Assessment of Anxiety Disorders: Categorical and Dimensional Perspectives

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Abstract This chapter provides an overview of evidence-based instruments for the assessment of pediatric anxiety disorders from both categorical and dimensional perspectives. The chapter begins with a brief discussion of a categorical perspective to pediatric anxiety assessment and how interview schedules best capture this perspective. This is followed by a summary of the most widely used interview schedules to assess pediatric anxiety, including the evidence base for accomplishing specific assessment goals (i.e., diagnosis and treatment evaluation). The chapter follows with a brief discussion on a dimensional perspective and how rating scales best capture this perspective. This is followed by a summary of the most widely used rating scales for assessing pediatric anxiety, including research support for their use across contexts (i.e., identifying and quantifying anxiety, screening, and treatment evaluation). Next is a brief summary of objective measures of pediatric anxiety. The chapter concludes with a discussion of future research directions.

Keywords Child • Adolescent • Anxiety • Assessment • Evidence base

Pediatric anxiety disorders are among the most common psychiatric disorders affecting children and adolescents, with prevalence rates ranging from 11 % to 12.3 % in community samples [1] and from 4 % to 45 % in clinical samples [2]. They are associated with significant personal distress and interference in functioning (e.g., academic, family, peers) [3]. If left untreated, pediatric anxiety disorders can lead to other psychopathologic conditions including depression and substance abuse [4–6].

One of the greatest challenges is the appropriate assessment of these disorders both in research and clinical settings, particularly in light of their high comorbidity with one another and with other diagnoses. Over the past two decades there has been much attention paid to the development of evidence-based assessment approaches. Evidence-based assessment is important to ensure that treatment is targeted to address the most impairing concern, such as anxiety, and that symptoms can be reliably tracked over time [7].

This chapter provides an overview of evidence-based methods and instruments for the assessment of pediatric anxiety disorders. Both categorical and dimensional perspectives are considered.

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Categorical measures are designed to ascertain appropriate diagnosis or diagnoses. For this purpose, structured and semi-structured diagnostic interview schedules, administered to the child or adolescent (from here on referred to as child) and their parents, are used. Dimensional measures assess anxiety as a continuous measure, providing quantitative information about frequency and severity of symptoms. Rating scales, completed by multiple informants including the child and his/her parents, are the most commonly used dimensional measures. For most purposes including initial assessment and treatment evaluation, the combination of the two is recommended, thereby incorporating both perspectives.

Interview schedules and rating scales are emphasized in this chapter because they are the most widely used assessment approaches. We provide an evaluative narrative as well as comprehensive tables that summarize reliability, validity, and utility information. However, such subjective verbal reports have limitations and do not directly capture two additional aspects within the tripartite conceptualization of anxiety [8], namely, (1) avoidance of anxiety-provoking situations or objects and (2) physiological reactions such as rapid heartbeat and sweating. To assess behavioral avoidance, other assessment methods need to be considered such as direct observations. To assess physiological reactions, psychophysiological measurements such as heart rate or galvanic skin response need to be considered. Thus, we include a brief section on these objective measures. There also is growing interest in assessment methods that are at the crossroads of neuroscience and clinical science such as brain imaging and laboratory tasks in attention biases. We refer the interested reader to Chap. 2, as well as Field et al. [9] and Pine [10], for further information on these methods.

It is important to note that all of the categorical and dimensional anxiety measures included in this chapter have been developed based on the revised third or fourth editions of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III-R; DSM-IV) [11, 12]. The advent of the fifth edition of the DSM will likely have implications for existing measures of pediatric anxiety which might require revision and psychometric reevaluation.

Multi-method and Multisource Assessment of Pediatric Anxiety

It is generally recommended that a multi-method (e.g., diagnostic interviews, rating scales, observations, physiological measures) and multisource (e.g., children, parents, teachers) assessment approach be pursued whenever possible [13]. A multi-method assessment approach is recommended for pediatric disorders, including anxiety, because symptoms typically manifest across different response systems including the behavioral, the subjective/cognitive, and physiological [8]. The rating scales and diagnostic interview schedules summarized in this chapter capture these three aspects via subjective verbal reports and therefore do not directly capture behavioral and physiological reactions of anxiety. However, more objective measures of these responses are obtained through direct observations and physiological assessment which are summarized later in this chapter.

A multisource assessment approach is also recommended for pediatric disorders, including anxiety, because different respondents typically have different perspectives [14]. It is common practice to obtain information from the child and parent(s) when assessing anxiety. Despite this, there is often low agreement between child and parent reports [15]. This low agreement has been found for both dimensional [15] and categorical measures of pediatric anxiety. For example, studies using the Anxiety Disorders Interview Schedule: Child and Parent versions (ADIS: C/P) [16, 17] have yielded poor estimates of agreement between children and parents regarding the presence of anxiety diagnoses [18–20], although child–parent agreement is higher at the symptom level, especially for observable symptoms [21]. It is less common to obtain information from teachers given the logistical challenges and the lower reliability of internalizing symptom detection in the school setting [22].

Certain factors (e.g., sex, age, parent psychopathology) have been shown to be related to child–parent agreement and the relative reliability of respondents' reports, though these findings have

been inconsistent [23]. Edelbrock [24] found parent reports of internalizing symptoms to be more reliable than young children's self-reports, but older children's self-reports of symptoms were more reliable than parents' reports. In contrast, Silverman and Eisen [25] did not find age differences in parent or child reliability estimates of anxiety symptom reports. In light of these mixed findings, there is clearly a need to advance our understanding of the conceptual and clinical meaning of child and parent discordance [26]. However, despite this, it is generally recommended that information be obtained from both the child and his/her parents in the assessment of pediatric anxiety to obtain as full and accurate a diagnostic picture as possible.

Categorical Perspective in the Assessment of Pediatric Anxiety Disorders

Consistent with a medical model [27], the categorical perspective is the dominant approach used in clinical psychology and psychiatry. Clinical disorders are defined by a specific set of symptoms and criteria, based on the DSM-IV (text revision) [28] or the International Classification of Diseases (ICD-10) [29]. These diagnostic labels are useful because they provide the field with a common language to describe psychopathological conditions. This "present/absent" approach implies that individuals either meet criteria for a disorder or do not and provides less information about subthreshold symptoms that lead to significant impairment [30]. Information about such symptoms may be important for treatment planning [30]. This is where dimensional measures can be useful, as discussed in the following section.

Semi-Structured and Structured Diagnostic Interview Schedules

In clinical practice, diagnostic interviews are most often unstructured. Clinicians ask a series of questions that they either learned during their training or have developed over time, aimed at identifying whether the child meets criteria for any DSM diagnoses. However, in research, semi-structured and structured interviews are the norm for both initial diagnosis and treatment evaluation [31]. These standardized interviews have been designed to limit the variability inherent in unstructured clinical interviews by asking the same questions of all informants and using specific methods to capture the data and record responses. In addition to the standard questions, semi-structured interviews allow interviewers to ask follow-up questions to clarify informants' responses regarding the presence or absence of symptoms. They require administration by clinically trained interviewers who are knowledgeable in the DSM and/or ICD. In contrast, structured interviews require that each question be asked verbatim and additional questions cannot be used to clarify informant responses. Thus, they can be administered by lay persons and require minimal knowledge of the DSM and/or ICD.

Table 1 [17, 20, 25, 32–47] presents a summary of the most widely used and researched semi-structured and structured interview schedules, including, when available, reliability estimates obtained from initial psychometric studies. All of the interview schedules have respective child and parent versions, which are administered separately. Most can be administered to children between the ages of 6 and 18 years. The interview schedules' formats are generally similar. They begin with an introductory section, which includes questions requesting a brief description of the presenting problems, as well as questions about school, activities, friendships, and family. This is followed by sections or modules designed to assess for specific disorders, which typically begin with a small number of screening questions. If an informant responds "yes" to a screening question, the entire set of questions for that section is administered, which includes obtaining frequency, intensity, and interference ratings of endorsed symptoms. If an informant responds "no" to all screening questions, the diagnostic

Table 1 Structured and semi-structured diagnostic interview schedules

Diagnostic interview	Ages, years	DSM anxiety diagnoses	Interrater reliability (κ [kappa])			Test–retest reliability (κ [kappa])			Studies
			Child	Parent	Combined	Child	Parent	Combined	
Semi-structured									
Anxiety Disorders Interview Schedule for DSM-IV: Child and Parent versions	6–18	Generalized Anxiety Disorder	0.72–0.82	0.78–0.82	0.80–0.90	0.63	0.72	0.80	Lyneham et al. [32]
		Obsessive- Compulsive Disorder	…	0.91	0.91–0.96	…	…	…	Rapee et al. [20]
		Separation Anxiety Disorder	0.70–0.81	0.66–0.86	0.59–0.89	0.78	0.88	0.84	Silverman and Eisen [25]
		Social Phobia	0.80–0.87	0.63–0.87	0.77–0.82	0.46–0.71	0.54–0.86	0.73–0.92	Silverman and Nelles [17]
		Specific Phobia	0.59–1.00	0.33–0.87	0.63–1.00	0.76–0.80	0.65–0.80	0.81–0.84	Silverman et al. [33]
Child and Adolescent Psychiatric Assessment	9–17	Generalized Anxiety Disorder	…	…	…	0.79	…	…	Angold and Costello [34] Angold and Costello [35]
Diagnostic Interview for Children and Adolescents	6–18	Separation Anxiety Disorder	…	…	0.94	0.32–0.75	…	…	Boyle et al. [36]
		Specific Phobia	…	…	0.98	0.65	…	…	Kebede et al. [37] Reich [38]
Schedule for Affective Disorders and Schizophrenia for School-Age Children	6–18	Generalized Anxiety Disorder	…	…	1.00	…	…	0.78	Ambrosini [39]
		Obsessive-Compulsive Disorder	…	…	…	…	…	0.67–0.74	Ambrosini et al. [40]
		Post-traumatic Stress Disorder	…	…	…	…	…	0.60–0.67	Kaufman et al. [41]
		Separation Anxiety Disorder	…	…	0.65–1.00	…	…	…	Shahrivar et al. [42]
		Specific Phobia	…	…	0.64–0.75	…	…	0.80	
Structured									
NIMH Diagnostic Interview Schedule for Children Version IV	9–17	Generalized Anxiety Disorder	…	…	1.00	0.38	0.65	0.58	Breton et al. [43]
		Obsessive- Compulsive Disorder	…	…	…	0.63	0.84	0.79	Ho et al. [44].
		Panic Disorder (Agoraphobia)	…	…	…	0.20	…	…	Roberts et al. [45]
		Separation Anxiety Disorder	…	…	1.00	0.27–0.72	0.44–0.58	0.49–0.80	Schwab-Stone et al. [46]
		Social Phobia	…	…	…	0.25–0.44	0.45–0.54	0.44–0.48	Shaffer et al. [47]
		Specific Phobia	…	…	…	0.42–0.68	0.55–0.96	0.86	

section may be skipped. Sections covering developmental, medical, and psychiatric history also are contained in most of the parent versions of the schedules.

Diagnoses are obtained after the separate administration of the child and parent interviews. Both interviews contain questions that correspond to each criterion required to meet a given diagnosis. If the required number of criteria is met for a particular diagnostic section in either the child or parent interview schedule, then a diagnosis is warranted. Separate diagnoses for the child and parent versions are obtained using diagnostic algorithms completed either by the clinician (e.g., Schedule for Affective Disorders and Schizophrenia for School-Age Children, [K-SADS]) [39] or by computer (e.g., The National Institute of Mental Health Diagnostic Interview Schedule for Children for DSM-IV [NIMH DISC-IV]) [47]. These diagnoses are then combined for a final diagnosis using rules derived either by the developers of the interview (e.g., ADIS: C/P) [16] or by computerized algorithms (e.g., DISC-IV) [47].

The *ADIS: C/P* [16] is the most widely used semi-structured interview in pediatric anxiety disorders research, including randomized clinical trials. This is likely because it has the most comprehensive coverage of the DSM anxiety disorders [7]. The ADIS: C/P also includes modules for other common DSM disorders, such as major depressive disorder (MDD) and dysthymia, as well as externalizing disorders (e.g., attention deficit hyperactivity disorder, oppositional defiant disorder).

In addition to acquiring information regarding DSM-IV diagnostic criteria, the ADIS: C/P contains clinician severity rating scales to assess the child's level of distress and/or impairment in functioning relating to each disorder using a 0- (*none*) to 8 (*very much*)-point scale [7]. The severity ratings derived by the clinicians are based on the information obtained from both the child and parent interviews. Severity ratings of 4 or higher suggest a DSM diagnosis, assuming all diagnostic criteria are met. When criteria for multiple disorders have been met, the most severe and interfering disorder, based on the severity rating scale, is considered the primary diagnosis, followed by a ranking of the other severity ratings (e.g., secondary, tertiary). The ADIS: C/P severity rating scales are also used to obtain ratings from children and parents of the severity of the child's fear and/or avoidance in specific situations. In this way, clinicians can ascertain which symptoms/situations are most severe and should be targeted in the child's treatment.

The *Child and Adolescent Psychiatric Assessment (CAPA)* [35] is a semi-structured interview that assesses the frequency, duration, and intensity of symptoms associated with over 30 psychiatric disorders, including the anxiety disorders, according to the DSM-IV and ICD-10. It also covers a number of disorders that were part of DSM-III-R but are no longer included in the DSM-IV (e.g., overanxious disorder [OAD], avoidant disorder [AVD]). The CAPA assesses symptoms of psychiatric disorders that have occurred over the past 3 months, referred to as the *primary period*. It uses a modular format, allowing interviewers to administer specific diagnostic modules independently from the entire interview. Unique to the CAPA is the inclusion of a glossary that provides descriptions of symptoms reported by the child or parent to aid the interviewer in determining the presence or absence of symptoms. Also included in the glossary are instructions for coding symptom severity levels.

The *Diagnostic Interview for Children and Adolescents (DICA)* [38] was designed originally as a highly structured interview to be administered by lay interviewers; however, successive versions have rendered the DICA more semi-structured [38]. In addition to a parent version, the DICA has a version for children ages 6–12 years old and a version for adolescents ages 13–18 years old. The DICA covers over 20 psychiatric disorders, including all of the anxiety disorders, using DSM-IV criteria. Similar to the CAPA, the DICA also covers a number of disorders that were part of DSM-III-R but are no longer included in the DSM-IV (e.g., OAD, AVD). Diagnoses based on the ICD-10 can be derived using computer algorithms. The DICA assesses both current psychiatric diagnoses and lifetime diagnoses.

The *(K-SADS)* [39] is a semi-structured interview that assesses over 30 psychiatric disorders, including the anxiety disorders. At present, there are three versions available: the K-SADS-Present

State (K-SADS-P-IVR), K-SADS-Epidemiologic (K-SADS-E), and K-SADS-Present and Lifetime (K-SADS-P/L). The K-SADS-P-IVR assesses frequency and severity of symptoms of psychiatric disorders, both currently and over the past 12 months, based on the DSM-IV, DSM-III-R, and the Research Diagnostic Criteria (RDC) [48]. The authors of the current K-SADS-P-IVR also included the Clinical Global Impressions Scales [49], which are used to measure symptom severity and symptom improvement. The K-SADS-E (fifth version) and K-SADS-P/L both assess current and lifetime diagnoses based on the DSM-IV and DSM-III-R. The K-SADS-P/L (version 1.0) is unique in its inclusion of an 82-symptom screening interview. If a child or parent responds "yes" to the presence of a given symptom, a supplement with the remaining symptom criteria for the specific disorder is administered. If a child or parent responds "no" to the screening symptoms, the specific diagnostic supplemental section is skipped, shortening administration time.

The *NIMH DISC-IV* [47] was originally designed for epidemiological use, but successive versions have been used in clinical studies and as an aid to diagnosis in service settings. The DISC-IV is a structured interview that assesses over 30 psychiatric disorders, including the anxiety disorders, based on the DSM-IV and ICD-10. The DISC-IV assesses the presence of current diagnoses (within the past 4 weeks at the time of the interview) and diagnoses occurring within the past 12 months. It also includes an optional module for lifetime diagnoses.

Reliability

Table 1 summarizes the interview schedules' reliability estimates (kappa coefficients) for specific anxiety disorders when study sample sizes were sufficient to allow these analyses. Kappa coefficients (κ[kappa]) greater than 0.74 are considered excellent, κ[kappa]s between 0.59 and 0.74 are considered good, κ[kappa]s between 0.40 and 0.58 are considered fair, and κ[kappa]s <0.40 are considered poor [50].

As Table 1 shows, estimates of reliability between clinicians (or interrater reliability) have generally been found to be good to excellent for generalized anxiety disorder (GAD), obsessive-compulsive disorder (OCD), separation anxiety disorder (SAD), social phobia (SOP), and specific phobia (SP) (κ[kappa]: 0.63–1.00) using the latest version of the ADIS: C/P for DSM-IV [16] and its previous version for DSM-III-R [17] according to child, parent, and combined child and parent reports (see Table 1) [17, 20, 32]. The previous version of the ADIS: C/P for DSM-III-R has shown somewhat lower reliability estimates for some anxiety disorders examined, such as SAD (κ[kappa] = 0.59) found anywhere in the diagnostic profile using combined child and parent reports, and poor to fair estimates for SP as the primary diagnosis and as a diagnosis anywhere in the profile using child and parent reports, respectively (κ[kappa]: 0.33–0.59) [17, 20].

Test–retest reliability estimates (7–14 day retest interval) for specific anxiety diagnoses using the ADIS: C/P for DSM-IV and its previous version have generally been found to be good to excellent for GAD, SAD, SOP, and SP (κ[kappa]: 0.63–0.92) according to child, parent, and combined reports (see Table 1) [25, 33]. However, one study [25] using the previous version of the ADIS for DSM-III-R [17] found fair reliability estimates for SOP according to child and parent reports (κ[kappa]: 0.46 and 0.54, respectively) (see Table 1).

The reliability of diagnoses has been examined using several versions of the K-SADS (K-SADS-P-IIIR and K-SADS-IV-R, K-SADS-E, and K-SADS-P/L) in both clinic and community samples [39–42]. Findings show that interrater and test–retest reliability estimates for anxiety diagnoses based on combined child and parent reports vary from good to excellent (see Table 1).

One study examined interrater reliability of a number of disorders, including some anxiety disorders, using the DISC-R [51]. Reliability estimates for the anxiety disorders examined, namely, GAD

and SAD, were excellent (see Table 1). This finding is not surprising given the highly structured nature of the DISC. Retest reliability of diagnoses using the latest version of the DISC (DISC-IV), as well as previous versions (i.e., DISC-R, DISC 2.1, and DISC 2.3), has been examined in both clinic and community samples [43–47]. Retest intervals ranged between 1 and 23 days. As Table 1 shows, reliability estimates in the good to excellent range were found for OCD using child, parent, and combined reports (κ[kappa]: 0.63–0.84) [44]. Poor to fair retest reliability estimates were found across studies for SOP and panic disorder (PD) with agoraphobia using child, parent, and combined reports (κ[kappa]: 0.20–0.54) [45, 47]. Test–retest reliability estimates for GAD, SAD, and SP using the DISC vary across studies and informants. Test–retest reliability estimates for GAD have been found to be good using parent report (κ[kappa] = 0.65) [46] but poor to modest for child and combined reports (κ[kappa]: 0.38–0.58) [45, 47]. Retest reliability estimates for SAD have been excellent for child and combined reports in one study (κ[kappa] = 0.72 and 0.80, respectively) [46], but other studies have found poor to fair estimates for SAD using child, parent, and combined reports (κ[kappa]: 0.27–0.58) [43, 45, 47]. Good to excellent reliability estimates were found for SP using child, parent, and combined reports in one study (κ[kappa]: 0.68–0.96) [47], but other studies reported only fair reliability estimates for SP using child and parent reports (κ[kappa]: 0.42–0.55) [43, 45].

Less research has been conducted on the reliability of anxiety diagnoses using the CAPA and DICA [34–38]. Overall, studies show good to excellent (κ[kappa]: 0.65–0.98) interrater and retest reliability estimates [34, 35, 37, 38], except for one study on the child-report version of the DICA, which found a poor retest reliability estimate of 0.32 for SAD [36]. More research is needed given the absence of interrater reliability estimates on CAPA- derived anxiety diagnoses and the availability of retest reliability estimates for child-reported GAD only. Further, interrater and retest reliability estimates are available for a couple of DICA-derived anxiety diagnoses (i.e., SAD, SP) based on combined child and parent reports or child report only.

Validity

Relative to studies examining reliability, fewer studies have examined the validity of anxiety diagnoses using interview schedules. Wood et al. [52] examined concurrent validity of ADIS: C/P diagnoses of GAD, PD, SAD, and SOP in 186 children (ages 8–17 years) referred to an anxiety disorders clinic. Children and their parents were administered the ADIS: C/P and completed the Multidimensional Anxiety Scale for Children (MASC) [53]. Findings showed strong convergence between the ADIS: C/P anxiety diagnoses (except for GAD) and the MASC subscale scores corresponding to the respective disorders. Findings also supported divergent validity of the ADIS: C/P in the predicted direction. For example, MASC Social Anxiety subscale scores, but no other subscale scores, were significantly elevated for children meeting *DSM-IV* SOP.

Studies of the validity of anxiety diagnoses obtained using the DICA and K-SADS have not shown such positive results [36, 54]. For example, in a study of 30 clinic-referred children (ages 7–16 years), poor to modest convergence was found for the presence of any DSM-III anxiety disorder between the K-SADS and Child Assessment Schedule [54, 55]. In a community sample of 2,317 children (ages 6–16 years), poor convergence was observed between the DICA-R DSM-III-R anxiety diagnoses of SAD and OAD and subscales corresponding to these disorders on the revised Ontario Child Health Study Scales [56] (κ[kappa] = 0.37 and 0.31, respectively) [36]. Although these findings fail to support the concurrent validity of these two widely used interviews, it should be noted that the K-SADS findings were likely impacted by the small sample size and both studies are based on previous editions of DSM; validity studies using DSM-IV diagnoses and measures are needed.

Alternative Formats

The semi-structured and structured interview schedules summarized above have been most commonly administered face to face with the interviewer recording the interviewees' responses using a hard paper copy of the interview. Several of the interview schedules are available in alternative formats, though research on these formats is relatively scant.

The DISC-IV (C-DISC-4.0) [47] and the DICA [38], for example, are available in computerized formats. With the C-DISC-4.0, interviewers read questions from a computer screen and key in responses given by the child and/or parent. Scoring algorithms are built into the computer program, which generates a diagnostic report immediately after completion of the interview, thus minimizing interviewer error. The administration of the DISC-IV is not necessarily straightforward for clinicians (e.g., clinicians must follow specific skipping instructions and keep track of informants' responses to a number of symptoms to determine if follow-up questions about onset and impairment are warranted). As a consequence, the DISC authors recommend that interviewers using more than a single diagnostic module employ the C-DISC-4.0 to aid interview administration [47]. Reliability of diagnoses using the C-DISC-4.0 was examined in one study [57] using the Spanish version of the interview. Test–retest reliability estimates for the anxiety disorders examined, namely, SAD, GAD, and SOP, were fair to good (κ[kappa]: 0.47–0.66) based on parent report only. Reliability estimates for lifetime diagnoses of SAD, GAD, and SOP based on parent report were poor to excellent (κ[kappa]: 0.27–0.75).

The computerized DICA can be administered by an interviewer or be self-administered. Children and/or their parents read the interview questions from the computer screen and answer them on their own. The DICA authors recommend that an interviewer administer the computerized DICA for younger children, as well as older children or parents with reading difficulties [38]. Only one study examined the retest reliability (over a 1 week retest interval) of diagnoses using the self-administered computerized DICA in a sample of clinic-referred children 6–18 years old [58]. Results revealed poor to modest kappa coefficients for the anxiety disorders examined, namely, OAD, SAD, and post-traumatic stress disorder (PTSD) (κ[kappa]: 0.35–0.50).

In addition to computerized formats, interview schedules can be administered via the telephone. Telephone assessments are useful when assessing families who reside in geographically distant locations as well as those with demanding schedules and/or transportation difficulties. Telephone assessments can also be useful for conducting posttreatment or follow-up evaluations. The parent version of the ADIS:C/P has been used in a telephone format. Lyneham and Rapee [59] compared agreement between diagnoses (present/absent) derived using a telephone administration of the parent ADIS to diagnoses derived from standard face-to-face administration of the ADIS:C/P. Kappa coefficients of agreement were in the good to excellent range for anxiety diagnoses examined, GAD, SAD, SOP, and SP (κ[kappa]: 0.63–0.86). These findings suggest anxiety disorders can be diagnosed using a less resource-demanding alternative to face-to-face assessments [59]. Similar studies are needed for other interview schedules, as well as other delivery formats including web-based formats (i.e., Internet DISC-IV [60]).

Summary

The primary aim of the interviews described above is to diagnose psychiatric disorders as well as to evaluate diagnostic status at posttreatment. Thus, it is critical that the anxiety diagnoses derived from these interviews are reliable and valid. The ADIS: C/P is well researched with respect to reliability, with several studies reporting overall good to excellent retest and interrater reliability estimates. The DISC is the next most researched interview in terms of retest reliability, with findings generally

showing fair estimates for most of the anxiety disorders examined. Less research has been conducted on the reliability of anxiety diagnoses using the K-SADS, CAPA, and DICA, but the findings generally show good reliability estimates for most anxiety disorders examined. Validity data have also been obtained for the ADIS: C/P, DICA, and K-SADS. The ADIS: C/P has demonstrated strong convergence between anxiety diagnoses examined (i.e., SAD, SOP, PD) and corresponding subscales of the MASC. In contrast, findings for the DICA and K-SADS have shown poor to modest convergence between anxiety disorders examined and other measures of anxiety, but these studies were conducted using previous versions of the DSM and require updating.

Overall, the ADIS: C/P is currently considered the "gold standard" and the most highly recommended interview for the diagnosis of pediatric anxiety disorders. Given most of the ADIS: C/P evaluative research has been conducted in anxiety disorders specialty clinics, more research is needed using the interview in community clinics where base rates for anxiety disorders are lower than in anxiety clinics. Also needed is research on the reliability of pediatric anxiety diagnoses with relatively low base rates such as OCD, PD, and PTSD. Finally, more research is needed on the evaluation of interview schedules administered in alternative formats.

Dimensional Perspective in Assessment of Pediatric Anxiety Disorders

Within a dimensional perspective, emotional and behavioral problems occur along a continuum of severity, instead of falling into distinct disorders [61]. As such, the differences between normal and disordered behaviors are viewed as quantitative rather than qualitative. Within this perspective, symptoms of disordered behavior as well as the threshold between normal and disordered behaviors are derived statistically from large representative samples of children and may vary according to child sex, age, and, in some cases, ethnicity.

Child and Parent Anxiety Rating Scales

Rating scales are the primary dimensional measure of pediatric anxiety. They are commonly used as screening tools to identify the presence of anxiety in children and to assess treatment response by quantifying the degree to which anxiety symptoms or anxious behaviors are present before and after treatment. Table 2 [62–123] presents the most widely used and researched rating scales for the assessment of pediatric anxiety. Also included in the table are reliability and validity estimates from psychometric studies.

All of the rating scales included in Table 2 are completed by children and/or adolescents, and most also have accompanying versions that can be administered to parents. The parent versions are identical to the child versions except the item stems have been changed (e.g., "I" modified to "My child"). These rating scales yield a total score, as well as subscale scores with higher scores indicating greater anxiety. Additionally, most have recommended clinical cutoff scores that suggest the presence of an anxiety diagnosis. (The utility of these clinical cutoffs is discussed later in the chapter.) The scales are now summarized below.

The *MASC* [53] contains 39 items that assess major areas of anxiety in children ages 8–19 years. A parent-report version (parent MASC) has also been examined for parents of children 7–13 years old [64, 75]. Children rate the frequency of experiences such as "I get scared when my parents go away" and "I worry about doing something stupid or embarrassing" using a 4-point scale (i.e., *never, rarely, sometimes, often)*. The MASC contains four subscales: Physical Symptoms, Social Anxiety, Harm Avoidance, and Separation/Panic. The MASC also contains an Inconsistency Index, to identify

Table 2 Youth and parent anxiety rating scales

Rating scale	Internal consistency (α)	Test–retest reliability	Convergent validity (r)	Divergent validity (r)	Studies
Youth scales					
Multidimensional Anxiety Scale for Children (MASC)	Total: 0.84–0.94 Physical Symptoms (PS): 0.77–0.89 Social Anxiety (SA): 0.66–0.91 Harm Avoidance (HA): 0.53–0.82 Separation/Panic (S/P): 0.58–0.81	3 weeks (ICCs) Total: 0.79–0.88 PS: 0.80–0.92 SA: 0.79–0.84 HA: 0.34–0.76 S/P: 0.85–0.89 1 month (ICCs) Total: 0.73–0.86 PS: 0.73–0.85 HA: 0.60–0.73 SA: 0.75–0.90 S/P=0.74 3 months (ICCs) Total=0.93 PS=0.83; HA=0.72 SA=0.83; S/P=0.93 12 months (rs) Total=0.52 PS=0.47; HA=0.48 SA=0.54; S/P=0.55	With RCMAS, STAIC, SCARED, SCAS Total: 0.60–0.81 PS: 0.44–0.76 SA: 0.54–0.73 HA: −0.13 to 0.43 S/P: 0.27–0.58	With Abbreviated Symptom Questionnaire [62] and Children's Depression Inventory (CDI) [63] Total: −0.15 to 0.60 PS: 0.07–0.66 SA: −0.01 to 0.59 HA: −0.04 to 0.32 S/P: 0.18–0.33	Baldwin and Dadds [64] Fincham et al. [65] Grills-Taquechel et al. [66] Ivarsson [67] Kingery et al. [68] March et al. [69] March et al. [70] Muris et al. [71] Olason et al. [72] Osman et al. [73] Rynn et al. [74] Villabø et al. [75] Yao et al. [76]. Yen et al. [77]
Revised Child Anxiety and Depression Scales (RCADS)	Generalized Anxiety Disorder (GAD): 0.77–0.86 Obsessive-Compulsive Disorder (OCD): 0.73–0.83 Panic Disorder (PD): 0.79–0.88 Separation Anxiety Disorder (SAD): 0.76–0.79 Social Phobia (SOP): 0.82–0.87	1 week (ICCs) GAD=0.79; OCD=0.65 PD=0.76; SAD=0.75 SOP=0.80	With RCMAS: GAD: 0.65–0.73 OCD: 0.49–0.67 PD: 0.59–0.69 SAD: 0.58–0.62 SOP: 0.62–0.73	With CDI GAD: 0.05–0.64 OCD: 0.12–0.64 PD: 0.20–0.60 SAD: 0.06–0.44 SOP: 0.14–0.60	Chorpita et al. [78] Chorpita et al. [79] de Ross et al. [80]

Revised Children's Manifest Anxiety Scale (RCMAS); RCMAS-2	Total: 0.85–0.92 Physiological Anxiety (PA): 0.67–0.75 Worry (W): 0.77–0.86 Social Concerns/Concentration (SC): 0.67–0.72 Social Anxiety (SA) = 0.80	1 week (*r*s) Total: 0.76–0.88 PA: 0.73–0.75 W: 0.71–0.85 SC = 0.85 SA = 0.64 2 weeks (*r*s) Total = 0.68 PA: =0.61; W = 0.66 SA = 0.61 5 weeks (*r*s) Total = 0.77 PA = 0.78; W = 0.63 SC = 0.60 9 months (*r*) Total = 0.68	With MASC, SCARED, SCAS, and STAIC Total: 0.58–0.88 PA: 0.59–0.85 W: 0.73–0.84 SC: 0.64–0.73	With CDI Total: 0.56–0.74 PA = 0.61 W = 0.66 SC = 0.69	Ang et al. [81] Muris et al. [71] Reynolds [82] Reynolds [83] Reynolds and Richmond [84] Varela and Biggs [85] Winsniewski et al. [86] Wolfe et al. [87]
Screen for Child Anxiety Related Emotional Disorders (SCARED)	Total: 0.89–0.94 Somatic/Panic (S/P):0.70–0.88 Generalized Anxiety (GA): 0.77–0.88 Separation Anxiety (SA): 0.54–0.75 Social Phobia (SOP): 0.72–0.89 School Phobia (ScP): 0.43–0.86	2 weeks ICCs (*r*s) Total = 0.57 (0.61) S/P = 0.77 (0.82) GA = 0.50 (0.52) SA = 0.46 (0.51) SOP = 0.53 (0.55) ScP = 0.65 (0.66) 5 weeks ICCs Total = 0.86 Subscales: 0.70–0.90 3 months ICCs (rs) Total = 0.50 (0.57–0.70) S/P = 0.67 (0.58–0.69) GA = 0.46 (0.50–0.62) SA = 0.51 (0.55–0.69) SOP = 0.24 (0.29–0.83) ScP = 0.52 (0.46–0.53) 6 months (*r*s) Total = 0.47 S/P = 0.38; GA = 0.48 SA = 0.19; SOP = 0.47 ScP = 0.36	With MASC, SCAS, STAIC, RCMAS, Internalizing (INT) and Anxious/ Depressed (AD) scales of the Youth Self-Rating Scale (YSR) [88] Total: 0.61–0.87 S/P: 0.59–0.78 GA: 0.61–0.84 SA: 0.47–0.66 SOP: 0.36–0.66 ScP: 0.36–0.58	With CDI, Conners Attention Deficit Hyperactivity Disorder-Adolescent Version [89], and Externalizing (EXT) scale of the YSR [88] Total: 0.13–0.71 S/P: 0.07–0.65 GA: 0.21–0.69 SA: 0.20–0.37 SOP: 0.08–0.43 ScP: 0.06–0.53	Birmaher et al. [90] Birmaher et al. [91] Boyd et al. [92] Crocetti et al. [93] Essau et al. [94] Hale et al. [95] Haley et al. [96] Linyan et al. [97] Muris et al. [98] Muris et al. [71] Muris et al. [99] Weitkamp et al. [100]

(continued)

Table 2 (continued)

Rating scale	Internal consistency (α)	Test–retest reliability	Convergent validity (r)	Divergent validity (r)	Studies
Spence Children's Anxiety Scale (SCAS)	Total: 0.88–0.94 Separation Anxiety (SA): 0.61–0.85 Generalized Anxiety (GA): 0.61–0.86 Social Anxiety (SOC): 0.70–0.80 Obsessions/Compulsions (O/C): 0.58–0.84 Panic/Agoraphobia (P/AG): 0.74–0.89 Fears of Physical Injury (PI): 0.53–0.90	2–4 weeks (rs) Total: 0.76–0.86 SA: 0.69–0.76 GA: 0.69–0.78 SOC: 0.67–0.79 O/C: 0.64–0.77 P/AG: 0.67–0.78 PI: 0.72–0.83 12 weeks (rs) Total = 0.63 SA = 0.52; GA = 0.66 SOC = 0.75; O/C = 0.69 P/AG = 0.51; PI = 0.59 6 months (rs) Total = 0.60 SA = 0.57; GA = 0.56 SOC = 0.57; O/C = 0.53 P/AG = 0.45; PI = 0.54	With RCMAS, MASC, SCARED, STAIC, and YSR INT and AD scales Total: 0.71–0.92 SA: 0.49–0.68 GA: 0.58–0.76 SOC: 0.41–0.73 O/C: 0.52–0.66 P/AG: 0.56–0.73 PI: 0.40–0.63	With CDI and Depression Self-Rating Scale [101] Total: –0.03 to 0.72 SA: –0.12 to 0.58 GA: 0.01–0.60 SOC: –0.09 to 0.70 O/C: –0.02 to 0.57 P/AG: –0.01 to 0.66 PI: –0.21 to 0.53	Brown-Jacobson et al. [102] Essau et al. [94] Hernandez-Guzman et al. [103] Ishikawa et al. [104] Mellon and Moutavelis [105] Muris et al. [71] Muris et al. [99] Spence [106] Spence et al. [107] Whiteside and Brown [108]
State-Trait Anxiety Inventory for Children (STAIC)	Trait (T): 0.59–0.91 State (S): 0.73–0.94	1 week (ICCs) S: 0.32–0.79 15 days (rs) T = 0.81; S: 65–0.67 3 weeks (ICCs) T = 0.85; S = 0.55 6 weeks (rs): T: 0.65–0.71; S: 0.31–0.47	With RCMAS, MASC, SCARED, and SCAS: T: 0.58–0.88 S: 0.24–0.35	With CDI: T: 0.36–0.74	Chayawat and Brown [109] Cross and Huberty [110] Li and Lopez [111, 112] Muris et al. [71] Nelson et al. [113] Papay and Hedl [114] Papay and Spielberger [115] Psychoutaki et al. [116] Reynolds [82] Schisler et al. [117] Spielberger [118]
Parent scales					
Multidimensional Anxiety Scale for Children-Parent Version (MASC-P)	Total = 0.87–0.90 Physical Symptoms (PS) = 0.77–0.85 Harm Avoidance (HA) = 0.70–0.74 Social Anxiety (SA) = 0.86–0.89 Separation/Panic (SP) = 0.72–0.77	12 months (rs) Total = 0.70 PS = 0.66 HA = 0.56 SA = 0.68 S/P = 0.70	With SCAS subscales Subscales: 0.16–0.74	…	Baldwin and Dadds [64] Villabø et al. [75]

Revised Child Anxiety and Depression Scale- Parent Version (RCADS-P)	Total = 0.95 Total Anxiety = 0.94 Generalized Anxiety Disorder (GAD): 0.82–0.88 Major Depressive Disorder (MDD): 0.80–0.83 Obsessive-Compulsive Disorder (OCD): 0.74–0.84 Panic Disorder (PD): 0.71–0.81 Social Phobia (SOP): 0.84–0.88 Separation Anxiety Disorder (SAD): 0.72–0.83	2 weeks (*r*s) GAD = 0.81 MDD = 0.83 OCD = 0.75 PD = 0.69 SOP = 0.79 SAD = 0.89	With CBCL subscales (i.e., INT, AD, and AP): Total Anxiety: 0.62–0.76 GAD: 0.71–0.73 OCD = 0.40 PD: 0.57–0.60 SOP: 0.60–0.65 SAD: 0.59–0.69	With DSM Affective Problems scale of CBCL Total Anxiety: 0.55–0.56 GAD = 0.53 OCD = 0.32 PD = 0.47 SOP = 0.46 SAD = 0.42	Ebesutani et al. [119, 120]
Screen for Child Anxiety Related Emotional Disorders-Parent Version (SCARED-P)	Total = 0.90	…	…	…	Birmaher et al. [91]
Spence Children's Anxiety Scale-Parent Version (SCAS-P)	Total: 0.89–0.93 Separation Anxiety (SA): 0.74–0.90 Generalized Anxiety (GA): 0.67–0.91 Social Anxiety (SOC): 0.74–0.92 Panic/Agoraphobia (P/AG): 0.61–0.92 Fear of Physical Injury (PI): 0.47–0.83 Obsessions/Compulsions (O/C): 0.74–0.92	…	With Negative Affectivity and Physiological Arousal subscales of Affect and Arousal Scale (AFARS) [121] and CBCL INT scale Total: 0.37–0.59 SA: 0.28–0.36 GA: 0.38–0.40 SOC: 0.38–0.48 P/AG: 0.25–0.27 PI: 0.12–0.28 O/C: 0.16–0.19	With AFARS Positive Affectivity subscale and CBCL EXT scale Total: –0.21 to 0.33 SA = –0.14 GA = –0.22 SOC = –0.27 P/AG = –0.18 PI = 0.03 O/C = –0.13	Brown-Jacobson et al. [102] Nauta et al. [122] Whiteside and Brown [108]
State-Trait Anxiety Inventory for Children- Parent Report-Trait Version (STAIC-P-T)	Total: 0.84–0.91	8 weeks (ICCs) Total: 0.71–0.75 12 months (ICCs) Total: 0.68–0.76	With CBCL AD Scale Total: 0.50–0.65	With CBCL AB and Delinquent Behavior scales Total: –0.03 to 0.21	Southam-Gerow et al. [123]

inconsistencies in responses. In addition, the MASC contains two embedded subscales: a 12-item Anxiety Disorders Index and a 10-item short form (MASC-10). The 12-item Anxiety Disorders Index was empirically derived to discriminate between children with anxiety disorders from children with other disorders. Studies have found that children with anxiety disorders score significantly higher on the Anxiety Disorders Index than children with other psychiatric disorders (e.g., depressive disorders) [66, 72]. The MASC-10 was designed for purposes such as treatment monitoring and evaluation [70]. Norms for the MASC based on a large school sample of children ($N = 2698$; 8–19 years old) are available separately for each sex and three age groups (8–11 years, 12–15 years, and 16–19 years). A *T*-score above 65 on the MASC total indicates clinically significant levels of anxiety [53]. There are no norms or suggested clinical cutoff scores available for the parent MASC.

The *Screen for Child Anxiety Related Emotional Disorders (SCARED)* [90, 91] contains 38 items and can be administered to children ages 8–19 years (and to parents of children 6–18 years for the parent SCARED) [91]. Children rate the frequency of experiences over the past 3 months such as "It is hard to talk with people I don't know well" and "I follow my mother or father wherever they go" using a 3-point scale (i.e., *not true or hardly ever true, somewhat true or sometimes true, very true or often true)*. In addition to the total scale, the SCARED contains five subscales: Somatic/Panic, Generalized Anxiety, Separation Anxiety, Social Phobia, and School Phobia. The original SCARED was subsequently revised to include an additional 3 items because the Social Phobia Scale did not discriminate between children with SOP from children with other anxiety disorders [91]. There are no norms available for the SCARED. However, one study using a sample of 190 clinic-referred children (9–19 years old) and their parents determined that a cutoff score of 25 optimally discriminated between anxiety and non-anxiety, anxiety and depression, and anxiety and disruptive disorders [91]. There are no norms or suggested clinical cutoff scores available for the parent SCARED.

In addition to the revised 41-item SCARED, there is another revised version of the SCARED that contains 66 items [124]. In this version, the School Phobia subscale was removed (i.e., these items were added to the Separation Anxiety subscale) and five additional subscales were added: SP-Animal type, SP-Blood Injection Injury type, SP-Situational Environment type, PTSD, and OCD. The 66-item revised version of the SCARED has been used less frequently than the 38- and 41-item versions. (See Muris et al. [124] and Muris and Steerneman [125] for examples of studies evaluating the 66-item version.)

The *Spence Children's Anxiety Scale (SCAS)* [107, 126] contains 44 items and can be administered to children ages 7–18 years (and to parents of children ages 6–18 years using the parent SCAS) [122]. Thirty-eight of the items assess symptoms of anxiety; six are filler items to reduce negative response biases. Children rate the frequency of experiences such as "I worry that I will do badly at my schoolwork" and "I am scared of the dark" using a 4-point scale (i.e., *never, sometimes, often,* and *always*). In addition to the Total Anxiety scale, the SCAS contains six subscales: Separation Anxiety, Generalized Anxiety, Social Anxiety, Obsessions/Compulsions, Panic/Agoraphobia, and Fears of Physical Injury (which maps onto SP). Norms for the SCAS based on a large school sample of Australian children ($N = 4{,}916$) are available separately by sex and two age groups (8–11 years; 12–15 years). A *T*-score of 65 on the SCAS total or subscales indicates clinically significant levels of anxiety. Norms based on a Dutch school-based sample of 745 parents of children ages 6–18 years are available for the parent SCAS, separated by sex, two age groups (6–11 years and 12–18 years), and by anxiety disorder status (with vs. without) [122]. Although norms are available, there are no suggested clinical cutoffs for the parent SCAS.

The *Revised Child Anxiety and Depression Scale (RCADS)* [78, 79] contains 47 items and can be administered to youth ages 6–18 years (and to parents of children ages 6–18 years using the parent RCADS) [119, 120]. Children rate the frequency of experiences such as "I am afraid to talk in front of class" and "I feel nothing is much fun anymore" using a 4-point scale (i.e., *never, sometimes, often, always*). In addition to the total scale and Total Anxiety scale, the RCADS contains six subscales: SAD, SOP, GAD, PD, OCD, and MDD. The RCADS is a revised version of the SCAS designed to

broaden the assessment beyond anxiety disorders to depressive disorders by including an MDD subscale. In addition to an MDD subscale, an important difference between the RCADS and the original SCAS is the GAD subscale: Items were added to the RCADS (replacing items from the original SCAS) that are more consistent with DSM-IV GAD criteria. Another important difference between the RCADS and SCAS is that the RCADS does not contain a Fear of Physical Injury subscale.

Norms based on a school sample ($N = 1887$) are available for the RCADS, separated by sex and grade [79]. Clinical cutoff scores on the subscales were derived using a sample of 513 clinic-referred children [78]. A score of 10 or higher on the SOP subscale indicates a diagnosis of SOP; a score of 7 or higher on the GAD subscale indicates a diagnosis of GAD; a score of 5 or higher on the SAD or OCD subscale indicates a diagnosis of SAD and OCD, respectively; and a score of 12 or higher on the PD subscale indicates a diagnosis of PD. Norms based on a school-based sample of 967 parents of children ages 6–18 ($N = 1,887$) are available for the parent RCADS, separated by sex and grade [120]. Clinical cutoff scores on the subscales were derived using a sample of 490 parents of clinic-referred children ages 6–18 [119]. A score of 12 or higher on the SOP subscale indicates a diagnosis of SOP; a score of 6 or higher on the GAD subscale indicates a diagnosis of GAD; a score of 4 or higher on the SAD or OCD subscale indicates a diagnosis of SAD and OCD, respectively. A cutoff score for the PD subscale was not derived in this study.

The *Revised Children's Manifest Anxiety Scale (RCMAS)* [84] has a long history in pediatric anxiety assessment and treatment evaluation research. The RCMAS is a revised version of the original Children's Manifest Anxiety Scale [127], a downward extension of the Manifest Anxiety Scale for adults [128]. The RCMAS contains 37 items and can be administered to children ages 6–19 years. Respondents indicate "yes" or "no" to items such as "I often worry about something bad happening to me" and "I am afraid of a lot of things." In addition to the Total Anxiety scale, the RCMAS contains three subscales: Physiological Anxiety, Worry/Oversensitivity, and Social Concerns. The RCMAS also contains a Lie Scale consisting of 9 items (e.g., "I am always good"). High Lie Scale scores may call into question the validity of the ratings and suggest the consideration of alternative sources of information. The Lie Scale also can be viewed as an indicator of social desirability [84, 129, 130]. Norms based on a large community sample of children ($N = 4,972$; ages 6–19 years) are available separately by sex, age (6–8 years, 9–14 years, 15–19 years), and race (white and black). A *T*-score on the Total Anxiety scale greater than one standard deviation above the mean ($T > 60$) indicates clinically significant levels of anxiety [84].

Recently, the RCMAS was revised from its previous 37-item version to a 49-item version (RCMAS-2) [131]. Like the RCMAS, the RCMAS-2 has a "yes/no" response format and yields a Total Anxiety score. The RCMAS-2 also contains three subscales: Physiological Anxiety, Worry, and Social Anxiety. The latter subscale replaced the RCMAS Social Concerns subscale. The RCMAS-2 also includes a new 10-item content-based cluster that assesses performance anxiety. In addition, by administering only the first 10 items, the RCMAS-2 can be used as a short form, which takes about 5 min to complete.

The RCMAS-2 eliminated the 9-item RCMAS Lie Scale and now contains a "Defensiveness Scale." The Defensiveness Scale consists of 9 items that assess whether children's responses have been given in a defensive manner, with the aim of presenting themselves in a positive light (i.e., social desirability). Higher scores on this scale indicate higher levels of defensiveness. The RCMAS-2 also contains a newly added Inconsistent Responding Index, which assesses inconsistency in responses to nine pairs of items. More pairs of inconsistent items suggest greater likelihood that the child or adolescent is responding randomly or without regard to the item's content.

Norms based on a large representative US sample of children ($N = 3,086$; 6–19 years old) are available for the RCMAS-2, separately by sex and age (6–8 years; 9–14 years; 15–19 years) [131]. A *T*-score on the Total Anxiety scale greater than 1 standard deviation from the mean ($T > 60$) indicates clinically significant levels of anxiety. The reliability and validity of the RCMAS-2 were evaluated using the same sample of children from which the norms were derived as well as a school sample

of children from Singapore [81]. Findings thus far show the RCMAS-2 yields similar reliability and validity estimates as the previous version.

Similar to the RCMAS, the *State-Trait Anxiety Inventory for Children (STAIC)* [118] has a long history. A downward extension of the adult State-Trait Anxiety Inventory [132], the 20-item STAIC assesses chronic (trait) and acute (state) symptoms of anxiety in children ages 8–15 years. An example of an item that assesses trait anxiety is "I worry about things that may happen." An example of an item that assesses state anxiety is "I feel like crying." Children rate the frequency of these experiences using a 3-point scale (i.e., *hardly ever, sometimes, often*). Norms based on a large US school sample ($N = 1{,}551$, 9–12 years old) are available, separately for sex and each grade (4th–6th grade) [118]. A *T*-score greater than 1 standard deviation above the mean ($T > 60$) indicates clinically significant levels of anxiety [118]. Unlike the anxiety rating scales summarized thus far, the STAIC is mainly used for the assessment of trait anxiety instead of clinical symptoms of anxiety. As such, it is not as widely used in the assessment of treatment outcomes as the other measures.

The parent STAIC [123] includes only the Trait scale (STAIC-P-T) and can be administered to parents of children ages 7–15 years old. The STAIC-P-T includes six additional questions that assess several child anxiety-related physiological responses (e.g., dry mouth, jittery, headaches) from the parent's perspective. Currently, there are no norms or suggested clinical cutoff scores available for the parent STAIC-P-T.

Reliability

Table 2 summarizes the internal consistency and retest reliability estimates found across studies for the child and parent rating scales described above. Internal consistency (alpha) coefficients provide a measure of how well the items on a particular measure are related to one another and are likely to be assessing the same or similar constructs. Alpha coefficients >0.80 are generally considered high; alphas between 0.70 and 0.80 are moderate; and alphas <0.70 are low [133].

As Table 2 shows, alpha (α) coefficients for the self-report scales' total scores are generally above 0.80. Most subscales have been shown to have internal consistency alpha coefficients between 0.70 and 0.94, although alphas lower than 0.70 have been reported for subscales of the MASC, RCMAS, SCARED, SCAS, and STAIC (see Table 2). Alpha coefficients for the parent scales' total scores are all above 0.80; for most of the subscales, alpha coefficients range from 0.70 to 0.92, though alphas lower than 0.70 have been reported in some studies for the Generalized Anxiety, Panic/Agoraphobia, and Physical Injury subscales of the parent SCAS (see Table 2). Overall, all of these pediatric anxiety scales appear to have a reasonable degree of internal consistency.

Test–retest reliability refers to the consistency of a given measure across time. Estimates used to examine retest reliability of dimensional measures include the intraclass correlation coefficients (ICCs) and/or Pearson's *r;* both estimates indicate the strength of correspondence between scores on a given measure administered to the same individuals across two different points in time. ICCs >0.74 are excellent, ICCs between 0.59 and 0.74 are considered good, ICCs between 0.40 and 0.58 are fair, and ICCs <0.40 are poor [50]. Pearson's *r* values > than 0.50 are considered large in magnitude; values between 0.30 and 0.50 are moderate; values < 0.30 are small [134]. ICCs and *r*s have been reported for the child rating scales in Table 2 using retest intervals of varying lengths (e.g., RCMAS intervals have ranged from 1 week to 9 months). As Table 2 shows, ICCs for the child rating scales' total and subscale scores are generally in the good to excellent range across retest intervals, and Pearson's *r* values are generally large in magnitude (above 0.50). More modest estimates have been reported in several studies for the SCARED total score and some subscales of the SCARED, MASC, and SCAS (see Table 2).

Retest reliability estimates (ICCs or Pearson's *r*) are available only for the parent MASC, RCADS, and STAIC (Trait scale), with estimates ranging from 0.56 to 0.89 for the total scores and subscale

scores across different retest intervals (i.e., 2 weeks, 8 weeks, and 12 months) (see Table 2). Overall, scores obtained on the child and parent rating scales listed in the table are generally reliable, which is desirable given that clinical levels of untreated child anxiety would not be expected to change over time. Additionally, good retest reliability is essential if measures are to be used to assess treatment-related changes over time.

Convergent and Divergent validity

Table 2 summarizes convergent and divergent validity estimates found across studies. Convergent validity refers to the degree to which a given measure is correlated with other measures that assess related constructs. Convergent validity is supported when scores on two related measures (e.g., two anxiety rating scales) yield large correlation (*r*) coefficients. Divergent validity refers to the degree to which a given measure is not correlated with measures that assess unrelated constructs. Divergent validity is supported when measures of unrelated constructs (e.g., an anxiety rating scale and an aggression rating scale) show relatively lower correlations than measures of related constructs (e.g., two anxiety rating scales).

As Table 2 shows, all of the child rating scales exhibit adequate convergent validity in that the total scales and most of the subscales correlate significantly with other measures of anxiety (e.g., RCMAS, SCAS, SCARED) (*r*s usually exceed 0.50) (see Table 2). The MASC's Harm Avoidance scale, however, has consistently yielded low or nonsignificant correlations with other measures of anxiety (*r*s: −0.13 to 0.43) [64, 69, 71]. The parent rating scales also exhibit convergent validity in that the total scales and most subscales significantly correlate with other parent anxiety scales (*rs:* 0.16–0.76) (see Table 2). Similar to the child MASC, the Harm Avoidance subscale of the parent MASC has shown relatively low correlations with the parent version of the SCAS (*rs*: 0.16–0.28) [64] (see Table 2). It is therefore not recommended that clinicians use this specific subscale as the sole measure of child anxiety.

In terms of divergent validity, Table 2 shows the MASC's and SCARED's total scales and subscales have yielded low or nonsignificant correlations with child-report measures of externalizing symptoms (*r*s: −0.01 to 0.24) [69, 92] (see Table 2). However, divergent validity of the child scales has been limited in regard to depressive symptoms, which is likely due to the substantial symptom overlap between anxiety and depression. Significant correlations (often exceeding *r*s of 0.50) have been found between most child anxiety rating scales and self-report measures of depression (see Table 2). Although more research is needed, the RCADS may be a more useful measure than other anxiety rating scales for distinguishing between anxiety and depressive symptoms in that nonsignificant correlations have been found between the RCADS anxiety subscales (except PD scale) and the Children's Depression Inventory (CDI) [63, 78]. The parent SCAS and STAIC (Trait) have shown good divergent validity as evidenced by low or nonsignificant correlations with parent rating scales of child-externalizing symptoms (*r*s: −0.03 to 0.33) [108, 122, 123]. The parent RCADS total anxiety scale and subscales, however, have shown significant correlations with parent measures of depression (*r*s: >0.50) suggesting poorer divergent validity (see Table 2) [119, 120]. Divergent validity estimates have not been reported for the parent MASC or SCARED.

Discriminant Validity

The terms divergent and discriminant validity are often used interchangeably in the literature. In this chapter, however, divergent validity is evidenced by lower correlations with measures of unrelated constructs than with measures of related constructs. Alternatively, discriminant validity is used when referring to a measure's ability to discriminate, or differentiate, children with different pediatric disorders. The availability of rating scales that can discriminate pediatric anxiety disorders from other

disorders is important given anxiety disorders are highly comorbid with other anxiety, depressive, and externalizing disorders [6].

Discriminant validity has been examined for all of the self-rating scales and some of the parent rating scales, with varied findings. For example, the RCMAS and STAIC have been found to discriminate between children with anxiety disorders from children with no disorders, and children with externalizing disorders, but not children with depressive disorders [135]. The MASC and SCARED total scales and subscales (except the MASC Physical Symptoms subscale) discriminate between children with anxiety disorders and those with no disorders [75]. The MASC total scale and subscales (except Harm Avoidance and Separation/Panic subscales in one study [80]) have been shown to discriminate between children with anxiety disorders and those without anxiety disorders [66, 77]. In addition, the MASC total scale and subscales (except Physical Symptoms subscale) can discriminate between children with anxiety disorders and those with depressive disorders [74]. The SCARED total scale and subscales also can discriminate children with anxiety disorders from those with disruptive disorders (except the Separation Anxiety subscale in one study [91]) and depressive disorders (except the Generalized Anxiety and School Phobia subscales in one study [97]) [90, 91, 97].

The total scale and subscales of the parent MASC (except the Separation/Panic subscale) and parent SCAS also have been shown to discriminate between children with anxiety disorders and those with no disorders [75, 108, 122]. Similar to the child SCARED, the parent SCARED also discriminates children with anxiety disorders from those with other psychiatric disorders. Specifically, the parent SCARED total scale and Somatic/Panic and Separation Anxiety subscales discriminate between anxiety and depressive disorders [91]. The parent SCARED total scale and subscales (except the Social Phobia subscale) also discriminate well between children with anxiety disorders and those with disruptive disorders [91].

Some of the MASC, SCARED, and SCAS subscales and all of the RCADS disorder-specific subscales show good discriminant validity between children with specific anxiety disorders and healthy comparisons [52, 66, 78, 90, 102]. Findings have been inconsistent for some subscales of the MASC and SCARED. For example, the MASC Harm Avoidance subscale was found to discriminate children with GAD from children without GAD in one study [66] but not others [52, 75]. Similarly, Birmaher et al. [90] found the SCARED Somatic/Panic, Generalized Anxiety, and Separation Anxiety subscales discriminated between children with PD, GAD, and SAD, respectively, from children without these disorders. Although findings regarding the Somatic/Panic and Generalized Anxiety subscales were replicated in Birmaher et al. [91], discriminant validity of the Separation Anxiety subscale was not found. Instead, the Social Phobia subscale showed good discrimination between children with SOP from children without SOP, which had not been demonstrated previously.

Some of the parent MASC, SCARED, and SCAS subscales have also been found to discriminate between children with specific anxiety disorders corresponding to the respective subscales and those without the disorders. For example, the parent MASC Separation/Panic subscale can discriminate between children with SAD and those without SAD; the Social Anxiety subscale can also discriminate between children with and without SOP [75]. In addition, the parent SCARED Somatic/Panic subscale can discriminate between children with and without PD, and the Separation Anxiety subscale can discriminate between children with and without SAD [91]. Similar to the child version, the Separation Anxiety, Social Anxiety, and Obsessions/Compulsions subscales of the parent SCAS discriminate well between children with the anxiety disorders corresponding to the respective subscales (i.e., SAD, SOP, OCD) from those without these disorders [102, 122]. The parent RCADS anxiety subscales also have been found to discriminate children with specific anxiety disorders corresponding to the respective subscales, as well as children with depressive disorders [119]. Research is needed to examine the discriminant validity of the parent STAIC (Trait).

In sum, both the RCMAS and STAIC are useful scales to discriminate between children with anxiety disorders from children with no disorders. However, to discriminate between children with anxiety disorders from children with other disorders, including externalizing and depressive disorders, the

child and parent versions of the MASC and SCARED are recommended. Further, the child and parent MASC and SCARED, as well as the child and parent SCAS and RCADS, can discriminate among specific pediatric anxiety disorders. Caution is warranted, however, in drawing conclusions about the discriminant validity of certain subscales of the child MASC (e.g., Harm Avoidance subscale) and child SCARED (e.g., Separation Anxiety subscale) given the inconsistencies across studies.

Screening

Anxiety rating scales are often used to screen for clinical levels of anxiety in children. As such, it is important that studies evaluate the accuracy of anxiety rating scales in identifying children with an anxiety diagnosis. However, few studies have examined anxiety rating scales' sensitivity and specificity for screening purposes. Sensitivity refers to the percentage of children with an anxiety diagnosis who scored at or above a specified cutoff score on an anxiety rating scale. Specificity refers to the percentage of children without an anxiety diagnosis who scored below the clinical cutoff score on an anxiety rating scale. Even less research attention has been paid to positive and negative predictive power of these scales. Positive predictive power refers to the percentage of children who score at or above the clinical cutoff score who received an anxiety diagnosis. Negative predictive power refers to the percentage of children who score below the clinical cutoff score on an anxiety measure who did not receive an anxiety diagnosis.

The scant research conducted on the screening utility of anxiety rating scales suggests that the cutoff scores provided by the older anxiety rating scales, namely, the RCMAS and STAIC, are less likely to correctly identify children with an anxiety disorder than the newer anxiety rating scales [136, 137]. For example, in a sample of inpatient children (6–13 years old), Hodges [137] found the cutoff scores ($T>60$) of the RCMAS and STAIC total scales yielded sensitivity rates of 34 % and 42 %, respectively.

Recent research using the child and parent versions of the SCAS in a clinic-referred sample [102] revealed that, on average, the subscales' cutoff scores ($T>65$) yielded a sensitivity rate of 64 % and 74 %, respectively, which was higher than rates obtained in studies using the STAIC or RCMAS. However, both the child and parent SCAS subscales on average yielded a relative positive predictive value of 43 %. Thus, about 57 % of children who had scored at or above the clinical cutoff score on the child and parent SCAS subscales did not receive an anxiety diagnosis.

Several screening evaluation studies have used receiver operating characteristic (ROC) analyses. ROC analyses yield an area under the curve (AUC), which is an estimate of a rating scale's overall diagnostic accuracy across the whole range of scores on the scale. Generally, AUC values between 0.50 and 0.70 indicate low accuracy, values between 0.70 and 0.90 indicate moderate accuracy, and values 0.90 or greater indicate high accuracy [138]. Because the whole range of scores on a given measure are considered, ROC analyses can also identify clinical cutoff scores on individual rating scales that maximize both sensitivity and specificity.

Several studies using ROC analyses have been conducted with the MASC in samples of community and clinic children [73–75, 139, 140]. Overall, the child and parent MASC total scores have low to moderate diagnostic accuracy in identifying children with anxiety disorders (AUCs: 0.60–0.82). One study of adolescent inpatients found that the total score had high accuracy for screening children with any anxiety disorder (AUC = 0.91) [73]. The child and parent MASC subscales also have shown low to moderate diagnostic accuracy in identifying children with specific anxiety disorders corresponding to the respective subscales (AUCs: 0.51–0.84) [75, 140]. Together, the MASC may be more useful for screening children with more severe levels of psychopathology than children with less severe levels of psychopathology.

Less research using ROC analyses has been conducted on the RCMAS and the child and parent versions of the SCARED and RCADS, and there have been no studies using ROC analyses on the

child and parent versions of the SCAS or STAIC. One study that used ROC analyses on the RCMAS in a community sample of adolescents found that the Total Anxiety score had low accuracy in identifying the adolescents with anxiety disorders (AUCs: 0.51–0.67) [139].

In terms of the SCARED, Birmaher et al. [90] found that total score and subscale scores had moderate accuracy for discriminating children with an anxiety disorder from those without anxiety disorders (AUCs: 0.66–0.86) and from those with disruptive disorders (AUCs: 0.68–0.78). The SCARED had low accuracy for discriminating between anxiety and depressive disorders (AUC = 0.60). In a subsequent study, Birmaher et al. [91] used ROC analyses to determine the cutoff score that would maximize both specificity and sensitivity. A cutoff score of 25 yielded a sensitivity rate of 71 % and specificity rates that ranged from 61 % to 71 % for discriminating between children with anxiety disorders and those with depressive and disruptive disorders. The parent SCARED has been found to discriminate pediatric anxiety from disruptive disorders, but not depression (AUC = 0.59) [91].

In terms of the RCADS, Chorpita et al. [78] used ROC analyses to identify cutoff scores that maximize sensitivity and specificity. Cutoff scores identified for each of the RCADS anxiety scales yielded sensitivity rates of 59–78 % and specificity rates of 64–92 % for screening specific anxiety disorders corresponding to the subscales. Using ROC analyses to examine the parent RCADS, Ebesutani et al. [119] showed that the cutoff scores identified for the RCADS-P anxiety subscales yielded sensitivity rates ranging from 71 % to 92 % and specificity rates ranging from 73 % to 86 % for screening specific anxiety disorders corresponding to the subscales.

In summary, the older scales such as the RCMAS and STAIC have limited utility for screening anxiety disorders in children. The newer scales such as the child and parent SCAS, SCARED, and child and parent RCADS have reported higher sensitivity rates than the RCMAS and STAIC. However, when overall diagnostic accuracy of a rating scale has been evaluated using ROC curves, findings generally show that the rating scales examined (i.e., RCMAS, MASC, SCARED) have low to moderate accuracy in screening anxiety disorders in children. Given these findings, the evidence is not firm that the scales summarized are useful for screening purposes. However, the rating scales do provide essential dimensional information about child anxiety and should be used as part of a comprehensive battery, which also includes administration of a diagnostic interview to ensure that no children who have a diagnosis are missed if only an anxiety rating scale is used.

Measuring Treatment Effects

The RCMAS has been used in most of the pediatric anxiety clinical trials and has been consistently found to be sensitive to treatment change [7]. As indicated earlier, the STAIC has not been used as frequently as the RCMAS for treatment evaluation because it focuses on trait anxiety rather than clinical anxiety symptoms. The newer scales such as the MASC, SCAS, SCARED, and RCADS have been used frequently in recent pediatric anxiety trials and also show sensitivity to treatment change [141–144]. Similarly, the parent versions of the SCARED, SCAS, and MASC have been used in several pediatric anxiety clinical trials, with findings generally showing good sensitivity to treatment-related changes [141, 143, 145]. The parent RCADS has not been included in any anxiety clinical trials to date.

Clinician Rating Scales

Clinician rating scales are useful as a supplement to child and parent rating scales, especially given research showing response biases in child and parent reports [7]. The only clinician rating scale specific to pediatric anxiety disorders is the *Pediatric Anxiety Rating Scale (PARS)* [146].

The PARS contains a 50-item symptom checklist and 7 severity items that assess frequency, severity, and impairment related to symptoms of DSM-IV SAD, SOP, and GAD in children ages 6–17 years. The PARS is administered by interviewing the child and parent separately or together. The PARS symptom checklist contains six subscales: Separation, Social Interactions or Performance Situations, Generalized, Specific Phobia, Physical Signs and Symptoms, and Other Symptoms. Each symptom is rated by the clinician as present/absent based on the "yes" or "no" responses elicited from the child, parent, or both. There appears to be an inconsistency across studies, or information is vague on the source upon which clinicians' PARS ratings were obtained.

Integrating information obtained from both children and parents, clinicians then rate the severity of the anxiety symptoms endorsed as presented by the child and/or parent along seven dimensions using a 6-point scale (0 for none and 1–5 for minimal to extreme) for each dimension. The seven dimensions include number of symptoms, frequency, severity of distress associated with anxiety symptoms, interference at home, severity of physical symptoms, and avoidance. Scores of 3 or greater on each dimension indicate clinically significant severity, avoidance, or interference. A total score is also calculated by summing five of the seven dimensions (not including number of symptoms and severity of physical symptoms). Higher scores indicate higher severity of anxiety symptoms.

The reliability and validity of the PARS have been evaluated [146, 147]. Internal consistency alpha coefficients for the PARS total score have varied, with alphas ranging from 0.64 to 0.91 across studies [146, 147]. Modest test–retest reliability estimates (24-day interval) have been reported for the total score and dimensional scales (ICCs: 0.35–0.59) [146]. However, excellent interrater reliability estimates have been reported for the total score and dimensional scales (ICCs: 0.78–0.97) [146].

The PARS has support for convergent validity in that significant correlations have been found between the PARS and clinician rating scales, such as the Clinician Global Impressions (Severity Scale) [49] and the Hamilton Anxiety Rating Scale [148] (*r*s: 0.49–0.61). The PARS has support for divergent validity in that low or nonsignificant correlations have been found between the PARS and a clinician rating scale of depressive symptoms (*r*s: 0.18–0.33) [146, 147]. ROC analyses have indicated that the PARS total score has high accuracy in identifying children with anxiety disorders (AUC = 1.00), with a cutoff score of 11.5 resulting in a sensitivity rate of 100 % and specificity rate of 98.8 % [147]. The PARS also has been found to be sensitive to treatment change. Specifically, change in the PARS total score has been found to be significantly correlated with pre- to posttreatment changes in global clinician rating scales (*r*s: 0.41–0.78) [146].

Global Psychopathology Scales

In addition to child and parent anxiety rating scales, there are a few rating scales designed to assess a broad range of symptoms in children, including anxiety symptoms. These include the *Achenbach System of Empirically Based Assessment (ASEBA) for School-Age Children* [88] and the *Behavior Assessment Scale for Children (second edition) (BASC-2)* [149]. Both scales have a long history in the pediatric assessment area; however, the ASEBA scales are more widely used in the area of pediatric anxiety. Both the ASEBA and BASC-2 contain child, parent, and teacher versions. Below we summarize both of these rating scales. We also summarize the available reliability, validity, and utility information of the scales, with an emphasis on the anxiety subscales.

The ASEBA scales are designed to assess competencies, adaptive functioning, and problem behaviors in children and adolescents. The ASEBA scales include the Child Behavior Checklist (CBCL), Youth Self-Report (YSR), and Teacher Report Form (TRF). Both CBCL and TRF are administered to parents and teachers, respectively, of children ages 6–18 years old, and the YSR is administered to children ages 11–18 years old. The ASEBA scales contain 118 items that assess a range of problem behaviors. Respondents rate the frequency of each problem behavior (e.g., "too fearful or anxious,"

"temper tantrums," and "cries a lot") using a 3-point scale (*not true, somewhat or sometimes true, very true or often true*). The majority of the problem behavior items are the same across the ASEBA scales (CBCL, YSR, TRF), though there are a few differences (e.g., YSR contains items that assess social desirability that are not included in the CBCL or TRF).

In addition to the Total Problems scale, ASEBA scales (i.e., CBCL, YSR, TRF) contain two broadband and eight narrowband subscales. The Internalizing broadband subscale and the Anxious/Depressed narrowband subscale include items that assess anxiety symptoms in children. The CBCL's Internalizing and Anxious/Depressed subscales in particular have been used in most of the pediatric anxiety clinical trials and are sensitive to treatment change (see Silverman and Ollendick) [7]. Recently, six DSM-Oriented subscales were included in the ASEBA scales to provide a closer link with the DSM-IV [150]. The DSM Anxiety Problems subscale specifically assesses for symptoms of DSM-IV GAD, SAD, and SP, though it has been rarely used in the clinical child anxiety literature. The ASEBA scales were standardized using a national US probability sample of children. Norms are available for the CBCL and TRF separately by sex and age (6–11 years and 12–18 years), and norms are available by sex for the YSR. A *T*-score of 64 or higher on the broadband subscales (e.g., Internalizing) and a *T*-score of 70 or higher on the narrowband (e.g., Anxious/Depressed) and DSM-Oriented subscales (e.g., Anxiety Problems) are considered clinically significant [88].

The BASC-2 [149] is designed to assess adaptive and clinical dimensions of behavior in children. It includes parent rating scales (PRS), teacher rating scales (TRS), and a self-report of personality (SRP). The PRS and TRS have specific versions to assess children across three age ranges: 2–5 years old, 6–11 years old, and 12–21 years old. Each version of the PRS contains 160 items and each version of the TRS contains 139 items. The SRP contains 185 items and is administered to children ages 6 through 25 years. Respondents rate the frequency of behaviors using a four-point scale (from "never" to "almost always"). All of the BASC-2 scales (i.e., PRS, TRS, SRP) include a number of clinical subscales, including an anxiety subscale. Norms based on a nationally representative sample of children are available for the BASC scales separately by sex, age, and clinical status. A *T*-score of 70 or higher on the clinical subscales (e.g., Anxiety subscale) falls in the clinical range [149].

Reliability

Alpha coefficients for the ASEBA Internalizing, Anxious/Depressed, and DSM Anxiety Problems subscales range from 0.72 to 0.90 [88, 151], though an alpha of 0.67 was reported for the DSM Anxiety Problems subscale of the YSR [88]. Alpha coefficients for the BASC clinical subscales (including the Anxiety subscale) are above 0.80 [149].

Retest reliability (r) estimates for the Internalizing, Anxious Depressed, and Anxiety Problems subscales range from 0.68 to 0.91 for the CBCL and YSR over an 8-day retest interval and from 0.73 to 0.86 for the TRF over a 16-day retest interval [88, 151]. Retest reliability (r) estimates for the BASC clinical subscales (including the Anxiety subscale) are above 0.70 [149].

Validity

The ASEBA Internalizing, Anxious/Depressed, and DSM Anxiety Problems subscales have evidence for convergent validity with other related measures. For example, the CBCL and TRF Internalizing, Anxious/Depressed, and Anxiety Problems subscales have demonstrated significant correlations (*r*) with respective parent and teacher ratings on the BASC Anxiety subscales (*r*s: 0.46–0.83), thus supporting the convergent validity of the BASC as well [88]. The YSR Anxious/Depressed and DSM Anxiety Problems subscales also have demonstrated significant correlations with the anxiety subscales of the RCADS (*r*s: 0.49–0.59) [152].

Information on discriminant validity of the Internalizing, Anxious/Depressed, and DSM Anxiety Problems subscales is available only for the CBCL. The CBCL Internalizing subscale has been found to discriminate between children with anxiety disorders and those with externalizing disorders, but not children with depressive disorders [135]. The CBCL Anxious/Depressed subscale has been found to discriminate between children diagnosed with specific anxiety disorders (i.e., SAD, GAD, SP) from children without these disorders and from children with depressive disorders [153]. The CBCL DSM Anxiety Problems scale also has been found to discriminate children with specific anxiety disorders (i.e., PD, SAD, SOP, PTSD, GAD, SP, OCD) from those without anxiety disorders and those with depressive disorders [151, 153]. Information on the discriminant validity of the BASC Anxiety subscales is not available.

Screening

Information on the screening utility of the Internalizing, Anxious/Depressed, and DSM Anxiety Problems subscales is only available for the CBCL and YSR. In terms of the CBCL, Aschenbrand et al. [154] used ROC analyses in a sample of parents of anxious and non-anxious children and found that CBCL Internalizing and Anxious/Depressed subscales had moderate to good accuracy (AUCs: 0.84–0.94) for screening children with any anxiety disorder (i.e., SAD, SOP, GAD) but low to moderate accuracy for screening children specifically for GAD (AUCs: 0.65–0.73) and SOP (AUCs: 0.40–0.44). The CBCL DSM Anxiety Problems subscale was found to have low accuracy for screening children with any anxiety disorder as well as children with specific anxiety disorders (SAD, GAD, and SP) from those without these anxiety disorders (AUCs: 0.60–0.70) in a sample of parents of clinic-referred children [155].

In a recent study using a sample of parents of clinic-referred children, Ebesutani et al. [153] found the CBCL Anxious/Depressed and DSM Anxiety Problems subscales had moderate accuracy for identifying children with SAD, GAD, and SP, respectively, from children without these disorders and from children with depressive disorders (AUCs: 0.72–0.84). Comparisons of the two subscales also revealed the Anxiety Problems subscale (AUCs: 0.82–0.84) yielded significantly greater AUC values than the Anxious/Depressed subscale (AUCs: 0.72–0.80). Thus, the Anxiety Problems subscale fares better than the Anxious/Depressed scale for screening children with anxiety disorders from children with depressive disorders. However, one study using the YSR in a sample of children referred to an anxiety and depression clinic [155] found that both the Anxious/Depressed and Anxiety Problems subscales had low accuracy in identifying children with any anxiety diagnosis (AUCs: 0.64–0.68). Information on the screening utility of the BASC Anxiety subscales is unavailable.

Summary

Overall, there are a number of widely used dimensional rating scales available for the assessment of pediatric anxiety. Additionally, global psychopathology rating scales commonly used in clinical child assessment contain subscales used to assess pediatric anxiety. The rating scales summarized possess adequate evidence with respect to internal consistency and retest reliability, though retest reliability estimates are lacking for the parent SCARED and SCAS. Most of the rating scales also show evidence for convergent validity with other anxiety scales. However, most anxiety rating scales have shown strong convergence with measures of depression, providing only partial support for the divergent validity of the scales. More work is needed on the convergent and divergent validity of the parent SCARED and the divergent validity of the parent MASC.

With respect to discriminating between anxiety and other clinical disorders, the child and parent SCARED and MASC are recommended. The child and parent SCARED, MASC, and SCAS subscales, as well as the child and parent RCADS anxiety subscales, are useful for discriminating among specific anxiety disorders. However, caution is warranted when using some of the subscales of the child MASC and SCARED. In terms of screening utility, the majority of the rating scales summarized (except the PARS) have low to moderate accuracy in identifying children with anxiety disorders. Therefore, when screening children for anxiety disorders, it is recommended that clinicians not rely solely on rating scales and include other methods of assessment, such as a diagnostic interview schedule.

Preschool Assessment

All of the categorical and dimensional measures summarized thus far are applicable for assessing children of school age (6–18 years old). In recent years, there has been growing recognition that anxiety is prevalent in children of preschool age [156, 157]. For example, in community samples of preschool children, a prevalence rate of 9.4 % was reported for the presence of "any anxiety disorder" [156]. Therefore, identification of anxiety at this young age is important for treatment and prevention of later difficulties [158].

There are only a few evidence-based instruments designed specifically for the assessment of anxiety in preschool children. All are completed by parents and/or teachers, because the reliability of young children's self-reports of anxiety is suspect [24]. The *Preschool Age Psychiatric Assessment (PAPA)* [159, 160] is an interview schedule that covers a number of disorders, including anxiety disorders in preschool children. The *Preschool Anxiety Scale (PAS)* [161] is a rating scale designed specifically for assessing anxiety in preschool children. There are two other rating scales that assess a broad range of symptoms in preschool-age children that contain subscales for assessing anxiety: the *Children's Moods, Fears and Worries Questionnaire (CMFWQ)* [162] and the *ASEBA Scales for Preschool Age Children* [163]. As indicated earlier, the BASC-2 TRS and PRS also include versions to assess children ages 2–5 years [149].

The PAPA [159, 160] is a parent semi-structured interview based on the parent version of the CAPA [34, 35]. The PAPA is similar to the CAPA, but some of the content and structure has been revised to improve its utility with preschool-age children (2–5 years old). The PAPA assesses frequency, intensity, and duration of symptoms of 16 psychiatric disorders, including anxiety, based on several classification systems (i.e., DSM-IV-TR, ICD-10, RDC-Preschool Age [RDC-PA] [158], and Diagnostic Criteria: Zero to Three [164]). Additional symptoms and behaviors commonly exhibited by young children are assessed (e.g., sleep and eating behaviors, toileting history). Impairment ratings can also be obtained in 30 areas, such as the child's relationships with others (i.e., parents, other adults, siblings, peers), as well as the child's functioning at home, school or daycare, and out of home.

Only one study has examined the reliability of the PAPA. Egger et al. [160] examined the test–retest reliability of a number of psychiatric disorders (including anxiety disorders) using the PAPA in a sample of parents of preschoolers (2–5 years old) recruited from a pediatric clinic. Findings showed reliability estimates were poor for GAD (κ[kappa] = 0.39) and SP (κ[kappa] = 0.36), fair for SOP (κ[kappa] = 0.54), good for SAD (κ[kappa] = 0.60), and excellent for PTSD (κ[kappa] = 0.73). No studies have evaluated the validity of diagnoses using the PAPA.

The PAS [161] is a 28-item parent-report rating scale designed specifically to assess a range of anxiety symptoms based on the DSM-IV in preschool-age children (2–6 years old). Parents rate the frequency of their child's experiences such as "is afraid of the dark" and "is afraid of meeting or talking to unfamiliar people" using a 5-point scale (from *not true at all* to *very often true)*. In addition to the Total score, the PAS contains five subscales: Separation Anxiety, Generalized Anxiety, Social

Anxiety, Obsessive-Compulsive, and Physical Injury Fears. Recently, the PAS was revised (PAS-R) [165] to a 30-item version to better reflect the range of common symptoms of anxiety in this age group as well as to provide a clear distinction between the Separation Anxiety and Generalized Anxiety subscales. Norms for the original PAS based on an Australian community sample ($N = 510$) of mothers of preschool-age children are available separately by sex and each age (3–5 years old). A *T*-score of 60 or higher on the PAS total or subscales indicates clinically significant levels of anxiety.

In terms of internal consistency, alpha (α) coefficients for the PAS and PAS-R total scores are above 0.80. Alpha coefficients for the PAS Generalized Anxiety and Social Anxiety scales are above 0.75, though alphas lower than 0.70 have been reported for the Separation Anxiety, Physical Injury Fears, and Obsessive-Compulsive subscales (α: 0.59–0.66) [166]. All the PAS-R subscales, however, yielded alphas over 0.70 (α: 0.72–0.89) [165]. Retest reliability estimates (over 12 month interval) for the PAS-R total and subscale scores are large in magnitude (*r*s: 0.60–0.76) [165].

The PAS and PAS-R evidence convergent validity in that the total scales and subscales correlate significantly with other parent rating scales (i.e., CBCL Internalizing subscale, CMFWQ, and Emotional Symptoms subscale of the Strengths and Difficulties questionnaire [167]) (*r*s: 0.50–0.77) [161, 165, 166]. However, the Obsessive-Compulsive and Physical Injury Fears subscales have yielded relatively lower correlations with parent rating scales of anxiety (*r*s: 0.35–0.49) compared to the other PAS/PAS-R subscales [161, 165, 166].

The PAS/PAS-R also exhibits adequate divergent validity in that the total scale and subscales have yielded low or nonsignificant correlations with parent measures of externalizing symptoms (i.e., CBCL Externalizing scale, SDQ Conduct Problems scale, SDQ Hyperactive Inattention scale) (*r*s: −0.01 to 0.28) [161, 165]. In terms of discriminative validity, the total score of the PAS-R can discriminate between children (ages 3–5 years old) with anxiety diagnoses from children without diagnoses, and the subscales (except Obsessive-Compulsive) can discriminate between children with specific anxiety diagnoses corresponding to the subscales from children without these respective diagnoses [165].

The CMFWQ [162] is a 60-item parent-report rating scale specifically designed to assess a broad range of internalizing symptoms, including anxiety, in children ages 2–6 years old. Parents rate the frequency of their child's experiences such as "Fears strangers" and "Looks sad, miserable, and unhappy" using a 5-point scale (from *almost never* to *almost always)*. In addition to the Total score, the CMFWQ contains three subscales: Anxiety Problems, Inhibition/Solitary Play, and Mood Problems. Currently, there are no norms available for the CMFWQ. Internal consistency (α) coefficients for the CMFWQ total score and subscales are above 0.80 [162, 166]. Retest reliability (*r*) estimate (over 2-year interval) for the total scale is 0.56 [162]. The CMFWQ total scale and subscales correlate significantly with a parent rating scale of temperament (i.e., Short Temperament Scale for Toddlers [168]) ($r = 0.42$) and with the PAS total score (*r*s: 0.56–0.75) [166].

In addition to the scales for school-age children, the ASEBA contains scales for preschool-age children [163]. The ASEBA preschool scales include the CBCL for ages 1½–5 years (CBCL/1½ –5) and the Caregiver-Teacher Report Form (C-TRF). The ASEBA scales for preschool-age children are similar to the school-age scales in content and structure, and respondents rate the frequency of each problem behavior using a 3-point scale (*not true, somewhat or sometimes true, very true or often true*), similar to the school-age forms.

The ASEBA preschool scales (i.e., CBCL/1½–5, C-TRF) include the same broadband, narrowband, and DSM-Oriented scales found in the school-age forms, though three subscales are included in the preschool scales that are not included in the school-age scales (i.e., Emotionally Reactive, Sleep Problems, and DSM-Oriented Pervasive Developmental Problems subscales). Norms based on a nationally representative US sample are available for the CBCL/1½–5 and C-TRF separately by sex. A *T*-score of 64 or higher on the Internalizing and Externalizing broadband scales and a *T*-score of 70 or higher on the narrowband (e.g., Anxious/Depressed) and DSM-Oriented subscales (e.g., Anxiety Problems) are viewed as being clinically significant [163].

The reliability estimates for the ASEBA preschool scales are similar to those obtained for the school-age forms. Alpha coefficients for the CBCL/1½–5 and C-TRF Internalizing, Anxious/Depressed, and Anxiety Problems subscales scores are above 0.70. Retest reliability (*r*) estimates (over an 8-day interval) for these subscales are above 0.50 [163]. Less information is available regarding the validity of the Internalizing, Anxious/Depressed, and DSM Anxiety Problems subscales of the ASEBA preschool scales although the available research supports the validity of the CBCL Internalizing subscale and the CBCL and C-TRF Anxious/Depressed subscale. For example, the CBCL/1½–5 Internalizing subscale has evidence of convergent validity with the Internalizing subscales of the Infant-Toddler Social Emotional Assessment [169] (*r*s: 0.48 and 0.62). The Internalizing and Anxious/Depressed subscales of the CBCL and C-TRF also discriminate between non-referred and referred children [163]. More research is needed to evaluate the validity of DSM Anxiety Problems subscale.

In summary, there are only a few instruments available for the assessment of pediatric anxiety in preschool children. The PAPA is the only interview schedule designed specifically to diagnose psychiatric disorders in preschool children. Reliability estimates obtained for some anxiety disorders have been poor to modest, and information on the validity of the anxiety diagnoses is needed. The PAS/PAS-R, CMFWQ, and ASEBA preschool scales possess sufficient and adequate evidence with respect to internal consistency and retest reliability. The PAS and CMFWQ also have evidence of convergent and divergent validity, but only the PAS has evidence for discriminant validity. More research also is needed on the validity of the Internalizing, Anxious/Depressed, and DSM Anxiety Problems subscales of the ASEBA preschool scales.

Objective Measures

Interview schedules and rating scales have been emphasized in this chapter because they are the most widely used and researched categorical and dimensional assessment approaches for pediatric anxiety. As noted, however, interviews and rating scales do not capture directly the two additional aspects of anxiety: avoidance of anxiety-provoking situations or objects and physiological reactions. Direct behavioral observations and psychophysiological measures more directly capture these aspects. These are each briefly discussed below.

Direct Observations

Direct observational tasks have been used to identify and quantify specific avoidant behaviors in anxious children [170–172]. They also have been used to assess subjective levels of anxiety, based on child and/or observer ratings, while the child is in the anxiety-provoking situations (e.g., reading aloud to a group) [173–175]. These tasks have served as outcome measures in several pediatric anxiety clinical trials, with varied findings [171–175].

The two most widely used types of direct observation tasks have been behavior avoidance tasks (BATs) and social evaluative tasks. In BATs, children are typically asked to approach a feared object or situation in a series of graded steps (varying between 8 and 27) [171, 172]. Trained observers then record the number of steps taken by the child as he/she approached the feared stimulus. Children also are asked to rate their level of fear or anxiety during the BAT. In social evaluative observation tasks, children (usually those with SOP) are typically asked to role play with a peer, read aloud a story in front of a small group, or talk about themselves to a small group. Children, and often trained observers, provide ratings of anxiety. Children's performance of the task has also been rated in some studies [173–175].

Reliability of direct observation tasks has been evaluated. Studies that have used social evaluative tasks, for example, in samples of children with SOP, have reported large interrater reliability estimates

for the observers' ratings of the child's anxiety levels (*r*s: 0.82 and 0.87), as well as the child's performance during the tasks ($r = 0.89$) [173–175]. Studies that have used BATs in samples of children with specific phobias reported large retest reliability estimates for number of steps achieved ($r = 0.97$ over 1 week; $r = 0.92$ over 1 h) and for children's anxiety levels during the BAT ($r = 0.87$ over 1 h) [170, 171]. Currently, there is no information regarding the validity of direct observations for assessment of pediatric anxiety. For example, no studies evaluate whether direct observations can discriminate children with anxiety disorders from children without anxiety disorders, as well as among the different anxiety disorders.

Presence of observers may potentially influence how children behave [176]. It is therefore important to have some time to allow children to habituate to the observers' presence [176]. Another limitation of direct observations is the absence of a standardized approach for conducting such observations, as well as their coding. As a consequence, it is difficult to generalize findings across studies [177]. Despite these limitations, direct observation tasks are useful for directly capturing the extent of children's avoidance of anxiety-provoking stimuli as well as children's level of anxiety while performing the tasks.

Physiological Measures

Although physiological measures provide the most direct and unbiased way to capture fear or anxiety responses, such measures are used less frequently in the assessment of pediatric anxiety relative to the other assessment measures discussed in this chapter [178]. In general, physiological assessment of anxiety focuses on two systems: the sympathetic adrenal medullary (SAM) system and hypothalamic pituitary adrenal (HPA) axis [179].

The SAM system relies on indices of heart rate (HR) and blood pressure (BP) and, to a lesser extent, galvanic skin response (GSR). There is scant research on the psychometric properties and clinical utility of these measures in samples of anxious children. Few studies have examined the reliability of physiological measures using retest intervals of varying lengths (e.g., 2 weeks, 60 s). Beidel et al. [180], for example, reported 2-week retest reliability estimates that were moderate to large for BP (*r*s: 0.29–0.64) and weak to moderate for HR (*r*s: 0.15–0.48), both measured before and during two 10-min behavior tasks (vocabulary test, read-aloud task) in children with SOP and non-anxious children. Also of interest in the Beidel et al. study [180] was the stability of BP and HR over time. Findings showed that 6-month stability estimates were weak to large for BP (*r*s: 0.04–0.63) and weak to moderate for HR (*r*s: 0.19–0.22).

Weems et al. [181] examined retest reliability of HR and GSR over a 60 s interval in a community sample of children (6–17 years old) exposed to a video of a mildly phobic stimulus (i.e., large dog running toward the camera). HR and GSR were measured at several time points: after children viewed a blank screen for 10 s, after viewing an initial video (i.e., a pastoral scene for habituation) prior to the video of the phobic stimulus, and after viewing the video of the phobic stimulus. Large retest reliability estimates were reported for HR and GSR (*r*s: 0.71 and 0.97, respectively) between the initial blank screen and pre-video period.

In terms of discriminant validity, Beidel [182] found HR discriminated between children with test anxiety from children with no anxiety during two behavior tasks (vocabulary test and read-aloud task). BP however did not discriminate between these two groups of children. Using a community sample of adolescents (13–17 years), Anderson and Hope [183] found that neither HR nor BP discriminated between adolescents with SOP from adolescents without a diagnosis during two 10-min anxiety-provoking behavior tasks (i.e., speech task and conversation with an unfamiliar person). Additionally, in the Weems et al. [181] study mentioned above, HR discriminated children with high levels of anxiety from those with low levels of anxiety during and after exposure to the mildly phobic stimulus. GSR, however, did not discriminate between these groups of children. In addition, change in HR, but not in GSR, before and after watching the video was more strongly associated with anxiety

than depressive symptoms according to child report. Given the failure to find BP and GSR could discriminate between children with anxiety and children without anxiety, further research is needed on these measures before they are used for such purposes. HR has somewhat better evidence for discriminant validity, though findings are inconsistent. More research is needed here too.

Only one pediatric anxiety trial has examined the sensitivity of physiological measures to treatment change. Specifically, Ost et al. [172] examined a one-session treatment for various phobias and measured the BP and HR at the highest step they attained on a BAT at pre- and posttreatment. BP was found to be significantly lower at posttreatment than at pretreatment for children assigned to active treatment conditions versus a waitlist. HR, however, did not show sensitivity to treatment change.

Research studies conducted on physiological indices of the HPA system in pediatric anxiety are even scarcer than studies conducted on indices of the SAM system. HPA activity is usually assessed via cortisol levels in the blood, urine, or saliva or measurement of adrenocorticotropic hormone [179]. Most of the research on HPA activity has been conducted in samples of children with depression or disruptive disorders [184, 185]. In samples of anxious children, the few studies conducted have found increased basal cortisol activity among children with PTSD compared to non-anxious children [186] and among clinic-referred children with SOP [187, 188]. Here too, more research is needed to determine psychometric properties and clinical utility.

Summary

This section summarized briefly the information available using direct observations and physiological measures with anxious children. Compared to interview schedules and rating scales, objective measures are not as widely used or studied. Direct observational tasks have been used primarily to quantify avoidant behaviors, obtain subjective ratings of anxiety during the task, and evaluate treatment outcome. There is some information on the reliability of direct observations for assessing pediatric anxiety, but information on validity is lacking. Furthermore, reactivity of children during observation tasks may influence the external validity of the findings. There also are currently no standardized tasks and coding procedures, thus making it difficult to generalize across studies [177].

Physiological measurements aid in directly capturing physiological reactions of anxiety in children, but they have been insufficiently studied in the pediatric anxiety assessment area. Few studies have examined the reliability of physiological measures and have used retest intervals of varying lengths in the anxiety area, making it difficult to draw conclusions about the reliability of such measures for this problem area. Further, studies have not found support for discriminant validity of BP and GSR. Although there is some support for the discriminant validity of HR, findings are inconsistent. As noted, further research is needed on physiological measurement in pediatric anxiety before they can be recommended for clinical purposes.

Clinical Considerations

In pediatric anxiety treatment research, it is common practice to administer a full assessment battery to the patients and their parents, which includes an interview schedule, several rating scales, and in some cases direct observation tasks and physiological measures at pre- and posttreatment and during follow-up periods. However, this is not often the case in clinical practice, where such a comprehensive assessment is rarely feasible. In choosing which assessment instruments would be most practical for use in clinical settings, factors such as cost, time, and training must be considered.

Most interview schedules used to diagnose pediatric anxiety disorders need to be purchased (with the exception of the K-SADS which is freely available). Interview schedules are also lengthy, taking

anywhere between 90 and 120 min to administer per informant. However, clinicians have the flexibility of using the interview schedules as templates that can guide their questioning rather than a script that must be precisely followed [189]. By using the interview schedules this way, the interviewer has available a full range of empirically validated DSM-based questions to which he or she can refer.

Rating scales such as the RCADS, SCAS, and SCARED are freely available, while the MASC, RCMAS, STAIC, CBCL, and BASC-2 need to be purchased. Administration time for rating scales is minimal, taking between 5 and 20 min to complete. Training required for most rating scales also is minimal. Direct observations and physiological assessment of anxiety are costly, lengthy, and require extensive training and extra staff members available for administration, thus making them less feasible for use in clinical practice settings.

Future Research Directions

There remains a need for further research that cuts across categorical and dimensional perspectives. First, as previously mentioned, the advent of the DSM 5 will likely have implications for existing categorical and dimensional measures of pediatric anxiety disorders that may require revision and further psychometric assessment.

Second, another revision to the DSM that will likely have implications for the assessment of pediatric anxiety is the inclusion of dimensional severity ratings to the diagnostic categories of the upcoming DSM 5. Dimensional severity ratings would allow clinicians to rate both the presence and severity of symptoms (e.g., "very severe," "severe," "moderate," or "mild") [190]. Inclusion of dimensional severity ratings may address some of the limitations of a categorical approach. These include the DSM's inability to capture individual differences in severity of a given disorder and inability to provide information about severity of subthreshold symptoms [191, 192]. Research on whether including dimensional severity ratings successfully addresses these disadvantages will be needed.

Third, the instruments summarized in this chapter were originally developed in English and tested with predominantly Caucasian children. It is unclear whether these instruments are applicable for assessing anxiety disorders in children from diverse backgrounds. Some of the categorical and dimensional instruments summarized in this chapter do show promise for such use, at least in terms of similar reliability and validity estimates (e.g., Ólason et al. [72] and Mellon and Moutavelis [105]). More research is needed, however, especially on the issue of measurement equivalence—whether these instruments assess anxiety in the same way across diverse groups of children [193]. See Pina et al. [194] as an example of a measurement equivalence study, which showed the RCMAS yields equivalent information across European American and Latino children diagnosed with anxiety disorders.

In closing, as this chapter has illustrated, researchers and clinicians have available a number of sound measures, based on categorical and dimensional perspectives to assess pediatric anxiety. We hope the chapter will help guide decisions about "which measure to use for which purpose" and at the same time allow for continued advancements in our understanding of pediatric anxiety disorders from both categorical and dimensional perspectives.

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