keenan, K., et al. (2007). A developmental framework for distinguishing disruptive behavior from normative misbehavior in preschool children. *Journal of Child Psychology and Psychiatry*, 48(10), 976–987.
- Wakschlag, L., Briggs-Gowan, M., Choi, S., Nichols, S., Kestler, J., Burns, J., et al. (2014). Advancing a multidimensional, developmental spectrum approach to preschool disruptive behavior. *Journal of the American Academy of Child and Adolescent Psychiatry*, 53(1), 82–96.
- Wakschlag, L., Briggs-Gowan, M., Hill, C., Danis, B., Leventhal, B., Keenan, K., et al. (2008). Observational assessment of preschool disruptive behavior: Part 2. Validity of the disruptive behavior diagnostic observation schedule (DB-DOS). *Journal of the American Academy of Child and Adolescent Psychiatry*, 47(6), 632–641.
- Wakschlag, L., Choi, S., Carter, A., Hullsiek, H., Burns, J., McCarthy, K., et al. (2012). Defining the developmental parameters of temper loss in young children: Implications for developmental psychopathology. *Journal of Child Psychiatry and Psychology*, 53, 1099–1108.
- Wakschlag, L., Estabrook, R., Petittlerc, A., Henry, D., Burns, J., Perlman, S., et al. (2015). Clinical implications of a dimensional approach: The normal:abnormal spectrum of early irritability. *Journal of the American Academy of Child and Adolescent Psychiatry*, 54(8), 626–634.
- Wakschlag, L., Henry, D. B., Tolan, P. H., Carter, A. S., Burns, J. L., & Briggs-Gowan, M. J. (2012). Putting theory to the test: Modeling a multidimensional, developmentally-based approach to preschool disruptive behavior. *Journal of the American Academy of Child and Adolescent Psychiatry*, 51(6), 593–604.
- Wakschlag, L., Hill, C., Carter, A. S., Danis, B., Egger, H. L., Keenan, K., et al. (2008). Observational assessment of preschool disruptive behavior: Part 1. Reliability of the Disruptive Behavior Diagnostic Observation Schedule (DB-DOS). *Journal of the American Academy of Child and Adolescent Psychiatry*, 47(6), 622–631.
- Wakschlag, L., Leventhal, B., Briggs-Gowan, M., Danis, B., Keenan, K., Hill, C., et al. (2005). Defining the “disruptive” in preschool behavior: What diagnostic observation can teach us. *Clinical Child and Family Psychology Review*, 8, 183–201.
- Wakschlag, L., Leventhal, B., & Thomas, B. (2007). Disruptive behavior disorders and ADHD in preschool children: Characterizing heterotypic continuities for a developmentally informed nosology for DSM V. In W. Narrow, M. First, P. Sirovatka, & D. Regier (Eds.), *Age and gender considerations in psychiatric diagnosis: A research agenda for DSM-V* (pp. 243–258). Arlington, VA: American Psychiatric Association.
- Wakschlag, L., Perlman, S., Blair, R., Leibenluft, E., Briggs-Gowan, M., & Pine, D. (2018). The neurodevelopmental basis of early childhood disruptive behavior: Irritable and callous phenotypes as exemplars. *American Journal of Psychiatry*, 175, 114130.
- Wakschlag, L., Petittlerc, A., Estabrook, R., Burns, J., Roberts, M., Norton, E., et al. (2017). *Dimensional phenotypes of irritability, aggression and noncompliance in very young children: Validation of the MAP-DB Infant–Toddler Version*. Manuscript in preparation.
- Wakschlag, L., Petittlerc, A., Estabrook, R., Roberts, M., Norton, E., Burns, J., et al. (2017). *When to worry about young children's irritability: Developmental validation of the MAP-DB Infant–Toddler Temper Loss Scale*. Manuscript in preparation.

- Wakschlag, L., Tolan, P., & Leventhal, B. (2010). "Ain't misbehavin'": Towards a developmentally-specified nosology for preschool disruptive behavior. *Journal of Child Psychology and Psychiatry*, *51*, 3–22.
- Waller, R., Gardner, F., Viding, E., Shaw, D. S., Dishion, T. J., Wilson, M. N., et al. (2014). Bidirectional associations between parental warmth, callous-unemotional behavior, and behavior problems in high-risk preschoolers. *Journal of Abnormal Child Psychology*, *42*(8), 1275–1285.
- Waller, R., Hyde, L. W., Grabell, A. S., Alves, M. L., & Olson, S. L. (2015). Differential associations of early callous-unemotional, oppositional, and ADHD behaviors: Multiple domains within early-starting conduct problems? *Journal of Child Psychology and Psychiatry*, *56*(6), 657–666.
- White, J. L., Moffitt, T. E., Earls, F., Robins, L., & Silva, P. A. (1990). How early can we tell?: Predictors of childhood conduct disorder and adolescent delinquency. *Criminology*, *28*, 507–533.
- White, S. F., Briggs-Gowan, M. J., Voss, J. L., Petitclerc, A., McCarthy, K. R. Blair, R. J., et al. (2016). Can the fear recognition deficits associated with callous-unemotional traits be identified in early childhood? *Journal of Clinical and Experimental Neuropsychology*, *38*(6), 672–684.
- Wiggins, J. L., Briggs-Gowan, M. J., Estabrook, R., Brotman, M. A., Pine, D. S., Leibenluft, E., et al. (2017). *Enhancing sensitivity and specificity of clinically significant irritability in early childhood: A developmental, ROC approach*. Manuscript under review.
- Willoughby, M., Kupersmidt, J., & Bryant, D. (2001). Overt and covert dimensions of antisocial behavior in early childhood. *Journal of Abnormal Child Psychology*, *29*, 177–187.
- Willoughby, M. T., Waschbusch, D. A., Moore, G. A., & Propper, C. B. (2011). Using the ASEBA to screen for callous unemotional traits in early childhood: Factor structure, temporal stability, and utility. *Journal of Psychopathology and Behavioral Assessment*, *33*(1), 19–30.
- Zero to Three. (2016). *Diagnostic classification of mental health and developmental disorders of infancy and early childhood: DC:0–5*. Washington, DC: Author.