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Assessment of Behavioral and Emotional Problems in Infancy: A Systematic Review

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Abstract

Behavioral and emotional problems are highly prevalent in early childhood and represent an important focus of practice for clinical child and pediatric psychologists. Although psychological or psychiatric disorders are not typically diagnosed in children under the age of 2 years, recent research has demonstrated the appropriateness of assessing behavioral and emotional problems during the first 2 years of life (defined throughout as “infancy”). The current paper provides a systematic review of assessment procedures used to identify behavioral and emotional problems during infancy. Existing assessment procedures for infants take the form of parent- or caregiver-report questionnaires, observational coding procedures, and diagnostic classification systems. The questionnaires and observational coding procedures both had substantial psychometric evidence for use with infants, although observational coding may have limited utility in clinical practice. The classification systems have less empirical support for use with infants, and further research is necessary to demonstrate the appropriateness of these procedures with infants. Utilizing the reviewed procedures to assess behavioral and emotional problems in infants can have a substantial impact in research and practice settings, and further research is needed to determine the usefulness of these procedures in developing, testing, and implementing preventive and early intervention programs for infants and their families.

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Keywords

Infancy; Behavioral and emotional problems; Assessment

Overview

Behavioral and emotional problems are the most common referral for young children to mental health clinics (Keenan and Wakschlag 2000; Luby and Morgan 1997) and place children at later risk for developing more severe problems (Shaw et al. 2003). Early identification of these problems is critical for three main reasons. First, behavioral and emotional problems occur early, with children as young as 2 years receiving diagnoses of common psychological disorders (Egger and Angold 2006). Second, behavioral and emotional problems in early childhood have been shown to be stable over time. For example, as many as 50% of 2- to 3-year-old children with a disruptive behavior disorder continue to have a diagnosis 42–48 months later (Lavigne et al. 1998). Additionally, young children with recurrent and comorbid externalizing and internalizing problems have the most impairment, greater problem stability, and higher subsequent utilization of mental health services (Briggs-Gowan et al. 2006; Essex et al. 2009), highlighting the importance of early identification. Finally, early detection of behavioral and emotional problems has been shown to lead to successful early intervention efforts to ameliorate these problems (e.g., Murray 2010; Nixon 2002; Shaw et al. 2006).

Despite the considerable amount of research conducted on behavioral and emotional problems in preschoolers (i.e., defined in this review as ages 2–5 years), less work has focused on these problems in children younger than 2 years. Throughout this review, we define “infants” as children younger than 2 years. We recognize the time period of “infancy” can represent a variety of age ranges (e.g., 0–12 months, 0–3 years) and is sometimes termed “early childhood.” We use the term “infancy” in this review to emphasize the unique nature of identifying behavioral and emotional problems before the age of 2 years and to distinguish this age range from the preschool age range of 2–5 years. Infants are not typically diagnosed with psychological or psychiatric disorders, but many display clinically significant and impairing behavioral and emotional problems (van Zeijl et al. 2006). Therefore, there has been a growing interest in identifying problems as early as possible to develop effective preventive interventions to minimize current distress and enhance competence, which are the building blocks to facilitate acquisition of later competencies.

Research has demonstrated the feasibility of identifying early behavioral and emotional problems, which are thought to be due to the combination of rapid physical and cognitive developmental changes with the experience of complex emotions (e.g., frustration) that begin to occur during the first 2 years of life (Tremblay et al. 1999; van Zeijl et al. 2006). There has also been rising agreement that psychopathology, understood in the context of the primary caregiving relationship, can be detected as early as the first few of years of life (Zeanah 2009). Identifying these early behavioral and emotional problems can be challenging due to the developmental appropriateness of many of these behaviors. In fact, many parents and professionals believe that early problems are transitory and will decrease over time (Briggs-Gowan et al. 2006). Additionally, temperament, typically viewed as

inherent traits present since birth, can complicate the understanding of behavioral and emotional problems. There is recent support for both the homotypic and heterotypic continuity of several dimensions of temperament from infancy to toddlerhood (Putnam et al. 2008), but less research has examined the longitudinal nature of infant behavioral and emotional problems. We conceptualize temperament as an independent but related risk factor of infant behavioral and emotional problems and discuss the distinction between temperament and behavioral and emotional problems in more detail below.

Similar to temperament, there is some evidence that early behavioral and emotional problems can be rather stable. For example, 50% of parents of 12-month-olds report physically aggressive behavior occurring sometimes or often with moderate stability over the course of 1 year (Alink et al. 2006). Additionally, in a large representative sample, 55% of 12- to 23-month-olds with elevated behavioral or emotional problems (> 90th percentile) continued to have elevated scores 1 year later (Briggs-Gowan et al. 2006). Therefore, early behavioral and emotional problems do not always remit, and accurate identification of those at risk for long-term problems is an important step in providing appropriate intervention and prevention services Mouton-Simien et al. (1997). There has also been some research on coordinating efforts with pediatric healthcare providers in identifying these early problems (Briggs 2007), and this momentum has extended to other countries (e.g., Finland; Haapsamo et al. 2009). The increased interest in identifying infant behavioral and emotional problems is a positive step for improving early identification and intervention services, but it is critical for clinicians to use effective assessment procedures. However, there has been limited systematic review of assessment procedures to measure behavioral and emotional problems during the first 2 years of life.

To our knowledge, only two articles have reviewed assessment procedures for infants. Squires (2000) discussed six approaches to identify social and emotional difficulties and provided a useful understanding of tools appropriate to determine eligibility for early intervention services. However, the focus was on broad screening and did not include assessment procedures that can be used in a more comprehensive evaluation (distinction between screening and evaluation is described in more detail below). Additionally, the review only included a limited description of the psychometric properties of the screening tools, and most of the procedures reviewed were for children older than 2 years. The other review, conducted by Rescorla (2005), focused almost exclusively on the Child Behavior Checklist for ages 1½–5 years (Achenbach and Rescorla 2001). There was a brief description of an early diagnostic classification system and three commonly used temperament scales. However, a more comprehensive review of assessment procedures for infant behavioral and emotional problems is needed to facilitate research on prevention and early intervention efforts and guide clinicians targeting these issues.

Goals of Review

In the current article, we address the following goals: (1) define infant behavioral and emotional problems during the first 2 years and distinguish these problems from other related constructs, including temperament and other risk factors[1]; (2) review and systematically evaluate assessment procedures used to identify infants with behavioral and

emotional problems within the following categories: parent- and caregiver-report questionnaires, observational coding procedures, and diagnostic classifications systems (one parent-report questionnaire reviewed examines both behavior and temperament, but this review does not include an exhaustive review of temperament assessment tools); and (3) discuss the strengths and limitations of current assessment procedures and implications for future research and clinical practice.

Behavioral and Emotional Problems in Infancy

Research over the past decade has demonstrated the feasibility and reliability of diagnosing disruptive behavior disorders (e.g., oppositional defiant disorder) in children as young as 2 years using both standardized behavior checklists and observational ratings (Keenan and Wakschlag 2002; Wakschlag et al. 2008a, b). Additionally, there has been evidence supporting the diagnosis of internalizing disorders (e.g., anxiety and depression) in preschoolers (Luby et al. 2007; Tandon et al. 2009). There has been growing interest in identifying behavioral and emotional problems as early as possible because problems are associated with significant disruptions at a very young age (Briggs-Gowan et al. 2001) and persist over time without intervention (Briggs-Gowan et al. 2006). However, there has been considerably less research with infants. Therefore, it is important to understand how these problems are currently conceptualized and measured to move the field forward and improve intervention efforts for infants and their families.

Behavioral and emotional problems during the first 2 years of life can be difficult to define given the developmental appropriateness of many behaviors at this age (e.g., temper tantrums to assert independence) and greater variability in parental expectations for and knowledge about problem behaviors (Cox et al. 2010). Consistent with a developmental psychopathology framework, signs of problematic behaviors for this young age can be based on the frequency, intensity, and duration of specific behaviors compared to normative groups in narrow age bands (Carter et al. 2004). Problematic behaviors at this young age are typically grouped into clusters of behaviors or syndromes, such as externalizing (e.g., hitting, biting) and internalizing (e.g., withdrawn, fearful) problems. Egger and Emde (2011) have recently suggested that mental health problems from birth to 24 months can also be delineated by dysregulation across multiple domains (e.g., crying, sleeping, eating) based on normative data.

In addition to understanding problems within the infant, the parent-infant relationship has been viewed as an important component in conceptualizing and assessing behavioral and emotional problems in infancy (Zeanah 2009). In fact, several of the observational coding procedures and diagnostic classification systems reviewed below incorporate an assessment of the parent-infant relationship. For example, the Parent-Infant Relationship Global Assessment Scale (PIRGAS) is a supplement to the Diagnostic Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood (DC: 0–3; Zero to Three 1994), and ratings on the PIRGAS during a free play at 20 months were shown to

[1]Assessment of intellectual and developmental delays/disabilities in infancy (e.g., autism) has also received recent attention, and can be reviewed elsewhere (e.g., Dumont-Mathieu and Fein 2005).

predict internalizing behavior problems at 24 months (Aoki et al. 2002). Additionally, disturbances in the parent-infant relationship during the first 18 months have been shown to play a key role as a risk factor for early child psychopathology (Skovgaard et al. 2007, 2008), emphasizing the importance of the parent-infant relationship in understanding behavioral and emotional problems in infancy.

Risk Factors of Behavioral and Emotional Problems

In addition to disturbances in the parent-infant relationship, there are several other risk factors that are important considerations when assessing infant behavioral and emotional problems. These risk factors include poverty, as well as low maternal education, antisocial behavior, and smoking (Cote et al. 2006; Huijbregts et al. 2007; Tremblay et al. 2004). In addition, high levels of harsh parenting and family stress have been shown to increase the stability of early childhood behavior problems (Campbell et al. 2000).

There has also been a substantial amount of research demonstrating the negative effect of maternal depression on infant (Korja et al. 2008; Madigan et al. 2007; Martins and Gaffan 2000) and child (Beck 1999; Trapolini et al. 2007) outcomes, including a recent finding suggesting that maternal depression during the first year of the child's life had the largest effect on later child behavior problems (Bagner et al. 2010). Additionally, maternal depression in the presence of co-morbid psychopathology has been found to be associated with less optimal mother-infant interactions and higher rates of infant insecurity (Carter et al. 2001).

These findings highlight the importance of characterizing psychosocial risk factors to best conceptualize infant behavioral and emotional problems. In addition, awareness of the presence of contextual risk factors may help inform feedback to parents, such as providing appropriate referrals for intervention services. Finally, it is critical to target assessment efforts with infants experiencing multiple contextual risk factors, given their increased likelihood of developing clinically significant behavioral and emotional problems.

Temperament

Research on temperament has developed, for the most part, independently of research on child psychopathology, although some argue an integration of these two areas of research would likely enhance our understanding (Frick 2004). Originally defined as a "behavioral style," Chess and Thomas (1977) found a difficult infant temperament interacted with the environment to predict later behavioral problems. Related work by Kagan and colleagues demonstrated that behaviorally inhibited infants were not only more likely to be shy, but also at increased risk for internalizing behavior problems in childhood, adolescence, and adulthood (Kagan 1997). More recent work has conceptualized temperament along a continuum of the following four main dimensions with strong links to neural models: positive affectivity/approach, fear/behavioral inhibition, anger/irritability, and effortful control (Rothbart and Posner 2006).

Despite some overlap, temperament is typically viewed as a risk factor of child psychopathology. Difficult temperament in infancy is stable (Goldsmith 1996; Kivijarvi et

al. 2005; Putnam et al. 2006; Tomlinson et al. 1996) and predicts later aggression and other related externalizing behavior problems (Keenan and Shaw 1994; Lawson and Ruff 2004; Lee and Bates 1985; Loeber and Hay 1997). In addition, a difficult infant temperament prospectively predicted an earlier onset of childhood major depressive disorder, although higher stability of caregivers decreased the effect (Kapornai et al. 2007), as well as symptoms of borderline personality disorder in young adults (Carlson et al. 2009).

Temperament has also been shown to interact with other predictors of behavior problems, including maternal sensitivity (Leerkes et al. 2009), parental stressors (Stifter and Wiggins 2004), and neurobiological measures, such as the startle reflex response, which may be a risk factor for the development of anxiety disorders among adolescents who were behaviorally inhibited as infants (Reeb-Sutherland et al. 2009). Interestingly, genetic variation, specifically in dopamine receptor D4, impacts the effect of parenting on infant temperament (Sheese et al. 2007), suggesting the important effect the interplay between genes and the environment has on temperament and on the subsequent development of psychopathology.

Specific parenting behaviors have also been shown to interact with temperament in predicting later child psychopathology. For example, a lack of parental limit setting was associated with higher rates of later child behavior problems among 28-month-olds with high anger proneness (Smeekens et al. 2007). Additionally, difficult temperament moderated the effect of maternal discipline on child externalizing behavior problems (van Zeijl et al. 2007). A recent study demonstrated that both temperament and anxiety symptoms in 3-year-old children uniquely predicted later child anxiety at 6 and 8 years and mediated the effects of other maternal risk factors (e.g., anxiety and depression; Mian et al. 2011), which are related to parenting behaviors (Feldman 2007). Taken together, these findings suggest early behavioral and emotional problems and temperament are independent but interrelated risk factors of later child psychopathology.

Assessment Procedures of Behavioral and Emotional Problems in Infancy

When assessing behavioral and emotional problems, it is important to delineate whether the infant is identified through a screening or evaluation. In a screening, the goal is to detect a potential problem using high sensitivity and low specificity. Screening procedures are typically brief with the intention to target a large number of infants in a universal manner. When infants screen positive for a potential problem, the next step should be to conduct a more comprehensive evaluation, in which specificity becomes more important. During an evaluation,[2] on the other hand, the clinician conducts a thorough workup with the infant, in which utilizing multi-methods (e.g., parent-report questionnaires, observation coding procedures) across settings would be advantageous. The goals of an evaluation include conceptualizing the infant's problems, characterizing potential strengths and supports in primary and other caregiving relationships, assigning a categorical diagnosis when

[2]Evaluation and assessment are sometimes used interchangeably. In this review, we use the term assessment as a broader construct incorporating both screening and evaluation.

applicable (although limited for infants), and providing recommendations for intervention services as needed.

Screenings and evaluations can take place in a variety of contexts, including early child care/educational, pediatric, or mental health settings. Screenings usually take place in educational or pediatric settings to reach large populations, whereas evaluations primarily occur in more specialized mental health agencies. Screenings can present unique challenges because families are not necessarily seeking out services, particularly when screening in infancy. Despite the barriers of limited training, time, and reimbursement (Weitzman and Leventhal 2006), there has been success in screening infants for behavioral and emotional problems in pediatric primary care settings (Karabekiroglu et al. 2010). Additionally, efforts to train staff to implement infant mental health evaluations (and subsequent intervention services) for families seeking services have been successful in state public mental health agencies (Knapp et al. 2007). Therefore, there has been some progress in the identification of behavioral and emotional problems in infancy, but further research on the feasibility of screening and evaluation with this population is needed.

In addition to the type (i.e., screening or evaluation) and context of the assessment, the choice of informant and target of the assessment procedure are also important issues to consider. Similar to the field of clinical child psychology, assessment procedures in infancy can be implemented using three different methodologies: parent/caregiver report, observational coding, or clinician rating. Each method has strengths and limitations, such as the potential bias of parent/caregiver-report questionnaires and clinician rating scales in contrast to the more objective nature of behavioral observations (Hops et al. 1995). Therefore, it is essential to review psychometric properties when selecting assessment procedures (Bagner et al. 2006) and to use multiple informants and methods to improve incremental validity (Mash and Hunsley 2005), although further research in this area is needed (Johnston and Murray 2003).

The assessment procedures reviewed below are presented with respect to whether they are used in screenings and/or evaluations. Additionally, the context in which the procedures are typically implemented, as well as the potential conclusions (e.g., diagnosis, treatment planning) a clinician can gain from the respective procedure, is provided throughout. Finally, the choice of informant and target of assessment procedure are described in order to provide information about the clinical and scientific utility of these procedures.

Parent- and Caregiver-Report Measures

Below is a description and review of all, to our knowledge, seven parent- and caregiver-report measures that can be used with infants. The first four measures are typically administered at screenings and the remaining three measures are typically administered at evaluations, although there is some overlap in measures as indicated below. See Table 1 for more logistical details (e.g., availability, cost, languages, etc.) on each measure.

Ages & Stages Questionnaire: Social-Emotional (ASQ: SE; Squires et al. 2002)

The ASQ: SE is a parent-report screening questionnaire used to identify 6- to 60-month-olds requiring further evaluation for social and emotional problems. The ASQ: SE consists of 22–36 items (depending on age) rated either as “yes,” “sometimes,” or “not yet” and yields scores for seven behavioral areas (self-regulation, compliance, communication, adaptive behaviors, autonomy, affect, and interactions with people).

The questionnaire was normed using a national sample of 3,014 3- to 66-month-olds (Squires et al. 2001). The normative sample yielded good psychometric properties, including Cronbach’s alphas between .67 and .81 and an average test–retest reliability of 94% for 1- to 3-week intervals. Concurrent validity was demonstrated by comparing classifications on the ASQ:SE with classifications on the Vineland Social-Emotional Early Childhood Scale (SEECS; Sparrow et al. 1998) and questionnaires of maternal psychological distress in a clinical sample (Salomonsson and Sleed 2010).

Discriminative validity was illustrated by the fact that 24% of children in foster care were identified using the ASQ: SE compared to only 4% using provider surveillance. Collectively, these findings provide initial evidence for the utility of the ASQ: SE as an effective screening tool. With regard to its practical utility, the majority of parents who completed the ASQ: SE thought it was easy to understand, included appropriate questions, and took less than 10 min to complete (Squires et al. 2001). Administration of the ASQ: SE should take place in screening settings with large numbers of children, such as pediatric primary care and child care or educational settings, to identify infants at risk that need further evaluation for social and emotional problems.

Brief Infant-Toddler Social and Emotional Assessment (BITSEA; Carter and Briggs-Gowan 2006)

The BITSEA is a screener designed to identify social/emotional and behavioral problems and competencies in 12- to 36-month-olds. Each of the 42 items, which are the first items to the more comprehensive Infant-Toddler Social and Emotional Assessment (ITSEA; Carter and Briggs-Gowan 2006) described in more detail below, are rated as “rarely,” “sometimes,” or “often.” The BITSEA yields scores with cutoffs based on age and gender on both a problem scale and a competence scale. Given the short 7–10 min it takes to complete, the BITSEA can be administered to a parent or childcare provider in pediatric primary care or childcare screening settings.

In addition to the normative sample (Carter and Briggs-Gowan 2006), psychometric properties have been examined in a representative sample of 1,237 12- to 36-month-olds (Briggs-Gowan et al. 2004). Internal consistency was acceptable for both the problem and competency scales. Test–retest reliability between 10 and 45 days in a subsample (n = 119) was excellent, yielding intraclass correlation coefficients of .85 and .87 for the problem and competence scales, respectively. Inter-rater reliability between mothers and fathers (n = 68) was adequate (.61 and .68) but lower between mothers and child care providers (n = 79; .28

and .59). One-year stability of the BITSEA was acceptable yielding correlations of .53 and .65 for the problem and competence scales, respectively. For infants scoring above the cutoff on the problem scale or below the cutoff on the competence scale, the ITSEA can be administered for a more comprehensive evaluation.

Toddler Behavior Screening Inventory (TBSI; Mouton-Simien et al. 1997)

The TBSI is a 40-item parent-report screening tool used to assess problem behaviors (e.g., aggression, noncompliance) in 12- to 41-month-olds. Behaviors are rated using a 3-point Likert scale (from not true to very true) on the frequency scale and whether or not each behavior is problematic (i.e., “Yes” or “No”) on the problem scale.

The TBSI was normed using a sample of 581 mother-toddler dyads (Mouton-Simien et al. 1997). Results demonstrated good internal consistency for the frequency and problem scales, with Cronbach’s alpha of .88 and .90, respectively, although some item-total correlations were relatively low (range from .19 to .55). Two-week test– retest reliability for a subset of 30 mothers was also high for both scales (.89 and .68, respectively). In support of convergent validity, both scales were moderately to strongly correlated with the CBCL for ages 2–3 years (Achenbach, Edelbrock, and Howell 1987). McCain et al. (1999) provided additional psychometric support using a sample of 362 mother-toddler dyads and demonstrated good internal consistency, with Cronbach’s alpha of .84 and .85 for the frequency and problem scales, respectively, although some item-total correlations were low (range from .18 to .63). Two-week test–retest reliability was high with a correlation of .83 for both scales. Convergent validity was supported by moderate correlations with the CBCL for ages 2–3 years. Children who were clinically referred scored significantly higher on both scales than children who were not referred, demonstrating discriminative validity. The TBSI was designed for use at screenings and can be administered by pediatricians, psychologists, and other childcare professionals.

Temperament and Atypical Behavior Scale (TABS; Bagnato et al. 1999)

The TABS, consisting of both a screener and an assessment tool, is designed to measure temperament, self-regulation problems, and atypical behaviors that can be administered at screenings and evaluations, respectively. The TABS screener is a 15-item parent-report measure with “Yes” or “No” response choices, whereas the TABS assessment tool is a 55-item parent-report checklist, with “Yes,” “No,” or “Need help” response choices. Children with at least 1 item marked “Yes” on the screener should be assessed using the TABS assessment tool, which yields standard scores and percentiles and includes four factors (i.e., Detached, Hypersensitive/Hyperactive, Underreactive, and Dysregulated).

The TABS was normed using a sample of 833 11- to 71-month-olds from the U.S. and Canada. Approximately 25% of the pooled sample (n = 212) were identified as having a developmental delay, and the remaining 621 without any delays were used as the comparison group. Very little demographic information for the normative sample has been published. Internal consistency was high, yielding a Cronbach’s alpha of .83 and .85 for the screener and assessment tools, respectively (Judge 2003, 2004). Split-half reliability of the assessment tool was .95 for the combined sample and .88 for the sample without

developmental delay (Gomez and Baird 2005). Additionally, a factor analysis provided support for the proposed 4 factors (Bagnato et al. 1999). There are no published reports of concurrent or predictive validity. According to the authors, the TABS is appropriate for screening, eligibility determination, individualized program planning and intervention, progress monitoring, program impact and outcome evaluation, and applied research.

Child Behavior Checklist for 1½–5-year-olds (CBCL/1.5–5; Achenbach and Rescorla 2001)

The CBCL/1.5–5 is a 99-item parent-rating checklist for 18- to 60-month-olds, with each item rated as “not true,” “sometimes true,” or “often true.” It includes broad-band scales on internalizing and externalizing behavior problems, 7 narrow-band, syndrome scales (emotionally reactive, anxious/depressed, somatic complaints, withdrawn, sleep problems, attention problems, and aggressive behavior), and 5 DSM-oriented scales (affective problems, anxiety problems, pervasive developmental problems, attention deficit/hyperactivity problems, and oppositional defiant problems). The CBCL/1.5–5 has a parallel teacher-report form (C-TRF), which includes the same broad-band and narrow-band scales as the parent-report form except for sleep problems. The CBCL also includes the Language Development Survey to assess expressive vocabulary and word combinations.

The normative sample for the CBCL/1.5–5 included 700 non-referred, mostly middle class, Caucasian 18- to 71-month-olds with minimal gender and age differences (Achenbach and Rescorla 2001). In a different nonreferred sample (n = 68), test–retest reliability was assessed with an 8-day period yielding correlations between .68 and .92, and cross-informant correlations between mothers and fathers ranging between .48 and .67, which is consistent with other measures (Achenbach and Rescorla 2001). Additionally, studies provide support for convergent validity with other measures, including the ITSEA (Carter and Briggs-Gowan 2006), described in more detail below. Finally, the seven-syndrome model had acceptable to good fit in 23 different societies when responses were limited to presence versus absence (Ivanova et al. 2010). The CBCL is one of the most widely used measures of behavioral and emotional problems and has been used in numerous intervention studies providing support for its use in both research and practice.

Infant-Toddler Social and Emotional Assessment (ITSEA; Carter and Briggs-Gowan 2006)

The ITSEA is a 166-item parent- and caregiver-report questionnaire designed to assess social-emotional and behavioral problems, as well as competencies in 12- to 36-month-olds, with each item rated as “rarely,” “sometimes,” or “often.” The ITSEA has four broad domains and 17 subscales, including the following: externalizing (activity/impulsivity, aggression/defiance, and peer aggression), internalizing (depression/withdrawal, general anxiety, separation distress, and inhibition to novelty), dysregulation (sleep, negative emotionality, eating, and sensory sensitivity), and competence (compliance, attention, imitation/play, mastery motivation, empathy, and prosocial peer relations).

ITSEA norms are based on a nationally representative sample of 600 infants divided by gender and 6-month age bands (Carter and Briggs-Gowan 2006). Internal consistency was high, yielding Cronbach's alpha coefficients between .85 for the internalizing domain and .90 for the competence domain. Test–retest reliability of 6 days was assessed with a subset of parents from this sample (n = 84) with coefficients ranging from .76 for the competence domain to .91 for the dysregulation domain. Inter-rater reliability of a subsample of mother-father pairs (n = 94) was also high with correlations ranging from .72 for the internalizing domain and .79 for the competence domain. Convergent validity was supported by significant correlations with related scales on the CBCL/1.5–5 and the ASQ: SE. The ITSEA can be used in evaluations in which the goal is to identify problem areas of infant behavior and emotions that can be addressed in an intervention plan, and it is appropriate for use in a variety of clinical and research settings.

Baby and Infant Screen for Children with aUtIsm Traits (BISCUIT; Matson et al. 2009)

The BISCUIT is a comprehensive assessment battery designed to measure symptoms of autism spectrum disorders (ASD) and related difficulties in 17- to 37-month-olds. The battery is comprised of three components that assess symptoms of ASD (Part 1), comorbid psychopathology with ASD (Part 2), and behavioral problems (Part 3). For the purpose of this review, the focus will be on Parts 2 and 3 because they assess behavioral and emotional problems.

Part 2 includes 65 items assessing symptom severity of comorbid disorders (e.g., ADHD). Items are rated on a 3-point Likert scale that evaluates recent symptom severity, ranging from 0 (not a problem) to 2 (severe problem), or an × (does not apply). Internal reliability was high with a Cronbach's alpha of .96, and an exploratory factor analysis demonstrated support for a 5-factor model consistent with symptom clusters of psychopathology, including tantrum/conduct behavior, inattention/impulsivity, avoidance behavior, anxiety/repetitive behavior, and eating/sleeping problems (Matson et al. 2011). In addition, mothers of infants with ASD reported significantly higher factor scores in comparison with mothers of children without ASD, providing evidence for discriminative validity.

Part 3 includes 17 items assessing challenging behaviors common in children with ASD (i.e., aggressive, disruptive, self-injurious, and stereotypic) rated on the same 3-point Likert scale as Part 2. Matson et al. (2010) demonstrated high internal consistency overall and for the aggressive and destructive subscales with Cronbach's alpha of .91 and .85, respectively. However, the stereotypic and self-injurious subscales yielded lower Cronbach's alpha of .58 and .38, respectively. In the psychometric studies, the BISCUIT was administered in the child's home or day care setting. No specific information was provided on the length of administration, although this can be estimated based on the large number of items administered and, therefore, may be more appropriate for use during more comprehensive evaluations.

Observational Coding Procedures

Below is a description and review of all four, to our knowledge, observational coding procedures that can be used with infants in research and clinical practice. All of the observations include some form of coding the parent-infant relationship, which, as stated above, is an important component in understanding behavioral and emotional problems in infancy. The observations are all time-intensive and should likely occur during more comprehensive evaluations. Guidelines on administration and coder training are detailed below.

Functional Emotional Assessment Scale (FEAS; Greenspan et al. 2001)

The FEAS is a criterion-referenced observational coding procedure designed to measure social and emotional functioning during evaluations of 7- to 48-month-olds with regulatory disorders, interactional problems, and developmental delays. Coders assess six levels of infant and caregiver functioning: (1) regulation and interest in the world; (2) forming relationships (attachment); (3) intentional two-way communication; (4) development of a complex sense of self; (5) representational capacity and elaboration of symbolic thinking; and (6) emotional thinking or development and expression of thematic play.

The FEAS was validated with 468 7- to 48-month-olds, including typically developing children, as well as children with regulatory and developmental disorders (Greenspan and DeGangi 2001). Discriminative validity was examined and found to be adequate, with specificity ranging from 49 to 74% and sensitivity ranging from 75 to 82%. Divergent validity was supported by non-significant correlations between the scores on the FEAS with measures of sensory processing and attention in a subsample of 84 children with regulatory disorders. Finally, among a subsample of 46 children, inter-rater reliability was demonstrated in both live and video coding with coefficients ranging from .83 to .98. The FEAS must be administered by a trained clinician who has completed a training course sanctioned by the authors. Clinicians should obtain 80% reliability on at least 10 videos prior to conducting live scoring. Due to the high amount of costs and extensive time involved, it may be appropriate for only some clinicians depending on the scope of practice. An FEAS textbook including a protocol booklet can be purchased for $40 and is available at www.icdl.com.

Parent–Child Early Relational Assessment (PCERA; Clark 1985)

The PCERA is an observational coding system designed to measure the affective and behavioral quality of parent–child interactions at an evaluation during three 5-min situations: (1) meal time; (2) a structured task (e.g., parent attempting to get the infant interested in a toy); and (3) free play. The original assessment, which targeted psychiatrically ill mothers and their 2- to 48-month-olds, has been revised and modified for use with a broader age range (i.e., 0–5 years), fathers, and other high-risk groups (e.g., prematurely born infants; Clark 1999). The coding scheme consists of 65 variables across domains of parent (e.g., affective involvement), child (e.g., joint attention), and dyadic (e.g., mutual enjoyment) functioning, and each variable is rated from a 1 (concern) to a 5 (strength). Raters assess 8–10 variables at a time, requiring 7–9 viewings of each 5-min interaction.

In the only psychometric study of the PCERA (Clark 1999), inter-rater reliability was 85%, and internal consistency was adequate, with alphas ranging from .78 to .91. An exploratory factor analysis was conducted with half of a large sample (n = 179), and a confirmatory factor analysis on the second half of the sample (n = 180) demonstrated a good fit for the 3-factor model. Discriminant validity was also confirmed by differentiating mothers with and without a psychiatric diagnosis. Finally, convergent validity was demonstrated by significant correlations with other measures of dyadic functioning (e.g., Parenting Stress Index). Use of the PCERA requires extensive training (4 days) during which raters code practice tapes and are subsequently given four additional tapes to achieve 80% reliability with established codes. Coding materials are available upon request from the author. It is recommended that raters are masked to any other information collected on the coded dyad (Munson and Odom 1996). The extensive training, time required to code interactions, and necessity to be masked to clinical information may limit the clinical utility of the PCERA.

Nursing Child Assessment Satellite Training Program (NCAST) Parent–Child Interaction (PCI) Feeding and Teaching Scales (Sumner and Spietz 1994)

The NCAST PCI Feeding and Teaching scales are observations of the caregiver–infant interaction to assess both strengths and areas needing improvement. Both scales include 76 binary items, which are organized into six subscales: four describe the caregiver's behavior (sensitivity to cues, response to distress, social-emotional growth fostering, and cognitive growth fostering) and two describe the infant's behavior (clarity of cues and responsiveness to caregiver). The PCI Feeding scale is used with 0- to 12-month-olds, and the administration lasts as long as the feeding. The PCI Teaching scale can be used with 0- to 36-month-olds, involves the caregiver teaching an ageappropriate activity, and can be completed in 1–6 min.

In a large normative sample of mothers and infants, Cronbach's alpha ranged from .52 to .78 for the parent subscales and .50 to .78 for the child subscales (Sumner and Spietz 1994). Studies on the reliability and validity of the PCI scales have demonstrated high interrater reliability (Bryne and Keefe 2003), moderate convergent validity with other scales of child development and parent–child interaction (Bryne and Keefe 2003; Sumner and Spietz 1994), predictive validity by discriminating between lowand high-risk populations (Farel et al. 2007; Schiffman et al. 2003), and treatment sensitivity (French et al. 1998; Leitch 1999). In order to administer the NCAST PCI scales, it is a requirement to complete a training course sanctioned by NCAST, and examiners must demonstrate at least 85% interrater reliability for clinical purposes and 90% interrater reliability for research purposes. A strength of the NCAST PCI scales, particularly the Teaching scale, is the short time involved in administration, although the cost associated with training and purchasing the required materials may limit the use of the scales in clinical practice. A PCI Learner set, including the Teaching and Feeding manuals, teaching kit, and reliability forms, can be purchased for $217, and a packet of 100 rating scales for both Feeding and Teaching scales can be purchased for $21 each. All materials are available at www.ncast.org.

Emotional Availability Scales, Infancy and Early Childhood Version, 4th Edition (EAS; Biringen 2008)

The EAS is an observational coding system for 0- to 60-month-olds during evaluations and was designed to assess emotional availability during caregiver–infant interactions lasting at least 20 min. The EAS assesses four parental qualities (sensitivity, structuring, non-intrusiveness, and non-hostility) and two infant qualities (responsiveness to the adult and involvement of the adult). The EAS can be used with non-parental caregivers and in diverse childcare arrangements (e.g., neighbor care). There have been several studies demonstrating the reliability and validity of the EAS (e.g., Biringen et al. 1999; Biringen et al. 2000; Bornstein et al. 2006; Ziv et al. 1997). In a recent psychometric study, Skreitule-Pikse et al. (2010) found high inter-rater reliability (range from .84 to 1.00).

Training materials are available upon request from the author, and 4 days of face-to-face or self-paced distance training is required. Coders need to achieve 80% reliability with criterion tapes developed by Biringen and her central laboratory that have been validated with attachment measures, such as the Strange Situation and the Adult Attachment Interview (Biringen 2005). Despite its psychometric support, the EAS does not assess specific infant behavioral and emotional problems. The assessment of emotional availability in the caregiver and infant may help inform the development of interventions (Shivers 2008), but further research is needed to determine whether this construct is an appropriate mechanism of infant behavior change.

Diagnostic Classification Systems

Below is a description and review of the only two, to our knowledge, diagnostic classification systems that can be used with infants. These classification systems are typically utilized during evaluations and are primarily conducted by clinicians, including psychiatrists, psychologists, and other mental health professionals. Both diagnostic systems involve the classification of infants into diagnostic groups.

Diagnostic Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood, Revised (DC: 0–3R; Zero To Three 1994, 2005)

The DC: 0–3R was developed by a multidisciplinary task force of early childhood experts as a complement to the DSM and to provide a developmentally based approach to classifying mental health and developmental disorders in the first 3 years of life. The original DC: 0–3, published in 1994, consisted of five axes: primary diagnosis, relationship disorder classification, medical and developmental disorders and conditions, psychosocial stressors, and functional emotional developmental levels. In a study of 85 0- to 36-month-olds, Guédeney and colleagues (2003) demonstrated inter-rater reliability of .73 between two child psychiatrists with comparable clinical experience. Two studies demonstrated some differences between the DC: 0–3 and the DSM, providing preliminary support for divergent validity (Dunitz et al. 1996; Minde and Tidmarsh 1997). In response to the lack of psychometric evidence, Gueédeney et al. (2003) recommended changes to the DC: 0–3 to promote reliability and empirical studies validating the proposed diagnostic categories.

The DC: 0–3 was revised in 2005 to address several limitations, including the lack of psychometric support. The revision addressed Guédeney et al.'s (2003) recommendation by including specific criteria for all of the diagnostic categories, as well as some modifications to the diagnostic categories to reflect recent research (Zero to Three 2005). There have been some descriptive reports of the DC: 0–3R (Loeb et al. 2011). However, psychometric data have not been published, and Egger and Emde (2011) recently indicated that the DC: 0–3R does not adequately address the full range of possible problems in infants, limiting its utility in both clinical and research settings. However, the developers report clinicians have found it useful for clinical formulation. The manual is available for purchase at www.zerotothree.org for $32.95 and has been published in Dutch, French, German, Italian, Korean, Portuguese, Serbian, and Spanish.

Diagnostic and Statistical Manual for Primary Care (DSM-PC) Child and Adolescent Version (Wolraich et al. 1996)

The DSM-PC was developed as a comprehensive, developmentally sensitive method to identify behavioral and developmental problems in children of any age at primary care settings. The manual is divided into two sections: (1) Environmental Situations, which includes changes in caregiving, community/social/educational challenges, inadequate access to health care, and legal problems; and (2) Child Manifestations clusters, which includes 10 behavioral symptom clusters (developmental competency; impulsive/hyperactive or inattentive behaviors; negative/antisocial behavior; substance use; emotions and mood; somatic and sleep behaviors; feeding, eating, and elimination behaviors; illness-related behaviors; sexual behaviors; and atypical behaviors). The DSM-PC provides guidelines to facilitate coding of disorders for 0- to 2-year-olds (Drotar 1999). Clinicians use the presenting complaint to identify a relevant cluster or situation and then evaluate the severity on four dimensions (symptoms, dysfunction, burden of suffering on the child/family, and risk/protective factors) using the definitions provided.

Preliminary reports suggest pediatricians have found the DSM-PC to be useful for describing problems typically seen in primary care settings (Drotar 1999). Additionally, the DSM-PC can be used to describe problem severity and stressful environmental situations, as well as facilitate communication between psychologists and pediatricians. However, psychometric data on the DSM-PC are not available, which limits its utility in clinical and research settings. The DSM-PC is available for purchase for $39.95 at www.aap.org.

Discussion

The current paper provides a systematic review of all widely used assessment procedures for behavioral and emotional problems in infants (i.e., children younger than 2 years). Although infants are not typically diagnosed with psychiatric or psychological disorders, it is important for clinical child psychologists and other professionals working with infants to be familiar with the reviewed assessment procedures given the growing interest in the field of infant mental health. Early intervention and preventive services are becoming more widespread in a variety of pediatric and mental health care settings, and it is critical for

clinicians to use evidence-based assessment procedures in order to evaluate the effectiveness of interventions for infants and their families.

Several assessment tools included in this review had sufficient psychometric evidence for use with infants. Of the procedures reviewed, the parent- and caregiver-report questionnaires had the most extensive empirical support. Four screening tools, the ASQ: SE, BITSEA, TABS screener, and TBSI, are all brief questionnaires with sufficient evidence supporting their use in identifying infants at risk for behavioral and emotional problems. These screeners can be administered to families while waiting for appointments at outpatient settings, including sick and well visits with pediatricians and speech and occupational therapy appointments, and when dropping off or picking up their infant at a day care facility. Although these four screening measures can be administered to infants as young as 12 months, only the ASQ-SE can be administered during the first year of life (starting at 3 months). Infants identified as positive on one of these screeners can be administered any of the four questionnaires, including the CBCL, ITSEA, TABS, and BISCUIT, that provide more detailed information about the infant's behavioral and emotional functioning. These measures also have sufficient psychometric evidence and can be a part of a more thorough evaluation that may include a more in-depth discussion with the family about the infant's strengths and weaknesses, as well as observational procedures and assessment of the parent-infant relationship.

Specific strengths of the parent- and caregiver-report questionnaires include high internal consistency, test–retest reliability, and inter-rater reliability between mothers and fathers, as well as evidence for validity with other measures of related constructs. They are relatively easy to administer and can be used in a variety of both screening and evaluation settings and collect information from multiple informants (e.g., mother, father, caregiver, etc.). Additionally, the ITSEA (and BITSEA) provide a measure of competency in addition to problems, which is an important construct that can help inform parents how to use specific strengths in their infant to promote abilities and decrease the likelihood for future problems. The TABS was the only tool that uniquely provides an assessment of both temperament and behavior problems. Although the focus of this review was on behavioral and emotional problems, there are parent-report questionnaires designed specifically to measure infant temperament (e.g., Infant Behavior Questionnaire-Revised; Gartstein and Rothbart 2003) that should be reviewed in future work. Additionally, further research should address the relationship between infant behavioral and emotional problems and infant temperament. As discussed above, these are separate but related constructs that, when examined together, can help provide a more comprehensive understanding of the early onset and development of behavioral and emotional problems. A weakness of the questionnaires discussed in the current review is the limited information about the parent-infant relationship, which is an important construct in assessing infant behavioral and emotional problems.

Four observational coding procedures were identified for use with infants, including the FEAS, PCERA, NCAST PCI Feeding and Teaching scales, and EAS. Unlike the parent- and caregiver-report measures, all of the observation coding procedures could be used before 12 months of age (with the exception of the NCAST PCI Teaching scale) and all assess some aspect of the parent-infant relationship. Therefore, these observations can provide a window

into the relative well-being of the caregiving environment, which is an important predictor of emotion regulation (Jaffe et al. 2010). Adequate support for reliability and validity for all four procedures was provided. The FEAS and PCERA assess specific infant behaviors, whereas the NCAST PCI Feeding and Teaching scales and the EAS measure caregiver responses to the infant (e.g., emotional availability) and infant responses to the caregiver (e.g., clarity of cues). Although there may be important clinical implications for assessing caregiver and infant responses, further research is needed to support the validity of these constructs in the assessment of infant behavioral and emotional problems. Similar to the parent- and caregiver-report questionnaires, there is evidence that infant temperament can be reliable measured using direct observation (Seifer et al. 1994), and future work should also examine the relationship between infant behavioral and emotional problems and infant temperament when using observational coding procedures.

The observational coding procedures provide more objective and detailed information about the infant and caregiver. A more comprehensive multi-method evaluation would ideally include both questionnaires and behavioral observations and across multiple contexts for infants routinely cared for in multiple settings (e.g., childcare). However, it is often difficult for clinicians to implement timely and costly behavioral observations in practice, although the NCAST PCI Teaching scale is considerably shorter than the others lasting only 1–6 min in duration. Nevertheless, future research should examine the feasibility and appropriateness for the use of these tools in practice and examine the incremental validity (Johnston and Murray 2003) of incorporating behavioral observations with other assessment approaches and assessing problems across multiple contexts.

Finally, two classification systems have been developed for use with infants, including the DC: 0–3R and the DSM-PC. However, both systems have little psychometric support, and clinicians should use caution in using these procedures in practice. Additionally, recent work has shown the DC: 0–3R does not adequately address the full range of possible problems in infants (Egger and Emde 2011). Similar to research in child and adolescent psychopathology, there are limitations in classifying infants in categorical constructs rather than utilizing dimensional measures, including lower reliability and questionable validity (Beauchaine 2003). However, some have argued that the integration of dimensional and categorical conceptualizations of psychopathology is necessary (Pickles and Angold 2003). The development of a structured clinical interview, such as the Preschool Age Psychiatric Assessment (PAPA; Egger and Angold 2004), which includes diagnoses in the DC: 0–3R, may prove useful in improving the reliability of diagnostic classification systems in infancy. However, the PAPA has been shown to not be feasible for use in most clinical settings (Egger et al. 2006), and research must first demonstrate the appropriateness of these diagnostic categories before 2 years of age given that the current use of the PAPA is for 2- to 5-year-olds.

In conclusion, there is considerable support for the use of parent- and caregiver-report questionnaires and observational coding procedures in infants. More research is needed to examine the appropriateness of classification systems in infancy, but the existing classification systems are impressive given the young field of infant mental health. Clinicians can utilize the assessment procedures identified in the current review in both

screenings and evaluations in a variety of settings to help guide early intervention and prevention programs for infants. The ability to identify these problems during the first 2 years of life provides the field with a unique opportunity to intervene as early as possible and to prevent more severe problems from occurring in early childhood, particularly among children with multiple risk factors.

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Table 1

Summary of parent-report measures

Name	Authors	Publisher	Age range	Time to complete	Languages available	Cost
Ages & Stages Questionnaire: Social-Emotional (ASQ: SE)	Squires et al. (2002)	Brookes Publishing www.brookespublishing.com	3–66 months	10–15 min	English, Spanish	$149.95 for one set; can photocopy
Brief Infant-Toddler Social-Emotional Assessment (BITSEA)	Carter and Briggs-Gowan (2006)	Pearson Assessments www.pearsonassessments.com	12–36 months	7–10 min	English, Spanish	$108.60 for starter kit; $40.25 for add'l forms
Toddler Behavior Screening Inventory (TBSI)	Mouton-Simien et al. (1997)	Not published; available by contacting author	12–41 months	10 min	English	Information not provided
Temperament and Atypical Behavior Scale (TABS)	Bagnato et al. (1999)	Brookes Publishing www.brookespublishing.com	11–71 months	Screener: 5-min Assessment Tool: 15 min	English	$95 for complete system; $25–$30 for add'l forms
Child Behavior Checklist (CBCL)	Achenbach and Rescorla (2001)	Achenbach System of Empirically Based Assessment www.aseba.org	18–60 months	15–20 min	English, Spanish	$160 for hand-scoring starter kit; $295 for computer-scoring kit; $25 for add'l forms
Infant-Toddler Social-Emotional Assessment (ITSEA)	Carter and Briggs-Gowan (2006)	Pearson Assessments www.pearsonassessments.com	12–36 months	25–30 min	English, Spanish	$226.70 for computer-scoring starter kit; $50.50 for add'l forms
Baby and Infant Screen for Children with aUtIsm Traits (BISCUIT)	Matson et al. (2009)	Not published; see Matson et al. (2009) for items	17–37 months	Information not provided	English	Information not provided