Common emotional and behavioral disorders in preschool children: presentation, nosology, and epidemiology

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We review recent research on the presentation, nosology and epidemiology of behavioral and emotional psychiatric disorders in preschool children (children ages 2 through 5 years old), focusing on the five most common groups of childhood psychiatric disorders: attention deficit hyperactivity disorders, oppositional defiant and conduct disorders, anxiety disorders, and depressive disorders. We review the various approaches to classifying behavioral and emotional dysregulation in preschoolers and determining the boundaries between normative variation and clinically significant presentations. While highlighting the limitations of the current DSM-IV diagnostic criteria for identifying preschool psychopathology and reviewing alternative diagnostic approaches, we also present evidence supporting the reliability and validity of developmentally appropriate criteria for diagnosing psychiatric disorders in children as young as two years old. Despite the relative lack of research on preschool psychopathology compared with studies of the epidemiology of psychiatric disorders in older children, the current evidence now shows quite convincingly that the rates of the common child psychiatric disorders and the patterns of comorbidity among them in preschoolers are similar to those seen in later childhood. We review the implications of these conclusions for research on the etiology, nosology, and development of early onset of psychiatric disorders, and for targeted treatment, early intervention and prevention with young children. Keywords: Diagnosis, comorbidity, preschoolers, nosology, epidemiology, prevalence. Abbreviations: ADHD: attention-deficit hyperactivity disorder; ODD: oppositional defiant disorder; CD: conduct disorder; SAD: separation anxiety disorder; GAD: generalized anxiety disorder; PTSD: post-traumatic stress disorder; PAPA: Preschool Age Psychiatric Assessment; PTRTS: PAPA Test–Retest Study (PTRTS).

In the USA the number of preschool-age children receiving psychopharmacological treatment increased 3-fold from 1990 to 1995 (Zito, 2002; Zito et al., 2000) and is still growing (Barbaresi, 2003; Blackman, 1999; DeBar, Lynch, Powell, & Gale, 2003; Greenhill, 1998; Greenhill et al., 2003; Minde, 1998; Patel, Crismon, Hoagwood, & Johnsrud, 2005; Rappley et al., 2002; Stubbe & Martin, 2000; Waters, 1990; Zito et al., 2000). These data are concerning because our understanding of the nosology of preschool mental health disorders is still in its infancy (Angold & Egger, 2004). While the pediatricians and psychiatrists prescribing psychotropic medications for preschoolers are explicitly, or implicitly, applying some set of diagnostic criteria to these children, there is currently no consensus about the best criteria for defining most psychiatric disorders in very young children (Pine et al., 2002). How are these young children being diagnosed? What criteria are being applied? Are the criteria developmentally sensitive? Do they account for age-appropriate variation during this period of rapid cognitive, social, emotional and behavioral development? How do we distinguish between normative individual differences, temperamental variation, and clinically significant behaviors and emotions?

Answers to these questions have enormous implications for early intervention/prevention efforts, as well as for our understanding of the early emergence of psychopathology.

With the exception of autism (Volkmar, Lord, & Bailey, 2004) and, perhaps, ADHD (for a review see Egger, Kondo, & Angold, in press b), our understanding of the nosology of preschool psychiatric disorders, as well as the epidemiology of their prevalence and course, is still far behind our understanding of psychiatric disorders in older children (Angold & Egger, 2004). It is only very recently that a few programs of research on psychiatric disorders in preschoolers have begun to apply standardized measurement strategies (Carter, Briggs-Gowan, & Davis, 2004) familiar from the study of psychopathology in older children, such as reliable structured diagnostic interviews (Egger & Angold, 2004), to do the type of psychiatric epidemiology and clinical research with preschoolers that has been done with older children and adults.

Studies in adults using retrospective reports of onset dates have repeatedly shown that a substantial proportion of psychiatric disorders start in childhood or adolescence (Kessler et al., 2005a; Kim-Cohen et al., 2003). Thomas Insel, current Director...
of NIMH, recently concluded that psychiatric symptoms and disorders ‘begin early in life, are chronic, and protracted’ (Insel & Fenton, 2005, p. 590). In this paper, we will review various approaches to the characterization of preschool psychopathology, as well as recent data on the most common psychiatric disorders in preschool children. Although our understanding of preschool psychopathology lags far behind our understanding of psychopathology in school-age children and adolescents, these data suggest that to truly understand the ‘early onset’ of psychiatric disorders, we can start no later than the preschool period.

Methods

We review the literature on preschool psychopathology published concerning five diagnostic areas: attention-deficit hyperactivity disorder (ADHD), oppositional defiant disorder (ODD), conduct disorder (CD), depressive disorders (major depression, dysthymia, depression NOS/ minor depression), and anxiety disorders (separation anxiety disorder (SAD), generalized anxiety disorder (GAD), social phobia, specific phobia, post-traumatic stress disorder (PTSD)). This review will not consider autism or pervasive developmental disorders, because an excellent review was published in the 2004 JCPP Annual Review issue (Volkmar et al., 2004).

While we touch upon issues of measurement and assessment, we also refer readers to Carter and colleagues’ 2004 review of assessment measures for young children (Carter et al., 2004) and a recent book on the mental health assessment of infants and toddlers (DelCarmen-Wiggins & Carter, 2004), for in-depth reviews of methods and measures for assessing preschool psychopathology, as well as discussions of unresolved issues including methods for combining information from multiple informants, methods for making diagnoses in young children, methods for assessing young children’s internal distress, and approaches to the assessment of impairment.

Should preschoolers be diagnosed with psychiatric disorders?

Many researchers and clinicians wonder whether it is possible, or even desirable, to classify psychiatric disorders in preschool children (for a review of these concerns see Angold & Egger, 2004; Carter et al., 2004; Emde, Bingham, & Harmon, 1993). Objections to the classification of psychiatric disorders in preschoolers arise from several concerns: (1) that the preschool period involves such rapid physical (including neural), behavioral, emotional, and cognitive development that it is not possible to identify valid symptoms or clusters of symptoms that can be reliably measured, (2) that individual differences in normal development will be inappropriately identified as psychiatric symptoms or disorders, (3) that the dominant psychiatric taxonomy, the DSM/ICD approach, does not account for developmental variation, (4) that young children will be inappropriately ‘labeled’ with ‘diseases’ that will adversely shape the child’s perception of him/herself and parents’ or other caregivers’ perceptions of the child, and (5) that problematic behavior in very young children is not located ‘in the child’ but rather in the relationships between parents and children and the wider environment.

Similar concerns were raised 30 years ago when researchers began to define the nosology of psychiatric disorders in older children. In particular, the argument was made that depression diagnosed using adult criteria did not occur in school-age children and adolescents (Rie, 1966; Sandler & Joffe, 1965; Toolan, 1962). However, the operationalization of criteria for specific psychiatric disorders and sub-types of disorders and the development of reliable measures of these criteria proved to be the critical first steps in demonstrating the validity of childhood psychiatric disorders (or symptom clusters), including depression. That work has now allowed the field to move on to considering the physiologic, neural, genetic, and environmental correlates of these disorders, and their responses to treatment. For instance, the DSM criteria for depression were found to identify a valid childhood psychiatric disorder which could be reliably measured using structured psychiatric interviews, was not that uncommon, and was responsive to both medication and cognitive-behavioral treatment.

The significant advances in our understanding of the nosology, epidemiology, and neuropsychological and genetics correlates of autism spectrum disorders in young children have resulted from a similar systematic program of research (Fombonne, 2003; Rutter, 2000; Volkmar et al., 2004). Overall, the DSM-IV diagnostic criteria have worked quite well as a means of advancing our understanding of the presentation and course of autism spectrum disorders, despite their lack of developmentally specific criteria. The dual approach of testing the applicability of current diagnostic criteria for identifying autism spectrum disorders in young children, while exploring the validity and clinical utility of developmentally specific criteria and/or diagnostic algorithms for use with young children, provides an exemplary roadmap for examining the validity of specific behavioral and emotional disorders in preschoolers.

Multiple classification systems

There are different approaches and taxonomies for identifying young children with ‘at-risk’, ‘problematic’ or ‘clinically significant’ emotions and behavior.
Historically, young children’s affective and behavioral dysregulation has been approached dimensionally, with cutoffs set to characterize subsets of children at the extreme of the distribution of (1) normative behaviors and emotions and/or (2) temperament traits. In these models, extremes of problems or temperament traits have typically been regarded as precursors of, or risk factors for, later psychopathology, rather than as manifestations of psychiatric disorders similar to those identified at later stages of life. Diagnostic classifications of preschool psychopathology, categorical approaches, have either used (1) the DSM/ICD nosology, either unmodified or modified to be developmentally appropriate for young children (e.g., the Research Diagnostic Criteria-Preschool Age (Task Force on Research Diagnostic Criteria: Infancy and Preschool, 2003)), or (2) the Diagnostic Classification: 0–3 (DC:0–3), an alternative system for classifying mental health disorders in infant and toddlers (Zero to Three, 1994, 2005). These categorical approaches seek to identify clinically significant syndromes, characterized by severity, pervasiveness, persistence, and impairment, that are, themselves, early-onset ‘disorders,’ rather than simply risk factors for later disorders. None of these approaches to preschool dysfunction has established its superiority over the others. Each provides a particular window into understanding the phenomena of problematic behavioral and emotional dysregulation in preschoolers.

**Dimensional approaches**

*Checklist measures and ‘clinically significant’ cutoffs on symptom scales.* A number of studies, from the 1940s on, demonstrated that individual symptoms including aggression, oppositionality, hyperactivity, fears, and social anxiety were common in young children (Cummings, 1944; Earls, 1980; Griffiths, 1952; Loeb & Stouthamer-Loeb, 1997; MacFarlane, Allen, & Honzik, 1954; Marks, 1987; Richman et al., 1974; Tremblay, 2004). An important contribution of these studies was the description of the distribution of normative and problematic behavior in non-clinical samples of children and the variation in their presentations from toddlerhood to kindergarten entry. The careful description of behaviors and their frequencies and other qualities at each age in non-clinical populations is a necessary first step. This descriptive work makes it possible to designate empirically-determined cutoffs and identify non-normative clusters of symptoms.

More recently, studies of preschoolers have used checklist measures to define specific types of disordered groups of young children. These measures include ‘empirically-derived’ checklists such as the Child Behavior Checklist (CBCL) 1½–5 (Achenbach & Rescorla, 2000), DSM-referenced rating scales such as the Early Childhood Inventory-4 (ECI) (Gadow & Sprafkin, 1997, 2000; Gadow, Sprafkin, & Nolan, 2001; Sprafkin & Gadow, 1996), or checklist measures of specific symptom clusters such as the ADHD Rating Scale (DuPaul, Power, Anastopoulos, & Reid, 1998; Gimpel & Kuhn, 2000) or the Preschool Anxiety Scale (PAS) (Spence, Rapee, McDonald, & Ingram, 2001). Although checklist measures like these do not include enough symptom specificity (e.g., frequency, duration, onset) to enable researchers or clinicians to make the sorts of psychiatric diagnoses that we are familiar with at every other stage of life, they have been informative in a number of ways: (1) They show that relatively stable psychopathological characteristics can be reliably identified in preschoolers (consider, for instance, the encouraging psychometric properties of the CBCL 1½–5 (Achenbach & Rescorla, 2000) and the Early Childhood Inventory (ECI) (Gadow & Sprafkin, 1997)). (2) They have estimated the overall prevalence of ‘problematic’ preschool behavior at somewhere between 7% and 25% (Earls, 1980; Earls et al., 1982; Earls & Richman, 1980a; Earls & Richman, 1980b; Jenkins, Bax, & Hart, 1980; Koot & Verhulst, 1991; Richman, 1977; Richman, Stevenson, & Graham, 1982; Richman et al., 1974; Stevenson, Richman, & Graham, 1985; Thomas, Byrne, Offord, & Boyle, 1991), rates quite similar to those reported in early questionnaire studies of symptoms in older children (for a review see Achenbach & Edelbrock, 1978). (3) They have consistently identified distinct emotional (internalizing) and behavioral (externalizing) syndromes (Achenbach, Edelbrock, & Howell, 1987; Achenbach & Rescorla, 2000; Behar & Stringfield, 1974; Crowther, Bond, & Rolf, 1981; Koot, van den Oord, Verhulst, & Boomsma, 1997; Koot & Verhulst, 1991; McGuire & Richman, 1986; Richman et al., 1982; van den Oord, Koot, Boomsma, Verhulst, & Orlebeke, 1995). (4) They have provided strong evidence of continuity between preschool behavioral and emotional problems and psychopathology in later childhood (Campbell & Ewing, 1990; Campbell, Ewing, Breaux, & Szumowski, 1986; Earls, 1980; Fischer, Rolf, Hasazi, & Cummings, 1984; Keenan, Shaw, Deliquadro, Giovannelli, & Walsh, 1998; McGee, Partidge, Williams, & Silva, 1991; Mesman & Koot, 2000; Mesman & Koot, 2001; Richman et al., 1982; Shaw, Owens, Giovannelli, & Winslow, 2001), and even adulthood (Caspi, Moffitt, Newman, & Silva, 1996; Stevenson & Goodman, 2001). (5) They have identified clusters of symptoms that map onto the broad and specific DSM diagnostic categories (e.g., CBCL 1½–5 DSM-oriented scales (Achenbach & Rescorla, 2000) and ECI DSM-referenced syndromes (Gadow & Sprafkin, 1997, 2000; Gadow et al., 2001; Sprafkin & Gadow, 1996)). (6) They have been the basis for demonstrations of the heritability of certain preschool behaviors and emotions (van den Oord et al., 1995; van den Oord, Verhulst, & Boomsma, 1996), including differentiated clusters of anxiety symptoms (Eley et al., 2003).
Preschool temperaments as risk factors for psychiatric disorders later in childhood and adulthood. For 40 years temperament research has generated findings of great relevance to preschool psychopathology. The concept originated in the field of infancy research (Rutter, Birch, Thomas, & Chess, 1964; Thomas & Chess, 1977), but has now extended its reach into adulthood to cover formulations of a putative small number of dimensions with wide-ranging impacts on emotions, behavior, and psychopathology (e.g., Battaglia, Przybeck, Bellodi, & Cloninger, 1996; Ono et al., 2002; Wills, Windle, & Cleary, 1998). Although various conceptualizations of temperament have been proposed, each system shares common elements: Temperament characteristics are individual differences in reactivity and regulation that are constitutional (i.e., inherited, biological, physiological), present early in life, and relatively stable, although influenced by maturation and experience (Buss & Plomin, 1975; Goldsmith et al., 1987; Rothbart & Bates, 1998; Thomas & Chess, 1977). Broad temperament dimensions, particularly negative affectivity (which resembles adult neuroticism), and extreme temperament types, particularly behavioral inhibition and behavioral disinhibition, have been identified as risk factors for the development of psychiatric disorders later in childhood and adulthood, and have been shown to be concurrently associated with problematic behaviors in preschoolers.

Like the broad internalizing scale of the CBCL, negative affectivity is a global measure of a range of negative emotions including sadness, fear, anger, frustration, poor adaptability, and high emotional intensity (Buss & Plomin, 1984; Rothbart, Ahadi, Hersey, & Fisher, 2001; Rowe & Plomin, 1977; Thomas & Chess, 1977). Preschool negative affectivity has been found to predict later childhood externalizing and internalizing symptoms (Bates & Bayles, 1988; Caspi et al., 1995; Caspi & Silva, 1995; Earls, 1982b; Earls & Jung, 1987; Gjone & Stevenson, 1997; Goldberg, Corter, Lojkasek, & Minde, 1990; Goldsmith & Lemery, 2000; Goodyer, Ashby, Altham, Vize, & Cooper, 1993; Rende, 1993; Sanson, Oberklaid, Pedlow, & Prior, 1991; Schmitt et al., 1999; Shaw, Keenan, Vondra, Delliquadi, & Giovannelli, 1997), as well as antisocial behavior in adulthood (Henry, Caspi, Moffitt, & Silva, 1996; Moffitt, Caspi, Dickson, Silva, & Stanton, 1996). A few studies of preschoolers have linked negative affectivity to concurrent measures of overall problem behaviors (Earls, 1982b; Earls & Jung, 1987), internalizing and externalizing syndromes (Guerin, Gottfried, & Thomas, 1997; Lee & Bates, 1985; Mazziade, Côté, Bernier, Boutin, & Thivierge, 1989; Mazziade, Côté, Thivierge, Boutin, & Bernier, 1989; Shaw, Owens, Vondra, Keenan, & Winslow, 1996), and symptoms of anxiety and depression (Keenan et al., 1998; Kingston & Prior, 1995; Shaw et al., 1997; Wolfson, Fields, & Rose, 1987).

Patterns of temperament traits in preschoolers have also been linked to increased risk for later psychiatric disorders. The two extreme temperament types of behavioral inhibition (BI) and behavioral disinhibition/exuberance (BD) have been well characterized in infants and young children (for a review see Hirshfeld-Becker et al., 2003). Distinct patterns of biological arousal and reactivity underscore the differences in emotion regulation underlying these two patterns of temperamental emotionality (Derryberry & Rothbart, 1997; Fox, Henderson, Rubin, Calkins, & Schmidt, 2001; Fox, Schmidt, Calkins, Rubin, & Coplan, 1996; Gray, 1982). BI, identified in about 15% of preschoolers (and young rhesus monkeys), is associated with shyness, fear, withdrawal in novel situations, and anxious/fearful distress. BI is heritable, associated with parental anxiety disorders, has physiological accompaniments (sympathetic, cardiovascular, and cortisol hyper-reactivity), and is a risk factor for anxiety disorders and depression later in childhood and adulthood (Adamec & Stark-Adamec, 1989; Biederman et al., 1993; Biederman, Rosenbaum, Chaloff, & Kagan, 1995; Caspi et al., 1996; DiLalla & Falligant, 1995; DiLalla, Kagan, & Reznick, 1994; Fisher, Kagan, & Reznick, 1994; Hirshfeld, Biederman, Brody, Fareone, & Rosenbaum, 1997; Hirshfeld et al., 1992; Hirshfeld-Becker et al., 2003; Nachimias, Gunnar, Mangelsdorff, Parrritz, & Buss, 1996; Suomi, 1999). BI’s inverse, BD, is characterized by high approach, high novelty seeking, low harm avoidance, and irritable distress. BD is a putative risk factor for ADHD, disruptive behavioral disorders (DBDs), comorbid DBDs and mood disorders, and aggressive behaviors (Caspi et al., 1995, 1996; Caspi & Silva, 1995; Hirshfeld-Becker et al., 2002; Raine, Reynolds, Venables, Mednick, & Farrington, 1998; Rubin, Burgess, Dwyer, & Hastings, 2003; Tremblay, Pihl, Vitaro, & Dobkin, 1994).

Although temperamental characteristics have been conceptualized as risk factors for a variety of psychiatric disorders across the lifespan, it is also possible that early-measured temperamental characteristics could represent the early presence of the disorders themselves. The lack of conceptual clarity about the distinction between temperament and psychopathology is reflected in the number of overlapping items in temperament and psychopathology measures. Such overlap presents a serious methodological and conceptual problem for understanding the relationship between temperament and early-onset psychopathology (Frick, 2004). For example, 24 items of the 94-item Child Behavior Questionnaire (CBQ) (Rothbart et al., 2001), a commonly used early childhood temperament scale, are identical to or direct opposites of items on the CBCL. As Lahey has pointed out, naming certain behaviors ‘temperament traits’ and other behaviors (or even the same behaviors) ‘psychiatric symptoms’ is not an act inherently reflective of nature, but rather reflects
distinctions stemming from particular theoretical perspectives (Lahey, 2004). Both perspectives reflect the fact that there is a continuum between developmentally normative behaviors and emotions, individual (temperamental) variations and clinically significant symptoms, with gradations based on patterns of distribution, intensity, frequency, duration, persistence, and impairment.

At this point, it seems plausible that some ‘extremes of temperament’ could qualify as psychiatric disorders (e.g., some behaviorally inhibited preschoolers may meet criteria for DSM-defined social phobia), but extremity on a temperament dimension is neither a necessary nor a sufficient condition for the identification of a psychiatric disorder. Psychiatric disorders include many symptoms that are not included in any temperament assessment, particularly at the severe end of the spectrum, and so, from a measurement perspective, the temperamental approach does not cover many clinically significant phenomena. Hence, temperament constructs do not provide a conceptual framework for the full range of psychopathology and clinical need. To our knowledge, no preschool study has yet assessed temperament characteristics and the full range of psychiatric symptoms, disorders, and impairments concurrently, and accounted for measurement overlaps between the two approaches. But that is what is needed if we are to compare classifications in terms of psychiatric disorders (based either on clinically significant cutpoints on symptom scales or diagnostic classifications) with classifications based on temperament traits and types.

**Diagnostic approaches**

As we noted above, there has been persistent concern that diagnosis of psychiatric disorders in preschoolers is ‘inappropriate’ because it ‘overpathologizes’ and ‘medicalizes’ normal variation, individual differences, transient perturbations, and relationship disturbances (Burke, 2003; McClellan & Speltz, 2003). Clearly, as we have already shown, there is a real and substantial challenge in distinguishing between developmentally normal behaviors or affect states, temperamental variation and clinically significant problems in very young children, although we would argue that this difficulty is not unique to this age period. On the other hand, clearly defined, clinically valid disorders that can be reliably assessed are essential for clinical practice. There has been a longstanding debate in the child psychiatric literature whether psychopathology in children is ‘dimensional’ with clinically significant problems representing the extreme end of a continuum or ‘categorical’ with individuals either meeting criteria (‘cases’) or not meeting criteria for a specific disorder (‘non-cases’) (Achenbach, 1991; Arend, Lavigne, Rosenbaum, Binns, & Christoffel, 1996; Pickles & Angold, 2003; Sonuga-Barke, 1998). However, clinical evaluation and intervention requires that the clinician decide whether to treat or not to treat a child. Whether ‘caseness’ is defined using a cutpoint on a dimensional measure or application of diagnostic criteria, a categorical decision must be made. From the medical point of view, this decision is called making a diagnosis. Echoing Pickles and Angold from their paper on this topic, the central question is not whether symptomatology in preschoolers is best conceptualized as scalar or categorical, but rather ‘under what circumstances’ (Pickles & Angold, 2003, p. 529) it is useful to measure and define clinically significant behaviors and affects from dimensional and categorical points of view.

The DSM-IV-TR (American Psychiatric Association, 2000) and ICD-10 (World Health Organization, 1992) are the dominant psychiatric classification systems used around the world. Because of the similarity between the DSM and ICD systems, as well as the lack of studies of ICD criteria in preschoolers, this review will focus on the DSM-IV-TR criteria. The DSM-IV-TR (as well as the preceding DSM versions) was developed with essentially no attention to the emotional and behavioral problems of preschoolers. A few DSM disorders include criteria specific to children (e.g., irritability can be the primary mood state for the diagnosis of childhood depressive disorders). A few DSM disorders require that the disorder have its onset during early childhood (e.g., the onset of some impairing ADHD symptoms must be before the age of 7). The DSM does include a separate section entitled ‘Disorders Usually First Diagnosed in Infancy, Childhood, or Adolescence.’ Nonetheless, none of these childhood designations are specific to very young children (except young children’s exclusion from a diagnosis of enuresis until age 5 or encopresis until age 4).

Recently, infant and preschool mental health researchers, sponsored by the American Academy of Child and Adolescent Psychiatry, proposed modifications of DSM diagnostic criteria for use with preschool children. These modifications were published in 2003 as the Research Diagnostic Criteria-Preschool Age (RDC-PA) (Task Force on Research Diagnostic Criteria: Infancy and Preschool, 2003). RDC-PA is available at http://www.infantinstitute.org. The purpose of the RDC-PA was to define clearly specified, developmentally appropriate criteria for preschool psychopathology so as to facilitate further research on the diagnostic validity of psychiatric disorders in preschoolers, just as the research diagnostic criteria published in 1978 (Spitzer, Endicott, & Robins, 1978) led to the operationalized diagnostic criteria in the DSM-III and research on the reliability and validity of the psychiatric nosology for adults and then children and adolescents.

The Diagnostic Classification: 0–3 takes a different approach from the RDC-PA, with a primary goal of classifying disorders in infants and toddlers that are not covered in the DSM system (Emde, 2003).
Despite its title, the DC: 0–3 has commonly been used with children from birth through age five. The DC: 0–3 includes alternative versions of DSM-IV diagnoses (e.g., for anxiety and depressive disorders), new diagnostic categories (e.g., regulatory disorders and parent–child relationship disorders), and a revised multi-axial system that places relationship disorders on Axis II and the child's 'functional emotional developmental level' on Axis V (Zero to Three, 1994). A lack of operationalized criteria, as well as a lack of boundaries between many of the disorders (e.g., regulatory disorders and many of the other disorders), has limited research on DC: 0–3 disorders, although a start has been made (e.g., Boris, Zeanah, Larrieu, Scheeringa, & Heller, 1998; Cordeiro, Caldeira da Silva, & Goldschmidt, 2003; Guedeney et al., 2003; Keren, Feldman, & Tyano, 2003; Reams, 1999; Scheeringa, Zeanah, Drell, & Larrieu, 1995; Stafford, Zeanah, & Scheeringa, 2003; Thomas & Clark, 1998) Despite this lack of adequate validation, DC: 0–3 is widely used in service settings, reflecting the clinical need for a developmentally appropriate approach to classifying clinically significant behaviors in young children. A revised version of DC: 0–3 (DC: 0–3R; Zero to Three, 2005) was published in August 2005. Studies comparing unmodified DSM criteria with the RDC-PA and DC: 0–3R criteria are a necessary, but as yet unrealized, first step toward the development of an integrated, developmentally sensitive classification of psychopathology across the lifespan.

Preschool psychiatric disorders

With these issues in mind, we now turn to a review of the epidemiology of behavioral disorders (ADHD, ODD, and CD) and emotional disorders (anxiety disorders and depression) in preschool children. We will start with overall prevalence rates and then discuss specific diagnostic categories, concluding with data on comorbidity. As far as possible, we will focus on studies conducted in community samples or primary care pediatric clinics, rather than those recruited from mental health clinics. Patients attending specialty mental health clinics are known to be a biased subset of children with more disorders, greater symptom severity, and greater impairment than children with disorders in the general population (Costello & Janiszewski, 1990; Goodman et al., 1997). Thus, community samples are needed to address questions about nosology, comorbidity, and risk. Although representative general population samples are ideal (but expensive), randomly selected general pediatric primary care samples are also acceptable because rates of psychiatric disorder in older children and adolescents in randomly selected general pediatric primary care samples have been found to be similar to general population prevalence rates (e.g., Costello et al., 1988; Horwitz, Leaf, Leventhal, Forayth, & Speechley, 1992). It is highly plausible that the same will be true of preschool pediatric primary care samples. We will review the data from four non-specialty-clinic studies of preschool psychiatric disorders that separately report data on specific psychiatric disorders in preschool children (Angold, Egger, Erkanli, & Keeler, submitted; Earls, 1982a; Keenan, Shaw, Walsh, Delli-quadri, & Giovannelli, 1997; Lavigne et al., 1996). We will also review relevant high-risk studies using a case-control design, which have contributed to our understanding of the presentation and correlated features of specific disorders in this age group.

Community or primary care clinic studies of preschool psychiatric disorders

We identified four studies assessing the full range of DSM-like psychiatric disorders in community or primary care samples of preschool children. Earls' study was far ahead of its time, using questionnaires followed by clinical judgment based on the DSM-III criteria to assess the rates of psychiatric disorders in all of the 3-year-old children (N = 100) living on Martha's Vineyard (Earls, 1982a). Fifteen years later Keenan and colleagues studied another small sample, this time of children living in poverty. Mothers of 104 five-year-olds were administered the K-SADS and DSM-III-R diagnoses in the children were made (Keenan et al., 1997).

The first reasonably large-scale epidemiologic diagnostic investigation of preschoolers has been reported in a series of papers beginning in 1996 by Lavigne and his colleagues (Arend et al., 1996; Dietz, Lavigne, Arend, & Rosenbaum, 1997; Lavigne et al., 1998a, 1998b, 1998c, 1994, 1999, 1998d, 1993, 1996; Lavigne, Schulein, & Hahn, 1986). Using a two-stage design, the CBCL was administered to 3,860 (79% of eligible parents) parents of children aged 2 through 5 years visiting one of 68 Chicago area pediatricians. From this sample, 191 children who scored at 90% or above on the CBCL and 319 matched 'low scorers' (total N = 510) were then reassessed with the CBCL and a number of other measures including the Rochester Adaptive Behavior Inventory and play observation of the child. Two psychologists independently reviewed the protocol (but did not conduct a clinical interview) and used their 'best estimate' to make DSM-III-R diagnoses; 56.3% of the families eligible for the second stage evaluation participated, resulting in an overall response rate of only 44.5% (Lavigne et al., 1996).

The most recent study, the PAPA Test–Retest Study (PTRTS), was conducted by the authors of this review (for more details about the design of the study see Angold et al., submitted; Egger et al., in press aj). The PTRTS was a screen-stratified, two-stage study with subjects recruited from a large primary care pediatric clinic serving families from diverse ethnic and socioeconomic backgrounds. Over an 18-month period,
1,073 parents of children aged 24–71 months old attending the clinic for well-child and sick child visits completed the CBCL, and high scorers were oversampled to produce a final sample of 307 children whose parents were interviewed. The overall protocol completion rate from initial screening contact in the clinic to completion of the second PAPA interview was 70%. Data is weighted back to the screening population to obtain unbiased general pediatric clinic estimates of (1) the normative range of emotional and behavioral symptoms in children ages 2–5 years old and (2) the diagnostic reliability and prevalence of psychiatric disorders in young children. All of these studies have limitations: a high refusal rate may have affected the representativeness of Lavigne’s (1996) sample; only one study used a diagnostic measure with adequate psychometric properties for use with preschoolers (Egger et al., submitted-b); and two obtained data only from parent reports (Egger et al., submitted-b; Keenan et al., 1997).

**Overall prevalence**

Table 1 shows the prevalence rates of DSM disorders from the four available studies of preschoolers in non-psychiatric settings. These rates are approximations of expected general population rates. In all but the Lavigne study, the rates of preschool emotional and behavioral disorders were roughly equal. The much lower rates of anxiety disorders and depression in the Lavigne study were coupled with a much higher rate of ODD (16%). It is possible that the low response rate (45%), and the use of clinical consensus, rather than a structured diagnostic interview and specified diagnostic algorithms, in the Lavigne study may have resulted in a substantial bias in favor of the diagnosis of ODD, and against emotional disorders (Lavigne et al., 1996).

Figure 1 compares the rates of overall and specific psychiatric disorders found in the PTRTS with the median rates in children 5–17 obtained from community studies of psychopathology in childhood and adolescence from 1993 to 2005 (Costello, Egger, & Angold, 2005) and with the rates reported for adults 18 or older in the National Comorbidity Survey Replication (NCS-R) (Kessler & Wai Tat Chiu, 2005). The first thing to note is that the overall rates of psychiatric disorders across the four preschool studies (ranging from 14–26.4%; mean: 19.5%) are similar to the overall rate of disorders reported for older children. Second, as has been shown repeatedly in studies of older children and adults (Canino et al., 2004; Kessler & Wai Tat Chiu, 2005; Shaffer, Fisher, Dulcan, & Davies, 1996), the prevalence rate of preschool disorders falls when impairment is a required criterion. The preschool rates of ‘serious emotional disturbance’ (SED), psychiatric disorder(s) that are associated with significant impairment (US Government, 1993), were again quite similar to the rates in older children (12.1% and 9.1% in the PTRTS and the Lavigne study respectively, compared with a median rate across community studies of 13.2% in older children and adolescents (Costello et al., 2005) and 15.6% (those with severe or moderate impairment associated with a psychiatric disorder) in adults (Kessler & Wai Tat Chiu, 2005)).

These compared rates in Figure 1 are all cross-sectional and thus cannot be said to reflect patterns of change across the lifespan. Nonetheless, they do suggest that while the overall rate of disorders, particularly those associated with impairment, are similar across the lifespan, the pattern of specific disorders varies with age. In particular, we note variation in the prevalence of specific anxiety disorders with the expected decrease in SAD. We also see an increase in the rates of depression and decrease in the rates of ODD and CD with age. The

### Table 1: Prevalence of DSM disorders in preschoolers, non-specialty-referred samples

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<tr>
<th>Assessment</th>
<th>Angold et al. (DSM-IV), N = 307</th>
<th>Lavigne et al. (DSM-III-R), N = 510</th>
<th>Keenan et al. (DSM-III-R), N = 104</th>
<th>Earls (DSM-III), N = 100</th>
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<tr>
<td>ADHD</td>
<td>3.3%</td>
<td>2.0%</td>
<td>5.7%</td>
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<td>ODD</td>
<td>6.6%</td>
<td>16.8%</td>
<td>8.0%</td>
<td>4%</td>
</tr>
<tr>
<td>CD</td>
<td>3.3%</td>
<td>0.3%</td>
<td>4.6%</td>
<td>0</td>
</tr>
<tr>
<td>Depression</td>
<td>2.1%</td>
<td>0.3%</td>
<td>1.1%</td>
<td>0</td>
</tr>
<tr>
<td>SAD</td>
<td>2.4%</td>
<td>0.3%</td>
<td>2.3%</td>
<td>5%</td>
</tr>
<tr>
<td>GAD</td>
<td>6.5%</td>
<td>0.5%</td>
<td>4.6%</td>
<td>2%</td>
</tr>
<tr>
<td>Social phobia</td>
<td>2.1%</td>
<td>0.7%</td>
<td>1.5%</td>
<td>0</td>
</tr>
<tr>
<td>Specific phobia</td>
<td>0.6%</td>
<td>0.6%</td>
<td>14.9%</td>
<td>14%</td>
</tr>
<tr>
<td>PTSD</td>
<td>0.6%</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Selective mutism</td>
<td>0.6%</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Any anxiety disorder</td>
<td>9.4%</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Any emotional disorder</td>
<td>10.5%</td>
<td>–</td>
<td>14.9%</td>
<td>–</td>
</tr>
<tr>
<td>Any behavioral disorder</td>
<td>9.0%</td>
<td>–</td>
<td>14.9%</td>
<td>–</td>
</tr>
<tr>
<td>Any disorder</td>
<td>16.2%</td>
<td>–</td>
<td>26.4%</td>
<td>14%</td>
</tr>
<tr>
<td>SED</td>
<td>12.1%a</td>
<td>9.1%b</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

SED: serious emotional disorder (aDSM criteria plus impairment; bDSM criteria plus CGAS score <60).
consistent rates of ADHD in the preschool period, later childhood, and adulthood are quite striking, particularly in light of the fact that the field has only recently recognized and developed tools to measure ADHD in early childhood and adulthood. At this point in time we can only present these comparisons as a crude cross-sectional snapshot because data are not currently available to enable us to address critical questions about homotypic and heterotypic continuity between preschool psychiatric disorders and later childhood and adult disorders.

### Impairment

In the DSM, some disorders require impairment (e.g., ADHD, selective mutism), while many others require either distress or impairment (e.g., SAD, depression). Lavigne and colleagues have not directly reported rates of impairment. In Keenan and colleagues’ study, 91.3% of children with any psychiatric disorder, 100% of those with a behavioral disorder, and 84.6% of those with an emotional disorder were impaired (based on a Global Assessment of Functioning (GAF) score of 60 or less), compared with 15.5% of those children without a disorder (Keenan et al., 1997). In the PAPA, disability (impairment) from psychiatric symptoms is assessed separately from the symptoms themselves, so that the relationship between individual symptoms and syndromes and impairment can be examined. In the PTRTS, all of the disorders were significantly associated with impairment. Overall, 74.5% (mean impairment score of 9.6) of preschoolers with any psychiatric disorder were impaired compared with 9.3% of those without a disorder (mean impairment score of 0.6) (OR = 21 [10, 44]; p < .0001) (Angold et al., submitted).

While these strong associations between symptom clusters (diagnoses) and impairment provide support for the validity of these diagnostic entities, both the Keenan study and PTRTS found that preschoolers with sub-syndromal disorders (missing diagnostic criteria by one or two symptoms) were also highly impaired, a finding that has also been reported for older children (Angold, Costello, Farmer, Burns, & Erkanli, 1999b). For example, in the PTRTS, while the DSM-IV-TR six-symptom cutpoint identified a group of children who were significantly impaired, these children were different in degree, not type, from children with sub-threshold ADHD. As has been reported in studies of older children
(Angold et al., 1999b; Costello, Angold, & Keeler, 1999; Pickles et al., 2001) and preschoolers (Lahey et al., 2004, 1998), there was a linear relationship between the number of ADHD symptoms and impairment. Each additional ADHD symptom doubled the chance that the child would also be impaired (Egger et al., submitted-b). This relationship between sub-threshold ADHD and impairment illustrates the importance of combining dimensional and categorical approaches to identifying children with clinically significant symptoms and challenges the assumption that diagnostic status is the most clinically useful way to identify children in need of mental health services.

**Age effects**

While many DSM diagnostic criteria specify that the symptoms must be ‘developmentally inappropriate,’ no further guidance is provided about how to determine the boundary between what is developmentally ‘appropriate’ and ‘inappropriate.’ The conflicting results about the effect of age on the prevalence of disorders in preschoolers in the Lavigne study and the PTRTS provide an opportunity to examine the challenge of identifying developmentally appropriate diagnostic criteria that account for age and developmental differences across the preschool period and between preschoolers and older children.

**Age differences within the preschool period.** In the Lavigne study, psychiatric disorders increased in prevalence from age two to three years old and then declined from age four to five years old. Most of this difference was accounted for by an initial increase in oppositional symptoms and ODD at age 3 followed by a decline. The prevalence of ODD was 22.5% in 3-year-olds and 15% in 5-year-olds (Lavigne et al., 1996). However, the overall high rate of ODD in this sample (nearly 17% compared with a mean of 6.2% across the three other studies) raises the question whether their ODD diagnosis is truly indexing ‘developmentally inappropriate’ oppositional behaviors. Because these symptoms were not identified using a structured interview (which we could examine to understand how the ODD symptoms were defined and assessed) and because the diagnostic algorithms are not available, we cannot answer this question.

In the PTRTS we found a similar peak of problematic behaviors (as well as affect dysregulation) in 3-year-olds, leading us to agree with Lavigne that the ‘terrible twos’ should really be the ‘terrible threes’ (Tremblay and colleagues have found a similar peak of aggression at age 3 (Tremblay, 2004)). Nonetheless, we did not find a similar peak of disorders at age 3. We found no significant differences in the prevalence of ODD for toddlers (2- and 3-year-olds) compared with older preschoolers, nor did we find a significant age effect when age was entered into the model as a continuous variable. These data led us to use the same symptom cutpoints and diagnostic algorithms for diagnosing ODD across the preschool period with the PAPA. In the future, larger samples, multi-modal, multi-informant assessments, and longitudinal study designs will enable us to continue to examine the need for age (or developmental level) specific diagnostic algorithms for ODD and other disorders.

**Age differences between preschoolers and older children.** The DSM states that the symptoms of ODD must occur ‘often’ or ‘more frequently than is typically observed in individuals of comparable age and developmental level’ (American Psychiatric Association, 2000).

Using the same approach used in the Great Smoky Mountain Study of older children (Angold & Costello, 1996), we operationalized ‘often’ as specified in the ODD criteria as a frequency at or above the 90th percentile for preschoolers. Table 2 illustrates that if we had used the cutpoint that identified the 90th percentile in the GSMS for older children, then we would have vastly overdiagnosed ODD symptoms in preschoolers, because, as noted above, many of these behaviors are more common in young children. These data also show that there is great variation in frequency across the symptoms, suggesting that a priori cutpoints incorporated into a number of symptom and diagnostic measures (e.g., coding a symptom present if it occurs more than three times a week) may well be incorrect. This example illustrates the importance of setting symptom cutpoints based on the distribution of the behavior in the whole popula-

**Table 2** Comparison of frequency cutpoints to define ODD symptoms for preschoolers

<table>
<thead>
<tr>
<th>ODD symptom</th>
<th>90th % frequency for older children</th>
<th>Prevalence for preschoolers using cutpoints for older children</th>
<th>Empirically derived 90th % frequency for preschoolers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Often loses temper</td>
<td>At least 2 times/week</td>
<td>30.1%</td>
<td>2–3 times/day</td>
</tr>
<tr>
<td>Often argues with adults</td>
<td>At least 2 times/week</td>
<td>7.7%</td>
<td>2 times/week</td>
</tr>
<tr>
<td>Often actively defies</td>
<td>At least 2 times/week</td>
<td>57.1%</td>
<td>5 times/day</td>
</tr>
<tr>
<td>Often deliberately annoys people</td>
<td>At least 4 times/week</td>
<td>11.1%</td>
<td>5 times/week</td>
</tr>
<tr>
<td>Often blames others</td>
<td>&gt; once in 3 months</td>
<td>26.7%</td>
<td>Once a week</td>
</tr>
<tr>
<td>Often touchy or easily annoyed</td>
<td>At least 2 times/week</td>
<td>3.4%</td>
<td>&gt; once in 3 months</td>
</tr>
<tr>
<td>Often angry and resentful</td>
<td>At least 4 times/week</td>
<td>20.7%</td>
<td>Once a day</td>
</tr>
<tr>
<td>Often spiteful or vindictive</td>
<td>&gt; once in 3 months</td>
<td>10.3%</td>
<td>&gt;3 times in 3 months</td>
</tr>
</tbody>
</table>

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tion, rather than asking the parent or other informant to decide if the behavior ‘often’ occurs or is abnormal.

We present this example as one approach to operationalizing the DSM ODD criteria for young children, a first step toward characterizing empirically-derived constellations of abnormal disruptive and oppositional behaviors in preschoolers.

**Gender effects**

Of the four preschool studies reviewed here, only the Lavigne study and PTRTS examined gender differences in the prevalence of overall and specific disorders in preschoolers. Lavigne and colleagues found that boys were more likely to have a psychiatric disorder, with this difference being generated largely by ODD. The rate of ‘pure’ ODD was twice as high for boys, while the rate of ‘comorbid ODD’ was similar in boys and girls (Lavigne et al., 1996). There were no gender differences in the rates of emotional disorders (Lavigne et al., 1996). In the PTRTS, there were no significant gender effects on the prevalence of any of the five disorders (ODD, CD, ADHD, any anxiety disorder, depression), specific anxiety disorders, or ‘pure’ versus comorbid ODD. There was a trend suggesting that boys were more than twice as likely as girls to meet criteria for ADHD (4.7% vs. 1.8%; OR = 2.7 (.9, 7.8), p = .07) (Angold et al., submitted). A look at the ADHD sub-types revealed that combined type ADHD was much more common in boys than girls (2.7% vs. 0.3%; OR = 9.7 (1.1, 83); p = .04), while hyperactive-impulsive type was equally common in boys and girls (2.0% vs. 1.5%; OR = 1.3 (.4, 4.4); p = .7) (Egger et al., submitted-b).

**Specific psychiatric disorders**

We now turn to a review of data on specific behavioral and emotional disorders diagnosed in preschoolers. Most of the work on specific preschool psychiatric disorders has been conducted with ‘high-risk’ children recruited from specialty mental health clinics. Results from these studies will be included in this review because of the relative paucity of data on specific psychiatric disorders in community or primary care samples of preschoolers.

**Behavioral disorders**

The vast majority of work on preschool psychopathology has focused on ADHD and the disruptive behavior disorders, ODD and CD.

**ADHD.** ADHD appears to be the most common diagnosis received by young children referred for mental health services (Gadow et al., 2001; Keenan & Wakschlag, 2000; Wilens et al., 2002b). For instance, 86% of 200 preschoolers consecutively referred to an academic child psychiatry clinic were diagnosed with ADHD (Wilens et al., 2002b). The DSM-IV-TR states that the child’s inattention and/or hyperactivity-impulsivity must be severe, frequent, persistent, and ‘inconsistent with developmental level’ to be considered a symptom of ADHD. For preschoolers, who are developing the capacity to sustain attention (Jones, Rothbart, & Posner, 2003) and inhibit behavior (Diamond & Gilbert, 1989; Dowsett & Livesey, 2000), defining the boundaries between normal and clinically significant inattention, hyperactivity, and impulsivity behaviors is challenging (Kochanska, Coy, & Murray, 2001; Kochanska, Murray, & Harlan, 2000; Keenan & Wakschlag, 2002; Nigg, Goldsmith, & Sachek, 2004; Wakschlag & Keenan, 2001). Reports of the increase in the rate of stimulant prescriptions for preschoolers (DeBar et al., 2003; Rappley et al., 2002; Zito et al., 2000) over the past decade have raised the concern that normal preschool behaviors and capacities are being inappropriately pathologized.

Table 3 summarizes the prevalence rates for the 18 DSM-IV-TR ADHD symptoms from four studies of preschoolers in either primary care or daycare/preschool settings (Egger et al., submitted-b; Gadow & Sprafkin, 1997; Gimpel & Kuhn, 2000; Pavuluri, Luk, & McGee, 1999), with those symptoms endorsed for 10% or more of the children bolded. These data show (1) variation in rates by symptoms with the hyperactivity/impulsivity symptoms appearing to be relatively more common than the inattentive symptoms and (2) variation in rates by type of measure, with the highest rates reported in the study that used a ‘yes/no’ questionnaire (Pavuluri et al., 1999). However, despite the fact that some ADHD symptoms are commonly endorsed by parents of preschoolers, the mean number of hyperactive/impulsive symptoms was only 1.3 (sd 1.9) in the PTRTS and 1.2 (sd 1.6) in Gadow and colleagues’ study and the mean number of inattentive symptoms was 0.6 (sd 1.5) in both of these studies (Egger et al., submitted-b; Gadow & Sprafkin, 1997). In the PTRTS, only 2.8% of the preschoolers had the six or more symptoms needed to meet the symptom count criterion for inattentive ADHD and only 5.6% had six or more hyperactive/impulsive symptoms (Egger et al., submitted-b). Of the 5.7% of the children who had 6 or more symptoms in either or both categories, 58% met full ADHD diagnostic criteria (for an overall prevalence of 3.3%) (Egger et al., submitted-b). These data suggest that the DSM-IV-TR ADHD criteria are far from being descriptive of ‘normative’ preschool behavior.

Numerous studies have shown that DSM-IV ADHD criteria define a syndrome in preschoolers that behaves in terms of its correlates, heritability, and response to treatment like the disorder we are familiar with in older children (Connor, 2002; DeWolfe, Byrne, & Bawden, 2000; DuPaul, McGoey, Eckert, & Vanbrakle, 2001; Gadow & Nolan, 2002; Gimpel & Kuhn, 2000; Keown & Woodward, 2002;
Lahey et al., 1998; McGoey, Eckert, & DuPaul, 2002; Sonuga-Barke, Dalen, Daley, & Remington, 2002; Thomas & Guskin, 2001; Wilens et al., 2002a). The psychosocial impairment in relationships and functioning at home and at school, familiar from studies of older children with ADHD (Barkley, 1998; Barkley, Anastopoulos, Guevremont, & Fletcher, 1991), is already present during the preschool period (Egger et al., submitted-b; Gadow & Nolan, 2002; Lahey et al., 2004, 1998). In Lahey and colleagues’ study of 126 preschoolers with ADHD and 126 matched controls, the children with ADHD (all sub-types) were significantly impaired in global functioning, as well as in specific social relationships, including those with parents, teachers, and peers, and in academic functioning (Lahey et al., 1998). A three-year follow-up found that children with preschool ADHD continued to be functionally impaired across all settings and relationships (Lahey et al., 2004). In the PTRTS, over 40% of preschoolers who met criteria for ADHD had already been suspended from school or daycare, compared with only .5% of children without ADHD. Nearly 16% had been expelled (Egger et al., submitted-b). These data, as well as the similarity between the prevalence rates for preschool ADHD reported in the four non-specialty clinic studies reviewed above, and the consistency between preschool rates and those reported for older children (Costello et al., 2005) and adults (Kessler, Chiu, Demler, & Walters, 2005b), indicate that the unmodified DSM-IV-TR criteria are identifying a group of preschoolers with non-normative hyperactivity, impulsivity, and inattention who have a valid disorder similar to that seen at other stages of life.

Because studies in older children have shown significant familial clustering by ADHD sub-type, as well as different genetic influences contributing to each sub-type, it is critical that future studies of preschool ADHD assess the disorder using the DSM-IV sub-types (and the alternative latent class derived sub-types proposed by Todd and colleagues (Todd et al., 2001)), rather than by the presence or absence of ADHD overall alone (Rasmussen et al., 2002, 2004; Rohde et al., 2001). Few studies have examined ADHD sub-types in young children. So far it appears that hyperactive-impulsive and combined type ADHD are the two most common sub-types, with fewer children meeting criteria for pure inattentive type (Egger et al., submitted-b; Gadow et al., 2001; Gimpel & Kuhn, 2000; Pineda et al., 1999). Further work is needed to determine whether the low rates of pure inattentive type ADHD in preschoolers reflect true developmental differences between younger and older children or limitations of our current measures of preschool inattention. In future studies, it will also be important to examine similarities and differences in the behavioral manifestations, neuropsychological correlates, and genotypes of preschoolers with different ADHD sub-types.
Disruptive behavior disorders: ODD and CD. Toddlerhood to kindergarten is the developmental period when key mechanisms of emotional and behavioral control (and on the psychopathological side – dysregulation) are established, including the capacity to regulate anger, manage frustration, and inhibit verbal or physical reactions to negative stimuli (Kochanska et al., 2001, 2000; Sroufe, 1990). Most children’s irritability, oppositionality, and aggression decrease from the ages of 2 through 5 (Bhatia et al., 1990; Earls, 1980; MacFarlane, Allen, & Honzik, 1962, 1954; Moffitt et al., 1996; Nagin & Tremblay, 1999; Pavuluri & Luk, 1996; Richman et al., 1982; Shaw, Gilliom, Ingoldsby, & Nagin, 2003; Tremblay, 2000; Tremblay et al., 1999). However, in a subset of children, the degree of anger, as well as other negative affects, and disruptive and defiant behaviors are severe, persistent, and associated with the development of later disruptive and affective psychiatric disorders (Moffitt et al., 1996; Nagin & Tremblay, 1999; Shaw et al., 2003).

Developmentally modified criteria for ODD and CD. As with ADHD (and, perhaps, all of the disorders reviewed here), there has been considerable controversy about the diagnosis of ODD or CD in preschool children (Keenan & Wakschlag, 2002), with concerns raised (1) that developmentally normal aggression, non-compliance, defiance, and oppositionality will be inappropriately labeled as pathological (McClellan & Speltz, 2003), and (2) that young children are not capable of engaging in the behaviors that are described in the CD criteria (Campbell, 1995; Keenan & Wakschlag, 2000). The latter concern is certainly true for symptoms such as truancy and breaking curfew, but is less clear for a symptom like destruction of property that requires that the child’s behavior be ‘deliberate.’ A further concern is (3) that manifestations of ODD/CD symptoms in young children are not clinically or conceptually equivalent to manifestations of these behaviors in older children (e.g., is a preschooler’s assault of a peer with a toy or rock or pencil similar to an adolescent’s assault of a peer with a knife or firearm?) (Keenan & Wakschlag, 2000).

Keenan and Wakschlag have proposed modified criteria for CD in preschoolers which were adopted in the RDC-PA. Changes include deletion of 4 symptoms that are inappropriate for preschoolers (breaking and entering, breaking curfew, runs away, truancy), modification of the wording of other symptoms to emphasize persistent patterns of behavior and the age-specific presentation of these behaviors, and a decrease in the duration criterion from 12 to 6 months (Task Force on Research Diagnostic Criteria: Infancy and Preschool, 2003). Despite the exclusion of 4 symptoms, the cutpoint of three or more symptoms remained unchanged. No specific changes were recommended for ODD, except to state that ODD symptoms must be persistent, pervasive, and severe so as to exclude transient perturbations in oppositionality or defiance (e.g., secondary to the birth of a sibling).

Addressing the concerns about ODD/CD diagnoses listed above will require use of structured assessments (parent report and observational measures) that include the full range of oppositional and conduct disordered behaviors in young children and clearly specify (1) how these behaviors are being measured, (2) where (and how) frequency, duration, and severity cutpoints are being set and (3) how developmental/age differences, gender differences, and the effects of context (particularly the parent-child relationship) and culture are being accounted for in symptom definitions and diagnostic algorithms.

Despite the many unresolved questions, at this point, there is good evidence that ODD and CD symptoms and diagnostic criteria identify groups of impaired preschoolers with clinically significant behavior problems (Angold et al., submitted; Barkley et al., 2002; Coy, Speltz, DeKlyen, & Jones, 2001; DeKlyen, Biernbaum, Speltz, & Greenberg, 1998; Keenan & Wakschlag, 2002; Kim-Cohen et al., 2005; Lavigne et al., 1998b, 1998c; Speltz, DeKlyen, Calderon, Greenberg, & Fisher, 1999a; Speltz, DeKlyen, & Greenberg, 1999b; Speltz, DeKlyen, Greenberg, & Dryden, 1995; Speltz, McClellan, DeKlyen, & Jones, 1999c; Speltz, Greenberg, & DeKlyen, 1990; Wakschlag & Keenan, 2001). So few studies have examined ODD and CD separately that it is not yet clear that they should be considered two separate disorders or a single continuous entity. Data from the non-specialty clinic studies show a fairly wide range of prevalence estimates for ODD (4–16.8%) and CD (0–6.6%). Preschool ODD has been found to show substantial stability or prediction to other disruptive behavior disorders (50–76% – as high as in older children and adolescents) over a 2-year period (see also Barkley et al., 2002; Lavigne et al., 1998b, 1998c; Speltz et al., 1999c). A recent paper by Kim-Cohen and colleagues (Kim-Cohen et al., 2005) reporting rates and concurrent, convergent, and predictive validity of DSM-IV CD in a representative birth cohort (N = 2,232) of 4½–5-year-old twins provides compelling support for the diagnosis of CD, at least in older preschoolers. The overall prevalence was 6.6% with 2.5% of the children having moderate to severe CD, with rates in boys 3–5 times greater than in girls. Half of the children with CD at age 5 also met criteria at age 7. The children who no longer met CD criteria at age 7 were significantly more impaired with increased rates of educational difficulties than children who never met criteria for CD. Sadly, this study did not assess ODD. Future studies should assess ODD and CD separately to test whether children with each disorder have different patterns of correlated characteristics and distinct outcomes.

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**Emotional disorders**

**Depressive disorders**

Kashani’s early studies of preschoolers conducted in both clinical and community settings (Kashani, Allan, Beck, Bledsoe, & Reid, 1997; Kashani & Carlson, 1987; Kashani, Holcomb, & Orvaschel, 1986; Kashani, Ray, & Carlson, 1984) provided the first indication that DSM-like depressive symptoms and disorders could be identified in preschool children. The rate of major depressive disorder in preschoolers reported in non-clinical studies ranges from 0 to 2% (Angold et al., submitted; Earls, 1982a; Kashani et al., 1986; Keenan et al., 1997; Lavigne et al., 1996). The studies using DSM-III criteria and unstructured assessments reported the lowest rates. The PTRTS is the only non-clinical study to report rates of specific depressive disorders in preschoolers: 1.4% with major depressive disorder, .6% with dysthymic disorder, and .7% with depression NOS/minor depression (3 rather than 5 depressive symptoms).

Major depression was significantly more common in older preschoolers than toddlers (3.0% vs. .3%; OR = 12 (1.5, 101); p = .02). As with prepubertal depression, there was no difference in rates between boys and girls. In the PTRTS, 93% of preschoolers who met the diagnostic criteria for a depressive disorder were impaired with a mean impairment score of 12 (range 0–30) (Angold et al., submitted), suggesting that the current DSM-IV criteria are identifying a clinically significant group of children.

Luby and colleagues have conducted the most extensive recent research on preschool depression with their study of 174 three- to five-year-old children, 55 of whom met criteria for depression. Prominent symptoms included sad or irritable mood, anhedonia, low energy, eating and sleeping problems, and low self-esteem. From these data Luby has proposed developmental modification of DSM-IV symptoms, including reduction in the requirement for persistence of depressed or irritable mood. Another modification was that persistent death and suicide themes in play were included in the assessment of suicidal ideation (Luby et al., 2002). These modified criteria are included in the RDC-PA and in the DC: 0–3R.

Luby’s study has identified characteristics and patterns of risk similar to those reported for depressed older children (Goodyer, 1990; Goodyer, Herbert, Tamplin, Secher, & Pearson, 1997; Goodyer, 1995; Goodyer, Herbert, Tamplin, & Altham, 2000), including denser family histories of psychopathology, in general, and anxiety and depressive disorders, in particular, stability over 6 months, low socialization scores, higher child self-reports of depressive themes, and increased cortisol reactivity in response to stress, particularly in those with anhedonia (Luby et al., 2003a, 2003b, 2003c).

Because there are so few studies of preschool depression, it is too early to determine whether the depressive symptom clusters identified in these studies are phenotypically similar to the depressive disorders diagnosed later in childhood or predict depression later in childhood. Both Luby’s depressed preschoolers and those in the PTRTS had very high rates of comorbidity (Angold et al., submitted; Luby et al., 2003c), much higher than expected from studies of older children and adolescents (Angold, Costello, & Erkanli, 1999a). In both studies the rates of comorbidity with ODD were substantially higher than with anxiety disorders. These preliminary data lead one to question whether these depressive syndromes really do constitute valid separate disorders or whether these symptom patterns are indexing a more global emotional and behavioral dysregulation syndrome. We discuss this further in the section on comorbidity.

**Mania and bipolar disorder**

Only a handful of case studies and studies of small sample size have examined mania and the diagnosis of bipolar disorder in preschoolers. In all of these studies, irritable mood, elation, decreased need for sleep, ADHD symptoms, family history of affective disorder and impaired functioning were prominent characteristics (e.g., Dilsaver, 2004; Luby & Mrakotsky, 2003; Pavuluri, Janicak, & Carbray, 2002; Scheffer & Apps, 2004; Tumuluru, Weller, Fristad, & Weller, 2003). Using a modified version of the PAPA mania section with good test–retest reliability, Luby and colleagues have identified a subset of preschoolers with symptoms similar to those described in older children with bipolar disorders (Luby, 2005). Leibenluft and colleagues at NIMH have begun a study of preschoolers of parents with bipolar disorder which will use the PAPA, including the Luby modified mania section, as well as other measures to examine the symptoms of the narrow bipolar phenotype and the broader phenotype of severe emotional dysregulation (Leibenluft, James, Blair, Charney, & Pine, 2003) in these high risk preschoolers. At this point the data on preschool bipolar disorder are scarce and are far from providing evidence that bipolar disorder is a valid preschool psychiatric diagnosis.

**Anxiety disorders**

Remarkably little clinical or epidemiologic research has examined the nosology, prevalence or characteristics of clinically significant anxiety symptoms and disorders in preschool children. As with ADHD and ODD symptoms, a first question is whether the DSM-IV anxiety symptoms seem to be indexing problematic behavior or common, seemingly normative behavior. Our approach to developing the PAPA diagnostic algorithm for SAD illustrates one (albeit preliminary) approach to this question. In the PTRTS, SAD criterial symptoms ranged from being common (e.g., a quarter of preschoolers were reluctant to sleep
without being near caregiver) to very uncommon (e.g., less than a half a percent worried about calamitous separation from their parent) (Egger, Erkanli, Keeler, Potts, & Angold, submitted-a). Each of the SAD symptoms, except avoids being alone and separation nightmares, was significantly associated with impairment. To meet DSM criteria for SAD, a child must have 3 or more SAD symptoms that have lasted for 4 weeks or more. The symptoms must also cause distress or impairment. Thus, a straight implementation of the DSM SAD criteria would not require impairment for a diagnosis (as is true for the CAPA SAD diagnostic algorithm). The overall rate of SAD without the requirement of an impairment criteria was 8.6% (mean impairment scale score of 6.1), dropping to 2.4% when impairment was required (mean impairment scale score of 13.6). Based on these data, we decided to require impairment for a diagnosis of SAD in the PAPA. Similar decisions for the diagnosis of specific phobias and social phobia were made based on the argument that inclusion of an impairment criterion would decrease the chance that the diagnosis was identifying either normative separation or stranger anxiety or fears. Because the symptoms of GAD and PTSD cannot be conceptualized as developmentally normative, we strictly implemented the DSM (or, in the case of PTSD, RDC-PA criteria, based on Scheeringa and colleagues’ work on PTSD in preschoolers) and did not require impairment. We are well aware that future studies may demonstrate that these are not the best ways to define preschool anxiety disorders. Diagnostic algorithms will need to be revisited and perhaps revised as new data (particularly from multiple sources) are obtained.

Two recent community studies using checklist measures reflective of DSM criteria for specific anxiety disorders have provided support for the idea that, already in the preschool period, clinically significant anxiety can be sub-typed in patterns similar to those identified for older children (e.g., March, Parker, Sullivan, Stallings, & Conners, 1997; Muris, Mayer, Bartelds, Tierney, & Bogie, 2001; Spence, 1997). Spence and colleagues (Spence et al., 2001) assessed anxiety in 755 preschoolers using maternal reports on the 28-item Preschool Anxiety Scale (PAS). A confirmatory factor analysis found that preschool anxiety symptoms clustered into five factors that resembled the DSM-IV categories of separation anxiety, social phobia, obsessive compulsive disorder, generalized anxiety disorder, and specific phobias (here limited to the specific fear of physical injury), suggesting differentiation of anxiety in early childhood. While social phobia, obsessive compulsive disorder and fear of physical injury appeared to be separate dimensions, separation anxiety and generalized anxiety were not as well separated. A study of 4,564 four-year-old twins (Eley et al., 2003) provides similar evidence for phenotypic and genetic differentiation between specific categories of anxious behavior in young children. A confirmatory factor analysis of a 16-item anxiety survey which included anxiety-related items from psychiatric and temperament checklists identified five factors very similar to ones identified by Spence and colleagues: general distress, separation anxiety, fear, obsessive compulsive behaviors, and shyness/inhibition. The correlations between the general distress, separation anxiety, and fear factors and the shyness/inhibition factor were quite low (.17 to .28), suggesting that anxiety symptoms were distinct from behaviorally inhibited temperament.

As previously noted, the rates of anxiety disorders varied considerably in the community studies of preschoolers, with measurement limitation, sample selection bias, and/or lack of agreement about the boundaries between normative and clinically significant anxiety symptoms all potential reasons for this disparity. The PTRTS is the only diagnostic study in a non-specialty clinic sample to report rates of the full range of specific anxiety disorders, except OCD (see Table 1). There were no significant gender differences for anxiety disorders overall or for specific anxiety disorders. Older children (4 and 5 vs. 2 and 3) were more likely to meet criteria for PTSD (OR = 2.5 (1.1, 5.8); p = .03). Although the specific anxiety disorders were strongly inter-related, the patterns of association of individual anxiety disorders with non-anxiety diagnoses showed some specificity. All of the anxiety disorders were bivariately associated with CD, ODD and depression, but in models controlling for comorbidity between disorders, specific phobias, PTSD, and selective mutism were associated with depression, while SAD and GAD remained significantly associated with ODD. Children with anxiety disorders were significantly more likely to be impaired than children without an anxiety disorder (OR = 9.3 (4.2, 21); p < .0001). On an impairment scale (range 0–30), the mean scores for individual anxiety diagnoses were 13.7 for SAD, 7.7 for GAD, 10.9 for social phobia, 12.4 for specific phobia, 8.4 for selective mutism, and 14.3 for PTSD (Angold et al., submitted).

These data suggest that (1) anxiety disorders are common in preschool children, (2) they exhibit substantial homotypic and heterotypic comorbidity, (3) there are differences in the rates of homotypic and heterotypic comorbidity among the specific anxiety disorders, and (4) preschoolers who meet the DSM diagnostic criteria for specific anxiety disorders are significantly more impaired than children without an anxiety disorder. However, little of this data has been replicated. Anxiety disorders need to be a priority area for future work on preschool psychopathology.

**Diagnostic comorbidity**

A number of review articles (Abikoff & Klein, 1992; Achenbach, 1990; Achenbach, 1995; Angold &
Comorbidity in preschool psychopathology

Until recently, with the development of reliable structured assessments of the full range of psychiatric disorders in young children, data on comorbidity in preschool children were limited to co-occurrence between the broad categories of emotional and behavioral disorders (Keenan et al., 1997; Lavigne et al., 1996). In the Keenan study, a quarter of children with an emotional disorder also met criteria for a behavioral disorder, with the same proportion of children with a behavioral disorder having an emotional disorder. In Lavigne and colleagues’ study, 5.4% of the children (25.2% of children with at least one psychiatric disorder) had comorbid disorders, defined as ‘a disruptive disorder comorbid with an emotional disorder or other disorder’ (Lavigne et al., 1996). In the PTRTS, comorbidity was examined among these five categories of disorder(s): any depressive disorder, any anxiety disorder, ODD, CD, or ADHD; 51.6% of preschoolers with at least one disorder met criteria for a single type of disorder, 25.8% had two types of disorders, and 22.6% had three or more types of disorder. Eight percent of the preschoolers in the sample met criteria for more than one psychiatric disorder. The risk of having comorbid psychiatric disorders increased 1.6 times with each additional year from age 2 through age 5 (OR = 1.6 (1.1, 2.5); p = .03); 18.2% of 2 and 3-year-olds with a psychiatric disorder had more than one disorder, compared with 49.7% of 4- and 5-year-olds with at least one psychiatric disorder. Preschoolers with comorbid disorders were significantly more impaired than preschoolers with only one disorder (OR = 26 (2.5, 165); p = .005); mean impairment score 15.4 vs. 6.8) (Angold et al., submitted).

In the PTRTS all of the pair-wise associations between these five disorders were significant, except for that between ADHD and anxiety disorders. However, the pattern of comorbidity illustrated in Figure 2 was found when the effects of each disorder on all the other disorders were controlled for simultaneously. This approach accounts for what Angold has called ‘epiphenomenal comorbidity’ in which apparent pair-wise associations between disorders are actually a reflection of comorbidity between two other disorders (Angold et al., 1999a). Thus, referring to Figure 2, a preschooler with an anxiety disorder, but not ODD, is no more likely than a child without a disorder to have CD. What is striking about the comorbidity pattern depicted in Figure 2 is the centrality of ODD in mediating the relationships between anxiety disorders and depression, depression and CD, and the emotional disorders and ADHD. A similar (but not identical) pattern of comorbidity has been found in two large representative community studies of older children (Angold et al., 1999a; Ford, Goodman, & Meltzer, 2003). What is significant is that each of these three studies shows a strong relationship between depression and either CD or ODD that mediates the relationship of depression with ADHD. In the preschool model, ODD also mediates the relationship between depression and anxiety. This pattern of comorbidity between depression, anxiety disorders, and ODD raises the question whether preschool depressive disorders are truly equivalent to depressive disorders later in childhood and adulthood.

Comorbidity seems to be a central feature of psychiatric disorders in preschoolers, as it is in older children and adults. Just as capacities to regulate emotions and behaviors develop during the preschool period, so do dysfunctions in multiple systems. With the advances in our understanding of the genetics and neurobiology of psychiatric disorder it is increasingly clear that the psychiatric ‘syndromes’
specified in the DSM are phenotypes that reflect problems in multiple functional systems (e.g., affect regulation; behavioral regulation; attention regulation; regulation of serotonin; regulation of gene expression) (Charney, Barlow, & Botteron, 2002). Many of these dimensions (for example, sleep and appetite disturbances, disturbances of motor activity, or irritability) are common to multiple disorders with seemingly different etiologies. Different comorbidity; patterns (including lack of comorbidity, ‘pure’ disorders) may be associated with different sequences of dysfunction in underlying developmental processes (e.g., affect regulation, attention regulation, inhibitory control, language development). These different comorbidity patterns may also lead to the identification of more biologically and clinically valid sub-types of existing disorders or to definition of new disorders (e.g., irritable depression versus non-irritable depression) (Insel & Fenton, 2005).

To advance our knowledge of preschool psychopathology (and later disorders), longitudinal, community studies of preschoolers need to document rates of comorbidity, but they also must move beyond description to examine the specific and shared environmental, physiological, neural, and genetic correlates of different patterns of comorbidity, and the course of comorbidity from the preschool age to adulthood. Here we see an opportunity to integrate the multiple approaches and conceptualizations (temperament/emotion regulation/dimension/categorical) of preschool behavioral and emotional dysregulation and move beyond the DSM to characterize phenotypes that link genes with the brain and with behavior (Charney et al., 2002; Nelson et al., 2002). To do this, future studies of the onset, course, and etiology of comorbidity must start no later than age 2, and all studies of preschool psychopathology must account for comorbidity. These data will inform our understanding of the etiology, development, and persistence of psychopathology, and will translate directly into clinical opportunities for targeted treatment, early intervention and prevention with young children.

Limitations

In this review, we have attempted to identify the many limitations of our current conceptualization, definition, measurement, and study of behavioral and emotional disorders in preschool children. These include: (1) the lack of conceptual integration between diverse approaches to normal and abnormal behavior and affect in young children; (2) the reliance on parent report in most of the current non-clinical studies and the lack of a consensus about how to combine information from multiple informants and multiple modes of assessment; (3) the paucity of data on the cross-sectional and longitudinal associations between specific psychiatric syndromes and language development and capacities, cognitive functioning, attention regulation, impulse control, and affect regulation and the association of specific developmental disorders with psychiatric disorders; (4) the limitations of current conceptualization and measurement of impairment in young children; (5) the lack of research on putative risk factors associated with specific preschool psychiatric disorders including socioeconomic and cultural factors, acute and chronic adverse life events, disturbances in the parent–child relationship, family history of psychiatric disorders and impairment, physical health, prenatal and perinatal factors (e.g., low birth weight, maternal smoking during pregnancy) and neurodevelopmental functioning; (6) the overall small number of studies and research programs examining psychiatric symptoms and disorders in this age group; and (7) the lack of replicated findings.

Conclusion

This review highlights how early we are in the process of characterizing the nosology and epidemiology of preschool behavioral and emotional disorders, particularly depression and anxiety disorders. However, it also reveals how late we are in recognizing the distress and impairment of preschool children and their families. The furor over prescription of psychotropic medication for very young children brought to attention the lack of consensus about how to define and diagnose psychiatric disorders in preschoolers and the paucity of treatment studies. However, it seems ironic that it did not lead to the conclusion that these increasing prescription rates reflect real unmet need. In fact, very few preschoolers who meet criteria for a psychiatric disorder are referred for a mental health evaluation or receive treatment. In the Lavigne study, only 25% of preschoolers with a DSM-III-R disorder had been referred for treatment (Lavigne et al., 1998a). In the PRTTS, only 11% of children who had any psychiatric disorder had been referred for a mental health evaluation. While greater understanding of the presentation, nosology, and epidemiology of preschool psychiatric disorders will have enormous implications for research on the causes and outcomes of psychiatric disorders, these advances are also urgently needed so that we develop and disseminate clinically relevant assessment tools and evidence-based treatments, which will enable pediatricians and mental health providers to identify and help these preschoolers and their families.

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