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CHAPTER 8

Anxiety Disorders

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Fear and anxiety are common emotions that are a necessary part of the normal development of all children.[1] For some children, however, the levels of fear or anxiety are disproportionally high in relation to the cues or context (e.g., anxiety about grades for a student who is already receiving straight A's) or in relation to their developmental level (e.g., a fear of the dark for a 12-year-old). In such cases, when those emotions and their associated behaviors also lead to impairment in functioning—such as inability to attend school, make friends, perform academic tasks, or meet other developmental goals—their expression may be considered an anxiety disorder. Perhaps given the ubiquity of the emotions of fear and anxiety in everyday development, anxiety disorders collectively represent the most common type of psychiatric disorders among children (Anderson, Williams, McGee, & Silva, 1987; Costello & Angold, 1995; Kashani & Orvaschel, 1988; Kessler, Avenevoli, Costello, et al., 2012; Merikangas et al., 2010). Estimates from community samples show that one-third of adolescents will meet criteria for an anxiety disorder by the age of 18 (Merikangas et al., 2010), and studies of clinically referred samples show rates of anxiety disorders approaching 50% (Hammerness et al., 2008).

Anxiety disorders in childhood are more than just common. They are, by definition, associated with impairment in functioning, which in some cases can be extreme. For example, a considerable body of research shows that anxiety disorders in childhood are associated with later anxiety disorders, depression, substance use, and other negative mental health outcomes (Berg et al., 1989; Feehan, McGee, & Williams, 1993; Ferdinand & Verhulst, 1995; Flament et al., 1990; Keller et al., 1992; Langley, Bergman, McCracken, & Piacentini, 2004; Neal & Edelmann, 2003; Pine, Cohen, Gurley, Brook, & Ma, 1998; Woodward & Fergusson, 2001), and recent data from the National Comorbidity Study Replication—Adolescent Supplement suggests that having specific phobia, agoraphobia, social phobia (now known as social anxiety disorder), or panic disorder is the strongest predictor of most other subsequent disorders (Kessler, Avenevoli, McLaughlin, et al., 2012). Studies of community samples show that the presence of an anxiety disorder more than doubles the odds of impairment in family, educational, or peer functioning (e.g., Ezpeleta, Kessler, Erkanli, Costello, & Angold, 2001). Although this impairment can be more subtle than that caused by other disorders of childhood, such as externalizing disorders, the social costs of anxiety disorders are high. For example, a recent study estimated costs to families with clinically anxious children (e.g., health care costs, child care, missed

work or school days, lost leisure time) to be over 20 times higher than costs to families without such children (Bodden, Dirksen, & Bogels, 2008). Furthermore, when these disorders persist into adulthood, they continue to represent a high cost to society—accounting for an estimated 31.5% of 1990 adult mental health expenditures in the United States (DuPont et al., 1996). Although it is unclear whether this trend remains today, a recent systematic review found that across studies, anxiety disorders are responsible for both direct costs (e.g., treatment visits, drugs, emergency room visits), and indirect costs (e.g., reduced productivity, absence from work, early retirement), and that among the anxiety disorders, panic disorder and generalized anxiety disorder tend to shower higher direct costs than social phobia or specific phobia (Konnopka, Leichsenring, Leibing, & König, 2009).

Perhaps even more troubling than the current costs to society of this ongoing need for services is the number of children who are *not* receiving services. Data from the National Comorbidity Survey—Adolescent Supplement show that across adolescents with any of the more common disorders, the only other ones less likely to receive services than children with anxiety disorders (17.8%) are adolescents with substance use disorders (15.4%; Merikangas et al., 2011). When these numbers are compared with service utilization by adolescents with mood (37.7%), behavior (45.4%), and attentional disorders (59.8%), it is clear that adolescents with anxiety disorders significantly underutilize mental health services. To state this another way, the 2010 census reported that there are 74.18 million children under the age of 18 in the United States. Thus approximately 23.66 million children will suffer from an anxiety disorder sometime before the age of 18, and only 4.2 million of these will ever receive treatment for their illness, leaving 19.46 million children with untreated anxiety disorders to suffer in silence.

Not surprisingly, research on anxiety disorders in children has increased dramatically over the past 20 years in an effort to clarify the nature of the disorders, their impact, their etiology, and ultimately their treatment. What has emerged is a complex model detailing the interplay of genetics, temperament, early development, peers, family, and other factors in the course and expression of anxiety in children. Although far from complete, there is now a solid framework for understanding where anxiety disorders come from, how they change over time, and how they are related to each other and to other psychiatric disorders.

BRIEF HISTORICAL CONTEXT

Although a refined understanding of childhood anxiety disorders and their development is historically somewhat recent (e.g., Chorpita & Barlow, 1998; Rapee, Schniering, & Hudson, 2009; Vasey & Dadds, 2001), children's anxieties and fears have been described in the literature for over 100 years (Barrios & Hartmann, 1997). Some of the earliest research focused on case studies of childhood fears in the context of both psychoanalytic and behavioral theory. For example, in the classic case study of "Little Hans," Freud (1909/1955) defined and described several key unconscious processes operating in the development of phobia, such as the ego defense mechanisms of repression and displacement. Although the study of Little Hans has since been reconsidered (e.g., A. Freud, 1965), its value and place in psychoanalytic theory remain firmly ingrained. In a similar manner, the conditioned fear of a white laboratory rat in "Little Albert" provided early support for classical conditioning theories of the development of fears (Watson & Rayner, 1920). In this study, repeated pairings of a neutral stimulus (a white laboratory rat) and an aversive stimulus (a loud noise) resulted in the development of a conditioned fear response to the rat in 11-month-old Albert. In addition, Albert's fear generalized to a range of other stimuli, including a rabbit, a dog, a Santa Claus mask made with cotton balls, and a fur coat. Building on this work in yet another case study of a child, Mary Cover Jones (1924) described the treatment of 3-year-old Peter's fear of rabbits with a variety of behavioral techniques, including pairing the rabbit with a positive stimulus (food).

Although these and similar case studies of children served to further the interest and support for specific theoretical models and related therapeutic interventions, the study of anxiety disorders in children was essentially ignored until the latter part of the 20th century. This is both surprising and humbling, given the wealth of information and research over the last 80 years focused on the developmental progression of children's fears (e.g., see Barrios & Hartmann, 1997; Barrios & O'Dell, 1998; King, Hamilton, & Ollendick, 1988; Ollendick & King, 1991). In fact, prior to 1980, fear and anxiety reactions in children were largely ignored in psychiatric nosological systems; rather, they were studied as part of research investigating normative developmental reactions and were classified according to etiology (Hebb, 1946) or empirically based factor groupings (Miller, Barrett, Hampe, & Noble, 1972;

Ollendick, 1983; Scherer & Nakamura, 1968). That early research demonstrated that fears are common in children (e.g., Miller, 1983; Ollendick, 1983), that the number of fears reported by children declines with age (MacFarlane, Allen, & Honzik, 1954), and that the focus of the fear changes over time (e.g., Bauer, 1976). In addition, across studies, girls consistently endorse a greater number of fears than boys (Abe & Masui, 1981; Lapouse & Monk, 1958, 1959).

Formal psychiatric classification systems began to acknowledge the presence of pathological phobic reactions around the early 1950s. The first edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM; American Psychiatric Association [APA], 1952) identified phobias as psychoneurotic reactions, and in DSM-II (APA, 1968), the diagnostic category was changed to phobic neuroses. DSM-II introduced overanxious reaction as a distinct diagnostic category for children. These early DSM classification systems were heavily tied to psychoanalytic theory, purporting an unconscious process or conflict as the etiological mechanism for the phobic or overanxious reaction (Barlow, 2002). Although such theories have not stood the test of time, the inclusion of overanxious reaction in the psychiatric nosology marked a turning point for psychiatric classification, in that it began to give attention to anxiety disorders in children. Research on childhood anxiety disorders was relatively uncommon until the 1980s, and this lag may have been due in part to long-standing disagreements within the field as to what differentiates a clinical anxiety state from transient developmental fears and anxieties (Barrios & Hartmann, 1997; Strauss & Last, 1993). DSM-III (APA, 1980) and DSM-III-R (APA, 1987) represented the first attempts to delineate developmentally appropriate diagnostic criteria for phobic and other anxiety disorders in children. For example, separation anxiety disorder, avoidant disorder of childhood and adolescence, and overanxious disorder were posited as three anxiety disorders unique to childhood. At that time, children could be diagnosed with these three anxiety disorders in addition to any of the adult anxiety disorders, such as phobic disorder, obsessive–compulsive disorder, and posttraumatic stress disorder. Thus DSM-III and its revision precipitated a collection of studies examining the epidemiology and clinical characteristics of anxiety disorders in childhood (e.g., Francis, Last, & Strauss, 1987; Last, Francis, Hersen, Kazdin, & Strauss, 1987; Last, Hersen, Kazdin, Finkelstein, & Strauss, 1987; Last & Strauss, 1989). Those studies, in turn, led to changes and revisions in criteria for diagnosing anxiety disorders that were introduced in DSM-IV (APA, 1994).

This evolving classification system and the assessment instruments that followed (e.g., Silverman & Albano, 1996) enabled rigorous investigation into the prevalence, comorbidity, and severity of anxiety disorders in children. One highly consistent finding was that anxiety disorders are highly comorbid within themselves (homotypic comorbidity); that is, many children with an anxiety disorder have often had more than one—whether concurrently or across development (e.g., Benjamin, Costello, & Warren, 1990; Brady & Kendall, 1992; Kendall et al., 2010). Furthermore, a similar pattern has been shown with respect to depression and anxiety: Children with depression show elevated rates of anxiety disorders and vice versa, and anxiety disorders and depression are highly comorbid, especially across time (e.g., Costello, Mustillo, Erkanli, Keeler, & Angold, 2003, Hammerness et al., 2008).

Attempts to understand why anxiety disorders cooccur so often among themselves and with depression over the span of development led to some controversy regarding whether DSM-IV accurately represented distinct disorders, or whether it was artificially splitting subdimensions of broader pathological syndromes that truly occurred in nature (Brown, 1998; Caron & Rutter, 1991; Lilienfeld, Waldman, & Israel, 1994). Somewhat paradoxically, research has simultaneously demonstrated support for the validity of the DSM anxiety disorder syndromes (e.g., Comer & Kendall, 2004; Langer, Wood, Bergman, & Piacentini, 2010), as well as support for a single, overarching dimension underlying anxiety disorders that could perhaps better explain the high comorbidity observed among anxiety and depressive disorders (e.g., Chorpita, Albano, & Barlow, 1998; Lonigan, Carey, & Finch, 1994). Most recently, there have been attempts to unify these positions, and the emerging findings support the notion that both perspectives are likely to be valid. In other words, there is both a single underlying factor that contributes to the expression of anxiety disorders (and depression), and there are valid narrow-band syndromes of anxiety that are empirically distinct from one another. Collectively, this research paints a picture of a hierarchical model, which outlines multiple anxiety syndromes (e.g., separation anxiety, generalized anxiety, panic, social anxiety) associated with a higher-order factor common to most if not all anxiety disorders as well as depression. This hierarchical system enables us to understand the

relations among disorders (Chorpita, 2002; Clark & Watson, 1991; Craske, Rauch, et al., 2009; Joiner, Catanzaro, & Laurent, 1996; Lonigan et al., 1994). Given that such a conceptualization is relatively recent, research is only now beginning to investigate how this model behaves across the developmental span of childhood, and whether and which influences operate at the general level versus the syndrome-specific level. Before exploring these issues in more detail, this chapter first describes and examines the pathological syndromes of anxiety at the syndrome or disorder level.

DSM-5 ANXIETY DISORDERS

Although anxiety and fear are normal emotions, when they occur in the absence of typical cues and cause distress or impairment, they are referred to as anxiety disorders and phobias, respectively (Barlow, 1988). In DSM-5 (APA, 2013), children can be diagnosed with any of seven anxiety disorders: specific phobia, separation anxiety disorder, social anxiety disorder (formerly social phobia), selective mutism, panic disorder, agoraphobia, and generalized anxiety disorder. These disorders share anxious emotion as the predominant feature, expressed through specific and discrete cognitive, physiological, and behavioral reactions. Much of what distinguishes one anxiety disorder from the next is the focus of the child's anxiety. In this section, we define the core and related symptoms of specific DSM-5 anxiety disorders affecting children. A listing of DSM-5 criteria is provided in tabular form for each disorder. Whereas obsessive–compulsive disorder, posttraumatic stress disorder, and acute stress disorder were categorized with the anxiety disorders in DSM-IV, they are now categorized in DSM-5 with the obsessive–compulsive and related disorders and the trauma- and stressor-related disorders, respectively. (The reader interested in these disorders is referred to Piacentini, Chang, Snorrason, & Woods, Chapter 9, and Nader & Fletcher, Chapter 10, this volume, for a comprehensive review.)

Specific Phobia

Core Symptoms

Specific phobia (known as simple phobia prior to DSM-IV) refers to a pronounced fear of a specific situation or object (e.g., animals, heights, receiving an injection) that is disproportional to the actual danger posed and to the sociocultural context (see Table 8.1 for DSM-5 criteria). Exposure to the situation or object provokes fear, and in children, this fear may be expressed behaviorally as crying, throwing tantrums, freezing, or clinging to caregivers. The feared object or situation is actively avoided or is endured with great distress, and the fear and avoidance associated with the object causes major distress or impairment in functioning. Although DSM-IV required duration of symptoms for at least 6 months for children under the age of 18, in DSM-5 this criterion is extended to all ages, to minimize diagnosis of transient fears. Miller, Barrett, and Hampe (1974) differentiate specific phobia from normal developmental fears (e.g., a toddler's fear of strangers), in that the phobic reaction is excessive and out of proportion to the demands of the situation, cannot be reasoned away, leads to avoidance, persists over time, and interferes with activities or relationships. Although a great deal of research has examined specific phobia in children since Miller and colleagues' seminal description, the core features of the condition remain relatively unchanged.

Common fears and phobias of childhood include heights, darkness, loud noises (including thunder), injections, insects, dogs, and other small animals (Essau, Conradt, & Peterman, 2000; Silverman & Rabian, 1993; Strauss & Last, 1993). School phobia is also common in children, but the principal motivating condition for the observable avoidance behavior must be delineated for accurate differential diagnosis and prescriptive treatment planning (Kearney, 2001). A child may be diagnosed with a specific phobia of school if the fear is circumscribed to a particular school-related situation (e.g., fire drills) as opposed to fear of social or evaluative situations in the school setting, in which case social anxiety disorder might be a more appropriate diagnosis.

In the cognitive-behavioral models that have become increasingly well established over the past 40 years (Beck, Emery, & Greenberg, 2005; Kendall & MacDonald, 1993; Lang, 1968), the responses of children with phobias are often described in terms of three components of anxiety: behavioral, physiological, and cognitive. Behaviorally, avoidance is the predominant response of children with phobias. Avoidance may take the form of screaming, crying, throwing tantrums, or hiding in anticipation of confronting the feared stimulus. When contact with the phobic stimulus is unavoidable, clinging and begging caregivers for help to escape

TABLE 8.1. DSM-5 Diagnostic Criteria for Specific Phobia

A. Marked fear or anxiety about a specific object or situation (e.g., flying, heights, animals, receiving an injection, seeing blood).

Note: In children, the fear or anxiety may be expressed by crying, tantrums, freezing, or clinging.

B. The phobic object or situation almost always provokes immediate fear or anxiety.
C. The phobic object or situation is actively avoided or endured with intense fear or anxiety.
D. The fear or anxiety is out of proportion to the actual danger posed by the specific object or situation and to the sociocultural context.
E. The fear, anxiety, or avoidance is persistent, typically lasting for 6 months or more.
F. The fear, anxiety, or avoidance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.
G. The disturbance is not better explained by the symptoms of another mental disorder, including fear, anxiety, and avoidance of situations associated with panic-like symptoms or other incapacitating symptoms (as in agoraphobia); objects or situations related to obsessions (as in obsessive–compulsive disorder); reminders of traumatic events (as in posttraumatic stress disorder); separation from home or attachment figures (as in separation anxiety disorder); or social situations (as in social anxiety disorder).

Specify if:

Code based on the phobic stimulus:

300.29 (F40.218) Animal (e.g., spiders, insects, dogs).
300.29 (F40.228) Natural environment (e.g., heights, storms, water).
300.29 (F40.23x) Blood-injection-injury (e.g., needles, invasive medical procedures).

Coding note: Select specific ICD-10-CM code as follows: **F40.230** fear of blood; **F40.231** fear of injections and transfusions; **F40.232** fear of other medical care; or **F40.233** fear of injury.

300.29 (F40.248) Situational (e.g., airplanes, elevators, enclosed places).
300.29 (F40.298) Other (e.g., situations that may lead to choking or vomiting; in children, e.g., loud sounds or costumed characters).

Coding note: When more than one phobic stimulus is present, code all ICD-10-CM codes that apply (e.g., for fear of snakes and flying, F40.218 specific phobia, animal, and F40.248 specific phobia, situational).

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the confrontation are common. Moreover, children with a specific phobia are apprehensive and hypervigilant regarding the feared stimulus. For example, children fearful of thunderstorms may scan the news or watch the sky prior to leaving home. Children with a specific phobia of dogs may go to great lengths to avoid walking down a street even when a dog is penned behind a fence. Children with specific phobia report physiological symptoms consistent with panic sensations, including rapid heart rate, sweating, hyperventilation, shakiness, and stomach upset. Cognitions of children with phobias are often characterized by catastrophic predictions or overestimation of the chance that a threatening event will occur upon exposure to the feared stimulus. Children with specific phobia also report anticipatory anxiety in the form of "What if" statements (Silverman & Rabian, 1993). For example, a child who has a phobia of thunderstorms may lament, "What if it storms on my way to school, and I get struck by lightning?"

Specifiers

According to DSM-5, there are five different kinds of specific phobia, which are identified by specifiers. The animal specifier includes fear of animals such as dogs, insects (e.g., bees, spiders, centipedes), and snakes. The natural environment specifier includes fear of events or situations occurring in the environment such as weather (e.g., storms, thunder), water, and heights. The situational specifier includes different kinds of situations such as driving, flying, crossing bridges, going through tunnels, riding elevators, or being in other enclosed spaces. The blood–injection–injury (BII) specifier includes fear of needles, invasive medical procedures,

and dental work. The last specifier, given simply as "other," is a category used when the feared object does not fall into one of the first four categories. Phobias in this category include fears of choking or vomiting, loud sounds (e.g., firecrackers, sirens), or costumed characters. In a community study of 1,035 German adolescents, of those with a diagnosis of specific phobia (3.5%), most fell into the animal or natural environment categories, and the "other" category was the least common (Essau et al., 2000). Across studies, fears of animals and heights are the most common types of specific phobia (Curtis, Magee, Eaton, Wittchen, & Kessler, 1998; Depla, ten Have, van Balkom, & de Graaf, 2008; Stinson et al., 2007).

Although there has been some speculation as to whether these categories represent clinically meaningful and valid subcategories (e.g., Antony, Brown, & Barlow, 1997), the research to date suggests that although there are some similarities, there is enough independence to warrant their continued separation. For example, using confirmatory factor analysis, Muris, Schmidt, and Merckelbach (1999) found that specific phobia symptoms in children ages 7–19 clustered into three types (animal phobia, BII, and environment/situation), and these appeared to be invariant across age and gender. In a recent review across the child, adolescent, and adult literatures in preparation for DSM-5 recommendations, both similarities and differences were found across the types (LeBeau et al., 2010). LeBeau and colleagues (2010) found similarities in age of onset, gender ratio, and treatment response, but differences in focus of fear, physiological fear response, impairment, and comorbidity. According to their review, natural environment and animal phobias share the most in common with other types, whereas the BII type shares the least with other types. As such, they recommended retaining these subcategories for the DSM-5.

Several studies have directly examined the similarities and differences across children with different types of specific phobia. In a large study of Korean children, different subtypes reportedly had different comorbidities and associated problems, suggesting distinctive profiles (Kim et al., 2010). For example, phobias of the animal subtype were associated with the presence of another anxiety disorder and oppositional defiant disorder (ODD), whereas natural environment phobias were associated with another anxiety disorder only, and BII phobias showed a significant association with attention-deficit/hyperactivity disorder (ADHD). Furthermore, although animal phobias were reported most frequently in their sample (49% of all individuals with specific phobia), children with natural environment and/or BII phobias demonstrated significantly higher scores on subscales of the Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001) than children with animal phobias and children without a specific phobia diagnosis. Specifically, phobias of the natural environment type were related to higher scores on the Anxious/Depressed and Attention Problems CBCL subscales, and BII phobias were related to higher scores on the Attention Problems, Aggressive Behavior, and Externalizing Problems scales. These findings are consistent with a study by Ollendick, Öst, Reuterskiöld, and Costa (2010), who found that although there were no sociodemographic differences (age, sex, race, family structure, family income) between children with animal phobias and children with natural environment phobias, children with the natural environment type demonstrated significantly more internalizing problems, comorbid diagnoses, and lower life satisfaction than children with animal phobias; these findings suggest that the natural environment subtype is associated with greater clinical severity.

Associated Characteristics

In addition to experiencing fear and distress in the presence or anticipation of the phobic object or situation, children with a specific phobia may also demonstrate oppositional behaviors, presumably as a result of trying to avoid feared objects/situations. Adolescents with a specific phobia are likely to report somatic symptoms as well as depression (Essau et al., 2000; see section below for more details on comorbidities).

A vasovagal syncope or fainting response occurs in approximately 70–80% of adults with BII phobias (APA, 1994; Öst, Sterner, & Lindahl, 1984). Estimates specific to children are lacking at present. Decades of research and volumes on anxiety explain that this physiological response is diphasic: It is characterized by an initial brief acceleration of heart rate, followed by an immediate deceleration of heart rate and drop in blood pressure, which can lead to fainting (e.g., Barlow, 2002; Engel, 1978; Graham, Kabler, & Lunsford, 1961; Kozak & Montgomery, 1981). This response is unique to the BII type of specific phobia and is in contrast to the usual sustained acceleration of heart rate found in other specific phobia types. However, Ritz, Meuret, and Ayala (2010) recently critiqued the literature on the syncope response in the BII type. They argue that the

research to date is flawed by poor definitions of syncope; inconsistent findings on the initial acceleration of heart rate upon exposure to the feared stimulus; lack of clarity regarding which physiological parameters are important (i.e., heart rate, blood pressure, hyperventilation, adrenaline, vasopressin, etc.); lack of support for the diphasic response; and lack of emphasis on the role that cognitive variables, such as disgust and perceived loss of control, play in the fainting response. Thus, although it is clear that individuals with BII phobias show a unique pattern of physiological responses, the exact mechanisms of these physiological responses are not clearly understood.

Regardless of the mechanisms of syncope in BII phobias, it does appear that individuals with this type of specific phobia may be predisposed to this vasovagal response. For instance, according to some research, individuals with BII have an autonomic substrate that predisposes them to vasovagal syncope, and fainting during the blood phobic response is a manifestation of this underlying circulatory dysfunction (Accurso et al., 2001). It appears as though different parts of the brain are activated when individuals with BII, compared with individuals with spider phobia, are exposed to fear stimuli. When exposed to spider-related images, individuals with spider phobia showed increased activation in the dorsal anterior cingulate and anterior insula, whereas individuals with BII phobia showed increased activation in the thalamus and visual/attention areas (occipito-temporo-parietal cortex) when exposed to images related to blood, injections, and injuries (Caseras et al., 2010). However, it is unclear how or whether this functional neuroanatomical difference is related to vasovagal syncope, and whether this difference exists in children with BII.

Common Comorbidities

Several common comorbidities are found in children with specific phobia. In a community study of German adolescents, Essau and colleagues (2000) reported that 47.2% of children with specific phobia had another comorbid anxiety disorder, 36.1% had comorbid depressive disorders, 33.3% had comorbid somatoform disorders, and 8.3% had comorbid substance use disorders. Within the anxiety disorders, specific phobia co-occurred most commonly with posttraumatic stress disorder (13.9%), obsessive–compulsive disorder (11.1%), and anxiety disorder not otherwise specified (11.1%). In a community sample of adolescents, specific phobia was comorbid with separation anxiety disorder (odds ratio = 4.7) and social phobia (odds ratio = 7.2) (Lewinsohn, Zinbarg, Seeley, Lewinsohn, & Sack, 1997). In a community sample of Korean children ages 6–17, Kim and colleagues (2010) reported that 28.1% of children with specific phobia had at least one comorbid psychiatric diagnosis: 5.9% another anxiety disorder, 13% ADHD, and 13% ODD. Furthermore, in a study specifically examining the relation between depression and specific phobia by using data from the National Comorbidity Study, Choy, Fyer, and Goodwin (2007) found that individuals ages 15–54 with specific phobia experienced a significant increase in the likelihood of lifetime depression compared with those without specific phobia even after adjustments for lifetime comorbid anxiety disorders, and that the more fears an individual reported, the higher the risk for depression.

With regard to clinically referred children, Last, Perrin, Hersen, and Kazdin (1992) reported that 75% of referred children with specific phobia had a lifetime history of additional anxiety disorders, 32.5% had a lifetime history of any depressive disorder, and 22.5% had a lifetime history of any behavior disorder. The most common additional specific anxiety diagnosis was separation anxiety disorder (38.8%). In another clinic-referred sample, the most common concurrent comorbid diagnoses of specific phobia were generalized anxiety disorder, social anxiety disorder, and separation anxiety disorder (18.2%, 12.1%, and 9.1%, respectively) (Leyfer, Gallo, Cooper-Vince, & Pincus, 2013).

Epidemiology

The 12-month and lifetime prevalences for specific phobia in the National Comorbidity Study Replication—Adolescent Supplement, a large representative community sample of adolescents ages 13–18, were estimated at 15.8% and 19.3%, respectively—the highest rates of all DSM-IV psychological disorders (Kessler, Avenevoli, Costello, et al., 2012; Merikangas et al., 2010). In international community samples, 1-year prevalence of specific phobia was estimated at 7.9% in Korean children ages 6 to 17 (Kim et al., 2010), and lifetime prevalence at 3.5% in German adolescents ages 12–17 (Essau et al., 2000). In a primary care sample of children ages 8–17, the 1-year prevalence of specific phobia was 10% (Chavira, Stein, Bailey, & Stein, 2004). Among children referred to a specialty anxiety clinic, specific phobia was the third most common anxiety

disorder (27.6%) and the third most common comorbid diagnosis (10.4%) (Leyfer, Gallo, Cooper-Vince, & Pincus, 2013).

Developmental Course and Prognosis

Phobias of animals, darkness, insects, blood, and injury usually begin before age 7 (Marks & Gelder, 1966) and parallel the onset of normative fears in children, although the phobic diagnosis suggests that the fears have greater intensity and stability over time. Our understanding of the patterns of onset for childhood phobias is largely based on the retrospective report of adult phobic patients. For example, in the National Epidemiological Survey on Alcohol and Related Conditions, the mean age of onset across all types of specific phobia was 9.7 years (Stinson et al., 2007). Specifically, adult phobic patients place the onset of animal phobia between 6 and 7 years, environmental phobia at 6–12 years, blood phobia at 7–9 years, and doctors/dental/injection phobia at 9–15 years (Becker et al., 2007; Liddell & Lyons, 1978; Öst, 1987). Situational phobias tend to have a later onset, often in adolescence or young adulthood (Becker et al., 2007; Öst, 1987).

In contrast to the wealth of literature documenting the natural course of fears in children and retrospective reports from adults on the course of phobias, little empirical research has been conducted prospectively on the course of phobic disorders in childhood. In a classic and widely cited study, Agras, Chapin, and Oliveau (1972) followed a community sample of phobic individuals consisting of 10 children under the age of 20 years, and 20 adults. Participants were followed over a 5-year period, during which none received treatment for his or her phobia. Results from this study indicated that many phobic conditions resolve without active intervention. However, other researchers (e.g., Ollendick, 1979) have argued that although children improved in this study, they were not completely asymptomatic over the course of the follow-up assessment. It does appear that remission rates are higher in child and adolescent samples (Agras et al., 1972; Milne et al., 1995) than in adult samples (Stinson et al., 2007; Trumpf, Becker, Vriends, Meyer, & Margraf, 2009), and that remission rates may be associated with protective factors such as positive mental health and life satisfaction (Trumpf et al., 2009). Despite the finding that specific phobia is associated with significant psychosocial impairment (Essau et al., 2000), very few affected individuals (13.9% in adolescence and 8% in adulthood) actually seek treatment for the disorder, with mean age at first treatment in adults estimated at 31.3 years (Essau et al., 2000; Stinson et al., 2007).

Separation Anxiety Disorder

Core Symptoms

Separation anxiety disorder (hereafter abbreviated as SAD) is characterized by excessive anxiety and fear concerning separation from home or from caregivers to whom the individual is attached. DSM-5 outlines eight core symptoms, of which any three are required to meet criterion A (see Table 8.2). Three of those eight symptoms are related to distress and worry about separation from or harm to attachment figures. For example, children with SAD may worry about being kidnapped, getting lost, or having their parents involved in an accident. Three more symptoms are related to avoidance of work, school, being alone, or sleeping alone, and the last two symptoms of the first criterion involve nightmares and somatic complaints. Some research suggests that of these eight symptoms, the most common are recurrent excessive distress upon separation, reported by 87.4% of parents of children with SAD; reluctance to sleep separated from caregiver, reported by 85.7% of those parents; and reluctance to be alone, reported by 81.0% of those parents (Allen, Lavallee, Herren, Ruhe, & Schneider, 2010). Alternatively, nightmares about separation were reported by only 7.2% of parents of children with SAD (Allen et al., 2010), and have been found to be the least common symptom of SAD, dating back to DSM-III (e.g., Francis et al., 1987). Based on extensive clinical observations of children with separation anxiety, Eisen and Schaefer (2005) outlined four key symptom dimensions associated with SAD: fear of being alone, fear of abandonment, fear of physical illness, and worry about calamitous events. These dimensions correspond roughly to the DSM-5 criteria, but emphasize dimensions posited to be more relevant to treatment considerations.

As outlined in criterion A, SAD symptoms must be inappropriate for the child's age and expected developmental level, given that fears of separation are part of normative development from approximately age 7 months to 6 years (e.g., Bernstein & Borchardt, 1991). The changes from DSM-IV to DSM-5 are relatively minor, with the main emphasis involving a rewording to make the diagnosis more appropriate for adults as well as children, and removal of the criterion that the disorder onset must be prior to age 18 (the disorder has now been moved from a section on disorders diagnosed

TABLE 8.2. DSM-5 Diagnostic Criteria for Separation Anxiety Disorder

A. Developmentally inappropriate and excessive fear or anxiety concerning separation from those to whom the individual is attached, as evidenced by at least three of the following:
   1. Recurrent excessive distress when anticipating or experiencing separation from home or from major attachment figures.
   2. Persistent and excessive worry about losing major attachment figures or about possible harm to them, such as illness, injury, disasters, or death.
   3. Persistent and excessive worry about experiencing an untoward event (e.g., getting lost, being kidnapped, having an accident, becoming ill) that causes separation from a major attachment figure.
   4. Persistent reluctance or refusal to go out, away from home, to school, to work, or elsewhere because of fear of separation.
   5. Persistent and excessive fear of or reluctance about being alone or without major attachment figures at home or in other settings.
   6. Persistent reluctance or refusal to sleep away from home or to go to sleep without being near a major attachment figure.
   7. Repeated nightmares involving the theme of separation.
   8. Repeated complaints of physical symptoms (e.g., headaches, stomachaches, nausea, vomiting) when separation from major attachment figures occurs or is anticipated.

B. The fear, anxiety, or avoidance is persistent, lasting at least 4 weeks in children and adolescents and typically 6 months or more in adults.

C. The disturbance causes clinically significant distress or impairment in social, academic, occupational, or other important areas of functioning.

D. The disturbance is not better explained by another mental disorder, such as refusing to leave home because of excessive resistance to change in autism spectrum disorder; delusions or hallucinations concerning separation in psychotic disorders; refusal to go outside without a trusted companion in agoraphobia; worries about ill health or other harm befalling significant others in generalized anxiety disorder; or concerns about having an illness in illness anxiety disorder.

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in childhood to the anxiety disorders section). For example, symptom 4 of criterion A now includes avoiding going to work as an example of separation-relevant avoidance (see Table 8.2). Likewise, symptom 5 has been reworded to emphasize separation from "attachment figures" as opposed to "significant adults," giving a bit more flexibility for the application of this diagnosis across the lifespan (e.g., for adults, anxiety could be triggered by separation from their offspring; Hock, McBride, & Gnezda, 1989). In addition, the duration criterion was extended from 4 weeks to 6 months for adults (minimum duration for children and adolescents is still 4 weeks), to minimize diagnosis of transient fears of separation anxiety. Finally, unchanged from DSM-IV is the requirement that the disturbance should cause marked impairment and should not be better accounted for by another diagnosis.

Associated Characteristics

Although distress about separation is one of the defining characteristics of SAD, one of the most common and interfering symptoms involves school refusal behavior. In its most extreme form, school refusal behavior involves complete avoidance of school; milder forms can include pleas to stay home, leaving school early, visits to the school nurse, or phone calls to the caregiver (Kearney, 2001). Although many anxiety disorders can co-occur with school refusal, SAD is the most common, with estimates from about 38% (Last & Strauss, 1990) to 50% (Borchardt, Giesler, Bernstein, & Crosby, 1994) among children with school refusal referred to outpatient clinics, and estimates as high as 57% among children with school refusal in inpatient settings (Borchardt et al., 1994). The association is even stronger in the other direction; for example, Last, Francis, and colleagues (1987) reported school refusal behavior in 73% of children with SAD, whereas school refusal behavior occurs only at a rate of 1% in the general population (Last & Strauss, 1990).

Another symptom that is often quite pronounced among children with separation anxiety is complaints of aches, pains, or other symptoms of physical illness. For example, Last (1991) found that somatic complaints were evidenced by 78% of children with SAD, which was the second highest rate for all anxiety disorders and

significantly higher than the rate of such complaints among all other anxiety disorders combined (53%). Furthermore, although somatic complaints commonly co-occur with other anxiety disorders and even among typical children (e.g., Alfvén, 1993), with SAD such complaints usually occur in anticipation of separation, such as at bedtime or before school. Common somatic complaints include headaches, stomachaches, or nausea (e.g., Egger, Costello, Erkanli, & Angold, 1999). Interestingly, when somatic complaints co-occur with SAD, the rates of school refusal are noted to be significantly higher (58% vs. 39%; Last, 1991).

Common Comorbidities

In a clinic-referred sample, SAD was associated with a number of concurrent comorbid anxiety diagnoses, with generalized anxiety disorder, specific phobia, and social anxiety disorder being the most common (23.7%, 21.1% and 17.1%) (Leyfer et al., 2013). In a retrospective study of SAD, 86.1% of adults who met criteria for childhood SAD also met criteria for another psychiatric disorder (Shear, Jin, Ruscio, Walters, & Kessler, 2006). Other anxiety disorders were the most common comorbid diagnoses (65.3%), with over one-third of adults with childhood SAD reporting symptoms of specific phobia and social phobia. Mood disorders (53.1%), impulse control disorders (48.3%), and substance use disorders (28.8%) were also common (Shear et al., 2006). Although panic disorder was only comorbid among 15.9% in adults with childhood SAD in Shear and colleagues' (2006) sample, considerable research has tested the idea that childhood-onset separation anxiety has a unique association with panic disorder in adulthood; both supportive results (e.g., Hayward, Wilson, Lagle, Killen, & Taylor, 2004; Silove et al., 1995) and unsupportive findings (Aschenbrand, Kendall, Webb, Safford, & Flannery-Schroeder, 2003) have been obtained. This controversial issue is discussed further in the section below on panic disorder.

Epidemiology

Twelve-month and lifetime prevalence estimates of childhood SAD range from 1 to 7.6% (Costello et al., 2003; Kessler, Avenevoli, Costello, et al., 2012; Merikangas et al., 2010; Shear et al., 2006). Among clinic-referred samples of anxious children, rates of SAD have ranged from 10 to 33%, perhaps as a function of child age and clinic type (Chavira, Garland, Yeh, McCabe, & Hough, 2009; Last, Francis, et al., 1987; Leyfer et al., 2013). Whereas many of the anxiety disorders discussed in this chapter increase in prevalence over the course of development, given the nature of the condition, SAD decreases in prevalence from childhood through adolescence (Costello et al., 2003).

Developmental Course and Prognosis

SAD is most often diagnosed in prepubertal children (Bowen, Offord, & Boyle, 1990; Kashani & Orvaschel, 1988), with an average age of onset reported at just around age 7 (Lewinsohn, Holm-Denoma, Small, Seeley, & Joiner, 2008), although separation anxiety can occur at any age (Bell-Dolan & Brazeal, 1993; Nielsen et al., 2000). In one study examining the developmental differences in the expression of separation anxiety symptoms, Francis and colleagues (1987) found age differences but not gender differences with regard to which DSM-III criteria were most frequently endorsed. Young prepubertal children (ages 5–8) were most likely to report fears of harm befalling attachment figures, nightmares, or school refusal; children ages 9–12 endorsed excessive distress at the time of separation; and adolescents (ages 13–16) most often endorsed somatic complaints and school refusal. Moreover, younger children endorsed a greater number of symptoms overall relative to adolescents.

In terms of course, research suggests that about 80% of cases of SAD remit within 18 months (Foley, Pickles, Maes, Silberg & Eaves, 2004). Similar results regarding high rates of symptom remission have been found in younger samples as well. For example, Kearney, Sims, Pursell, and Tillotson (2003) found that separation anxiety symptoms present in 3-year-olds were no longer present in about half of the children when they were assessed again 3.5 years later. Although this seems encouraging in terms of prognosis, Foley and colleagues (2004) found that 41% of separation anxiety cases still had some psychiatric disorder 18 months later, which suggests that for two out of five children with separation anxiety, the disorder may simply be replaced by something else rather than by full remission of all disorders.

Three factors were noted in children for whom an SAD diagnosis persisted over time: (1) significantly higher prevalence of ODD; (2) significantly more impairment associated with symptoms of ADHD; and (3) mothers who were less satisfied with their marriages (Foley et al., 2004). This same research has shown that children with persistent SAD are at a significantly increased risk of major depression, relative to those with

transient SAD. Other research has shown that persistent SAD is associated with poor mental health outcomes, with 73.5% of adults who had SAD as adolescents showing some psychiatric diagnosis in young adulthood, most commonly depression (e.g., Lewinsohn et al., 2008). Some cases of separation anxiety persist into adulthood, and these are associated with a high degree of impairment, neuroticism, depression, and poor response to treatment (Silove, Marnane, Wagner, Manicavasagar, & Rees, 2010).

Social Anxiety Disorder (Formerly Social Phobia)

Core Symptoms

The essential feature of social anxiety disorder (hereafter abbreviated as SOC; formerly social phobia in DSM-IV) is a marked and persistent fear of one or more social situations—including social interactions (e.g., having a conversation with another person), being observed by others (e.g., being seen while eating in a cafeteria), and performing before others (e.g., speaking in front of the class)—where the child fears that he or she will behave in a way or show anxiety symptoms that will be negatively evaluated or will offend others (see Table 8.3 for DSM-5 criteria). In children, these fears must exist in peer situations and not just in situations with adults. Exposure to the feared social or performance situation provokes fear or anxiety. In children this fear response may present as crying, having tantrums, clinging, freezing, shrinking, or refusal to speak. Children with SOC may either actively avoid these situations or endure them with marked fear or anxiety. In DSM-IV, individuals with SOC had to recognize that the fear was excessive or unreasonable, but this was not necessary for children due to cognitive-developmental reasons. However, in DSM-5 individuals of all ages do not need to recognize that the fear is excessive or unreasonable; nevertheless, the fear or anxiety must be considered out of proportion to the actual danger posed by the situation and to the sociocultural context, and if another medical condition is present (e.g., disfigurement, obesity), the fear, anxiety, or avoidance is unrelated or is excessive. Symptoms are persistent, last for 6 or more months and cause significant interference in functioning or marked distress.

TABLE 8.3. DSM-5 Diagnostic Criteria for Social Anxiety Disorder (Social Phobia)

A. Marked fear or anxiety about one or more social situations in which the individual is exposed to possible scrutiny by others. Examples include social interactions (e.g., having a conversation, meeting unfamiliar people), being observed (e.g., eating or drinking), and performing in front of others (e.g., giving a speech).

Note: In children, the anxiety must occur in peer settings and not just during interactions with adults.

B. The individual fears that he or she will act in a way or show anxiety symptoms that will be negatively evaluated (i.e., will be humiliating or embarrassing; will lead to rejection or offend others).

C. The social situations almost always provoke fear or anxiety.

Note: In children, the fear or anxiety may be expressed by crying, tantrums, freezing, clinging, shrinking, or failing to speak in social situations.

D. The social situations are avoided or endured with intense fear or anxiety.

E. The fear or anxiety is out of proportion to the actual threat posed by the social situation and to the sociocultural context.

F. The fear, anxiety, or avoidance is persistent, typically lasting for 6 months or more.

G. The fear, anxiety, or avoidance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

H. The fear, anxiety, or avoidance is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication) or another medical condition.

I. The fear, anxiety, or avoidance is not better explained by the symptoms of another mental disorder, such as panic disorder, body dysmorphic disorder, or autism spectrum disorder.

J. If another medical condition (e.g., Parkinson's disease, obesity, disfigurement from burns or injury) is present, the fear, anxiety, or avoidance is clearly unrelated or is excessive.

Specify if:

Performance only: If the fear is restricted to speaking or performing in public.

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Children and adolescents with SOC often fear a number of different situations. In a study of children with SOC, the top most feared social situations identified on the Anxiety Disorders Interview Schedule—Child and Parent Version (ADIS-C/P) included (1) speaking to new or unfamiliar people (64%%), (2) answering questions in class (49%), (3) speaking to adults (47%), (4) oral reports or reading aloud (44%), and (5) musical or athletic performances (44%) (Bernstein, Bernat, Davis & Layne, 2008). In a similar study of adolescents with SOC, the top most feared social situations identified on the ADIS-C/P included (1) oral reports or reading aloud (90.5%), (2) attending dances (90.5%), (3) parties or activity nights (87.3%), (4) asking the teacher a question or asking for help (87.3%), and (5) musical or athletic performances (87.3%) (Beidel et al., 2007). Children with SOC often have fewer friends than children without SOC, have trouble making friends, are reluctant to join group activities, and endorse feelings of loneliness on self-report measures (Beidel, Turner, & Morris, 1999; Beidel et al., 2007; Bernstein et al., 2008; La Greca, 2001).

In feared situations, a child with SOC will experience excessive concerns about embarrassment, negative evaluation, and rejection. Observations and responses of children with SOC reveal their thoughts to be characterized by negative self-focus (Alfano, Beidel, & Turner, 2006; Higa & Daleiden, 2008) and accompanied by a range of autonomic symptoms and sensations (Albano, 1995; Albano, Marten, Holt, Heimberg, & Barlow, 1995). Complaints of stomachaches and illness are common, especially among younger children. Older children and adolescents become overly concerned with the physical manifestations of anxiety, much like adults with SOC. Fears of blushing or shaking during an oral report, unsteady voice while speaking to peers, or sweating that others may notice serve to magnify a child's SOC. Research has demonstrated that the aforementioned physical responses of children with SOC are consistent with those of their adult counterparts (see Beidel & Morris, 1993, 1995). Behaviorally, younger children may manifest excessive clinging and crying, whereas older children are likely to shrink from social contact and avoid being the focus of attention.

Specifiers

DSM-IV included a generalized subtype of social phobia, which was used to indicate whether the social fear included most social situations. Data suggest that the generalized subtype is the most common form of SOC in children and adolescents (Beidel & Morris, 1993; Hofmann et al., 1999), and that individuals with generalized SOC may be distinguished from those with the nongeneralized subtype by way of earlier age of onset, greater impairment in functioning, higher risk for comorbid conditions, a greater likelihood of earlier inhibited temperament, and stronger familial transmission (Beidel & Turner, 2007; Hofmann & Barlow, 2002; Mannuzza et al., 1995). However, in a recent review of the literature, Bögels and colleagues (2010) did not find support for a unique generalized subtype. Instead, they found greater support for a dimensional view of SOC in which severity of the condition is a function of the number of feared situations, and they argued that the use of the generalized specifier is therefore not useful. For instance, in a sample of adolescents with SOC, 92% met criteria for the generalized subtype (Beidel et al., 2007). Bögels and colleagues argue that in fact, more findings support the use of a performance-only subtype than the generalized subtype; hence DSM-5 does not include a generalized subtype, but does include a performance-only specifier to indicate fears that are restricted to speaking or performing in public.

Associated Characteristics

Although some suggest that having a shy temperament may be associated with SOC, recent data from the National Comorbidity Survey Replication—Adolescent Supplement suggest that only 12% of adolescents who self-identify as shy also meet criteria for SOC (Burstein, Ameli-Grillon, & Merikangas, 2011). On the other hand, about 70% of adolescents who meet lifetime criteria for SOC self-identify as shy. Furthermore, those with SOC are more likely to meet criteria for other psychiatric disorders and to demonstrate more impairment than those who are characterized as shy. Thus shyness may be a characteristic on which individuals fall along a continuum, with adolescents meeting criteria for SOC falling at the extreme end of that continuum.

Difficulties with peers constitute a common associated problem for children and adolescents with SOC. Children with SOC receive fewer positive outcomes from their interactions with peers at school, compared with nonanxious matched controls (Spence, Donovan, & Brechman-Toussaint, 1999); are more likely to be nominated by their peers as seeking anxious solitude (Gazelle, Workman, & Allan, 2010); and are less likely to be accepted by their peers and more likely to ex-

perience peer victimization (Erath, Flanagan, & Bierman, 2007; McCabe, Antony, Summerfeldt, Liss, & Swinson, 2003). However, it is unclear whether problems with peers contribute to the development of SOC or whether symptoms of SOC precede peer problems. Some research supports the former; for instance, in the Waterloo longitudinal study, Rubin (1993) found that peer isolation in second grade was correlated with social incompetence, shyness, and unpopularity in fifth grade. More recently, in a 5-year longitudinal study, peer neglect status in the first grade was correlated with social anxiety in the fifth grade (Morris, 2004). On the other hand, in another 5-year longitudinal study, a bidirectional relation between SOC and peer rejection emerged, in which anxious withdrawal contributed to peer rejection and peer rejection contributed to anxious withdrawal (Gazelle & Ladd, 2003).

Either as a result of lack of healthy peer relationships or perhaps as a cause of negative peer relations, or both, children with SOC exhibit poor social skills (Alfano et al., 2006; Beidel et al., 1999, 2007; Ginsburg, La Greca, & Silverman, 1998; Inderbitzen-Nolan, Anderson, & Johnson, 2007; Spence et al., 1999). For example, children with SOC exhibit reduced nonverbal communication (e.g., reduced facial activity; Melfsen, Osterlow, & Florin, 2000), as well as demonstrate impaired perception of social cues (e.g., interpretation of facial expressions) relative to nonanxious controls (Melfsen & Florin, 2002; Simonian, Beidel, Turner, Berkes, & Long, 2001).

Another associated feature of SOC is the experience of self-focused attention (SFA). Cognitive models of SOC in adults propose that the experience of a socially threatening situation elicits or heightens anxious apprehension and induces a shift in focus from external stimuli to detailed monitoring of the self (Clark & Wells, 1995; Hofmann & Barlow, 2002; Rapee & Heimberg, 1997). This self-focus produces increased awareness of feared anxiety responses and interferes with processing the situation and other people's behavior. Several studies have examined SFA, which is defined as "an awareness of self-referent, internally generated information that stands in contrast to an awareness of externally generated information derived through sensory receptors" (Ingram, 1990, p. 156), and negative self-imagery (NSI), which is defined as inaccurate visual impressions of the self (Alfano, Beidel, & Turner, 2008; Clark & Wells, 1995) in younger populations. For instance, Alfano and colleagues (2008) experimentally manipulated NSI in socially anxious and nonanxious adolescents. Socially anxious adolescents reported significantly more anxiety, rated their own performance as poor, and were observed to demonstrate more anxiety and poorer performance than nonanxious adolescents with induced NSI and a control group. Furthermore, in a community sample of children and adolescents, Higa and Daleiden (2008) found that children with elevated social anxiety reported heightened SFA. In a study of physiological arousal, Anderson and Hope (2009) found that although there was no difference between adolescents with SOC and nonanxious adolescents on objective physiological arousal, adolescents with SOC perceived elevated physiological arousal during two anxiety-provoking situations. These authors suggested that socially anxious adolescents had heightened SFA, which led them to be more aware of small increases in physiological arousal compared with nonanxious adolescents, who also demonstrated slight physiological arousal but did not perceive the arousal.

Research also suggests that negative cognitions persist even after a social event has occurred. According to Clark and Wells (1995), individuals with SOC engage in ruminative processes following a social event, in which they review the distressing event and reexperience negative feelings and cognitions. In a recent study of such postevent processing, children ages 8–12 with SOC demonstrated more negative and less positive postevent processing than healthy controls (Schmitz, Kramer, Blechert, & Tuschen-Caffier, 2010). Treatment specifically designed to target such negative cognitive processing appears to effectively increase positive appraisals and decrease state anxiety in socially anxious adolescents (Parr & Cartwright-Hatton, 2009). Thus emerging research suggests that adult cognitive models of SOC may extend to younger populations.

Common Comorbidities

Across studies of clinical samples of children and adolescents with SOC, the most common comorbid diagnosis is generalized anxiety disorder; other common comorbid anxiety disorders are SAD and specific phobia (Beidel et al., 2007; Bernstein et al., 2008; Leyfer et al., 2013). Children with SOC also demonstrate significantly higher levels of depressed mood than normal children (Beidel et al., 1999, 2007; Francis, Last, & Strauss, 1992; La Greca & Lopez, 1998; Leyfer et al., 2013). In fact, SOC in childhood appears to be a risk factor for the development of depression in adolescence and adulthood. In a retrospective study of adults with

comorbid major depressive disorder and SOC, adults reported SOC onset prior to major depression onset; the mean age of onset of SOC was 11.7 years, and that of major depression was 22 years (Dalrymple & Zimmerman, 2011). Furthermore, in prospective and retrospective studies, adults with childhood and adolescent onset of SOC have greater severity and treatment-resistant forms of major depression, compared with those who have adult-onset SOC (Beesdo et al., 2007; Dalrymple & Zimmerman, 2011).

SOC in childhood and adolescence also appears to be a risk factor for the development of substance use disorders. In the Oregon longitudinal study of depression, having a diagnosis of SOC at baseline was associated with greater odds of developing alcohol and cannabis dependence, even after the researchers controlled for gender, depression, and conduct disorder (Buckner et al., 2008). In fact, the relation between SOC and alcohol and cannabis dependence remained even after other anxiety disorders were controlled for, suggesting that SOC serves as a unique risk factor for substance dependence.

Epidemiology

After specific phobia, SOC is the next most common anxiety disorder in community prevalence studies, occurring in 8.2% of adolescents and in 9.1% across the lifespan (Kessler, Avenevoli, Costello, et al., 2012; Merikangas et al., 2010). These findings are similar to findings in samples from other countries. For instance, in a study of Dutch adolescents, the 6-month prevalence rate for SOC was 6.3% (Verhulst, van der Ende, Ferdinand, & Kasius, 1997). Furthermore, rates of SOC (6%) are also similar among children receiving public mental health services (Chavira et al., 2009). Among clinic-referred samples, SOC is the second most common anxiety disorder as well, occurring in 34% of children and adolescents (Leyfer et al., 2013).

Developmental Course and Prognosis

Although the average age of onset for SOC is between 10 and 13 years (e.g., Essau et al., 2000; Strauss & Last, 1993; Wittchen, Stein, & Kessler, 1999), it is not usually diagnosed until late adolescence or early adulthood. Perhaps owing to the nature of this disorder, individuals with SOC take significantly longer to seek help after symptom onset than individuals with other anxiety disorders do (Wagner, Silove, Marnane, & Rouen, 2006), and those with the most social fears tend to be the least likely to seek treatment (Ruscio et al., 2008).

Children and adolescents with SOC are at high risk for developing major depression (Last et al., 1992), with the likelihood increasing over time. Epidemiological studies indicate that SOC in early adolescence is a direct pathway to the development of substance use disorders by middle to late adolescence (Kessler et al., 1994). It is possible that adolescents stumble into the vicious cycle of drinking to ease their social anxiety, allowing them to enter challenging situations, and then form a dependence on use of alcohol to continue their social behavior. SOC (in addition to other anxiety disorders) is also associated with significant impairment in role functioning, delayed or unstable marriage, and an overall poor quality of life (Forthofer, Kessler, Story, & Gotlib, 1996; Kessler, Foster, Saunders, & Stang, 1995; Kessler & Frank, 1997). As compared with their peers without the disorder, girls with SOC are more likely to fail to complete high school and enter college, and both young men and young women with SOC who enter college are more likely to fail to graduate (Kessler et al., 1995). Such truncated educational attainment is associated with a number of adverse life course and societal consequences (see Kessler et al., 1995), including longer dependence on the family of origin, less training for and entering into the work force, and greater demands on health care systems.

Selective Mutism

Core Symptoms

A new development for the DSM-5 is the inclusion of selective mutism (hereafter abbreviated as SM) as an anxiety disorder. In the DSM-IV, SM was classified among the disorders usually first diagnosed in infancy, childhood, or adolescence. SM is characterized by lack of speech in situations where speaking is socially expected (e.g., school, social situations) in children who have little or no trouble speaking in other situations (e.g., with family) (see Table 8.4 for DSM-5 criteria). SM symptoms must be present for at least 1 month and should not be restricted to the first month of school. Furthermore, the inability to speak is not due to a lack of knowledge of the primary language required in the social situation, and it cannot be accounted for by a communication disorder or another developmental disorder; although these can be present, they are not the main reason for the failure to speak.

TABLE 8.4. DSM-5 Diagnostic Criteria for Selective Mutism

A. Consistent failure to speak in specific social situations in which there is an expectation for speaking (e.g., at school) despite speaking in other situations.

B. The disturbance interferes with educational or occupational achievement or with social communication.

C. The duration of the disturbance is at least 1 month (not limited to the first month of school).

D. The failure to speak is not attributable to a lack of knowledge of, or comfort with, the spoken language required in the social situation.

E. The disturbance is not better explained by a communication disorder (e.g., childhood-onset fluency disorder) and does not occur exclusively during the course of autism spectrum disorder, schizophrenia, or another psychotic disorder.

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Associated Characteristics

Similar to children with SOC, children with SM demonstrate lower social competence than their peers. For instance, teachers and parents rate children with SM as lower on verbal and nonverbal social skills than children without SM (Cunningham, McHolm, & Boyle, 2006), and as lower on verbal social skills than children with other anxiety disorders (Carbone et al., 2010). Furthermore, teachers rate children with SM as lower than nonanxious controls on social assertion, self-control, and total social skills, and parents rate children with SM as lower on social responsibility and total social skills than nonanxious controls (Carbone et al., 2010).

Despite the suggestion that SM is a variant of or related to ODD, given the staunch refusal by children with SM to speak even when encouraged by adults, the research does not support this claim. Although some children with SM do exhibit some mild oppositional symptoms (Kristensen, 2001), these behaviors are similar to those exhibited by children with other anxiety disorders when confronted with feared stimuli, and their oppositional behaviors appear to be confined to settings in which they are required to speak (Cunningham, McHolm, Boyle, & Patel, 2004; Cunningham et al., 2006).

Common Comorbidities

Given the high degree of comorbidity between SM and SOC (around 65%; Black & Uhde, 1995; Kristensen, 2000), some researchers propose that SM is a developmentally specific variant of SOC in young children or a developmental precursor to SOC (Bergman, Piacentini, & McCracken, 2002). This is further supported by family history research (Black & Uhde, 1995; Chavira, Shipon-Blum, Hitchcock, Cohan, & Stein, 2007; Cohan, Price, & Stein, 2006; Kristensen & Torgersen, 2002) and by treatment outcome research, which suggests that similar treatments work for both SM and SOC (Cohan, Chavira, & Stein, 2006; Standart & Le Couteur, 2003). In addition to SOC, other common comorbid diagnoses among children with SM include communication and elimination disorders (Cohan et al., 2008; Dummit et al., 1997; Kristensen, 2000; Steinhausen & Juzi, 1996) and ODD (Yeganeh, Beidel, & Turner, 2006).

Epidemiology

SMis a rare condition, with estimates of prevalence ranging between 0.03 and 0.2% in community samples (Bergman et al., 2002; Elizur & Perednik, 2003; Kolvin & Fundudis, 1981; Kopp & Gillberg, 1997; Kumpulainen, Räsänen, Raaska, & Somppi, 1998). Given how rare SM is, few clinic-referred epidemiological studies include SM as a diagnosis in their research, and thus the prevalence among referred populations is unknown. Whereas some research suggests that there may be a higher prevalence of SM in girls than in boys (e.g., Cunningham et al., 2004; Dummit et al., 1997; Kristensen, 2000), other work suggests that it occurs equally in both sexes (e.g., Bergman et al., 2002; Elizur & Perednik, 2003).

Developmental Course and Prognosis

SM is typically first noticed upon school entry (i.e., at about the age of 5), when pressures to speak in social

situations increase (Cunningham et al., 2004; Garcia, Freeman, Francis, Miller, & Leonard, 2004; Giddan, Ross, Sechler, & Becker, 1997), although reports of onset around age 3 exist (e.g., Remschmidt, Poller, Herpertz-Dahlmann, Hennighausen, & Gutenbrunner, 2001). However, despite being first noticed at entry to school, children are typically not referred for assessment and treatment until they are older (between 6 and 9 years of age) (Ford, Sladeczek, Carlson, & Kratochwill, 1998; Kumpulainen et al., 1998; Remschmidt et al., 2001; Standart & Le Couteur, 2003). Research on the course of SM is limited; however, in a study of 24 children seeking treatment for SM, 46% showed moderate to marked improvement, whereas 54% continued to show little to no improvement in the 5–10 years after treatment (Kolvin & Fundudis, 1981). In another study of follow-up data 12 years after referral, Remschmidt and colleagues (2001) reported that 81% of individuals with SM experienced gradual amelioration of symptoms, whereas 19% experienced abrupt relief of symptoms and 19% experienced periods of relapse. Notably, among those children who show improvement in SM symptoms, the majority do so by age 10, suggesting that those who fail to show improvements by middle childhood experience a more persistent form of the disorder (Kolvin & Fundudis, 1981). Moreover, even though children may experience reductions or complete absence of SM symptoms, research suggests that they still continue to experience difficulty in social situations (Kolvin & Fundudis, 1981; Remschmidt et al., 2001).

Panic Disorder and Agoraphobia

Core Symptoms

In DSM-IV, panic disorder and agoraphobia were linked together: A diagnosis of panic disorder was made with or without agoraphobia, and agoraphobia alone had to be noted as such (agoraphobia without history of panic disorder). Notably, in DSM-5 panic disorder and agoraphobia are now unlinked, each with separate diagnostic criteria. This change was made because research suggests that a number of adolescents and adults experience agoraphobia without panic symptoms (Wittchen et al., 2008). Despite this finding, however, the available research with children and adolescents to date has primarily examined the two conditions together, and hence we discuss them together in this section.

The core defining symptom of panic disorder is the presence of panic attacks. A panic attack is a discrete period of intense fear, physical discomfort, or both that culminates within a matter of minutes and is associated with at least 4 of a list of 13 potential symptoms, including such things as pounding heart, sweating, trembling, and shortness of breath. A panic attack is not a formal DSM diagnosis and can be experienced by individuals who do not meet diagnostic criteria for panic disorder. A diagnosis of panic disorder is defined by the occurrence of recurrent unexpected panic attacks in which at least one attack was followed by a month of either of the following: persisting worry or concern about experiencing future attacks or their consequences, or a marked maladaptive change in behavior related to the attacks (see Table 8.5). In addition, the panic attacks cannot result from the direct physical effects of a substance, such as medications or caffeine, or from another medical condition (e.g., hyperthyroidism). Throughout this section, the term "panic attack" is used to refer to discrete and intense periods of fear or discomfort that might or might not occur within the context of panic disorder, whereas the term "panic disorder" is used to refer the presence of the full constellation of symptoms as outlined in Table 8.5.

Symptoms associated with panic attacks most commonly reported by children and adolescents in both clinical and community samples include palpitations, trembling or shaking, dizziness, shortness of breath, faintness, sweating, and chest pain (Diler et al., 2004; Doerfler, Connor, Volungis, & Toscano, 2007; King, Ollendick, Mattis, Yang, & Tonge, 1996; Last & Strauss, 1989; Warren & Zgourides, 1988). Although somatic symptoms are more frequently reported than cognitive symptoms, a considerable proportion of children endorse symptoms such as fears of dying or "going crazy" (Doerfler et al., 2007; King et al., 1996). Moreover, there appears to be continuity between the presentation of panic symptoms in childhood and adulthood, without evidence to suggest that different diagnostic criteria are warranted for these age groups (Biederman et al., 1997; Craske et al., 2010). Those differences that have been observed in the experience of panic symptoms among adolescents and adults have suggested that adolescents worry less than adults do about subsequent attacks and their implications, report a lower likelihood of changing their behavior in response to the attacks, and are more reticent about feelings associated with the panic attacks (Craske et al., 2010; Wittchen, Reed, & Kessler, 1998).

TABLE 8.5. DSM-5 Diagnostic Criteria for Panic Disorder

A. Recurrent unexpected panic attacks. A panic attack is an abrupt surge of intense fear or intense discomfort that reaches a peak within minutes, and during which time four (or more) of the following symptoms occur:
Note: The abrupt surge can occur from a calm state or an anxious state.

1. Palpitations, pounding heart, or accelerated heart rate.
2. Sweating.
3. Trembling or shaking.
4. Sensations of shortness of breath or smothering.
5. Feelings of choking.
6. Chest pain or discomfort.
7. Nausea or abdominal distress.
8. Feeling dizzy, unsteady, light-headed, or faint.
9. Chills or heat sensations.
10. Paresthesias (numbness or tingling sensations).
11. Derealization (feelings of unreality) or depersonalization (being detached from oneself).
12. Fear of losing control or "going crazy."
13. Fear of dying.

Note: Culture-specific symptoms (e.g., tinnitus, neck soreness, headache, uncontrollable screaming or crying) may be seen. Such symptoms should not count as one of the four required symptoms.

B. At least one of the attacks has been followed by 1 month (or more) of one or both of the following:

1. Persistent concern or worry about additional panic attacks or their consequences (e.g., losing control, having a heart attack, "going crazy").
2. A significant maladaptive change in behavior related to the attacks (e.g., behaviors designed to avoid having panic attacks, such as avoidance of exercise or unfamiliar situations).

C. The disturbance is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication) or another medical condition (e.g., hyperthyroidism, cardiopulmonary disorders).

D. The disturbance is not better explained by another mental disorder (e.g., the panic attacks do not occur only in response to feared social situations, as in social anxiety disorder; in response to circumscribed phobic objects or situations, as in specific phobia; in response to obsessions, as in obsessive–compulsive disorder; in response to reminders of traumatic events, as in posttraumatic stress disorder; or in response to separation from attachment figures, as in separation anxiety disorder).

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Related Symptoms

In addition to experiencing panic symptoms, children and adolescents with panic disorder may display concomitant agoraphobia, defined as the fear of being in situations from which escape may be difficult or embarrassing, or in which help is not readily available in the event of a panic attack (Kearney, Albano, Eisen, Allan, & Barlow, 1997; Masi, Favilla, Mucci, & Millepiedi, 2000). In one study (Kearney et al., 1997), situations reported as most often avoided by adolescents with panic disorder included restaurants/school cafeterias, crowds, small rooms, auditoriums, elevators, parks, grocery stores, shopping malls, being home alone, and movie theaters. Two of the most commonly endorsed symptoms of adolescents diagnosed with agoraphobia, both independently and in the presence of panic disorder, are enduring situations with intense anxiety when avoidance is not possible and needing a companion when away from home (Biederman et al., 1997; Doerfler et al., 2007). A child with panic disorder may also avoid school situations such as riding the bus or attending gym class, or may present with an outright refusal to attend school. In some cases, a parent or close friend becomes the child's "safety person," and activities are endured in the presence of this person. To ensure attendance, a parent may attempt to accompany the child during the school day. Although this behavior resembles SAD, the differential diagnosis

must be made according to the focus of the child's fear. In panic disorder, the fear is of the panic attack itself or the physical sensations accompanying the attack, and is not triggered by the fear of becoming lost or separated from a caregiver or loved one.

In a large normative sample ($N = 3,021$) ages 14–24 at the baseline assessment and followed longitudinally for 10 years, Wittchen and colleagues (2008) observed that agoraphobia, although often considered a related feature of panic, is a discrete disorder that can be conceptualized independently of both panic attacks and panic disorder. Specifically, in this sample, agoraphobia evidenced sex and age differences with respect to incidence and onset that were distinct from those observed with panic attacks and panic disorder. The progression and stability of agoraphobia was also different from that of panic disorder, and panic attacks were not reliably identified as a precursor to the onset of agoraphobia. These findings are consistent with the recent changes in DSM-5, suggesting that rather than an outcome of panic disorder, agoraphobia is an anxiety disorder in its own right; this builds on previous findings of agoraphobia in the absence of panic disorder in adolescents (e.g., Biederman et al., 1997; see Table 8.6 for DSM-5 criteria for agoraphobia). Although rates of agoraphobia as high as 15% have been cited in clinical samples (Biederman et al., 1997), Wittchen and colleagues (2008) reported an incidence of 0.6% for agoraphobia with no history of panic in their normative sample when employing strict DSM-IV hierarchical rules for diagnosis, and an estimated incidence of 5.3% when attending only to the endorsement of marked fear in one or more situations and disregarding whether or not there was a concurrent presence of "panic-like" symptoms. Most recently, as reported in the National Comorbidity Survey Replication—Adolescent Supple-

TABLE 8.6. DSM-5 Diagnostic Criteria for Agoraphobia

A. Marked fear or anxiety about two (or more) of the following five situations:
   1. Using public transportation (e.g., automobiles, buses, trains, ships, planes).
   2. Being in open spaces (e.g., parking lots, marketplaces, bridges).
   3. Being in enclosed places (e.g., shops, theaters, cinemas).
   4. Standing in line or being in a crowd.
   5. Being outside of the home alone.

B. The individual fears of avoids these situations because of thoughts that escape might be difficult or help might not be available in the event of developing panic-like symptoms or other incapacitating or embarrassing symptoms (e.g., fear of falling in the elderly; fear of incontinence).

C. The agoraphobic situations almost always provoke fear or anxiety.

D. The agoraphobic situations are actively avoided, require the presence of a companion, or are endured with intense fear or anxiety.

E. The fear or anxiety is out of proportion to the actual danger posed by the agoraphobic situations and to the sociocultural context.

F. The fear, anxiety, or avoidance is persistent, typically lasting for 6 months or more.

G. The fear, anxiety, or avoidance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning.

H. If another medical condition (e.g., inflammatory bowel disease, Parkinson's disease) is present, the fear, anxiety, or avoidance is clearly excessive.

I. The fear, anxiety, or avoidance is not better explained by the symptoms of another mental disorder—for example, the symptoms are not confined to specific phobia, situational type; do not involve only social situations (as in social anxiety disorder); and are not related exclusively to obsessions (as in obsessive–compulsive disorder), perceived defects or flaws in physical appearance (as in body dysmorphic disorder), reminders of traumatic events (as in posttraumatic stress disorder), or fear of separation (as in separation anxiety disorder).

Note: Agoraphobia is diagnosed irrespective of the presence of panic disorder. If an individual's presentation meets criteria for panic disorder and agoraphobia, both diagnoses should be assigned.

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ment, the 12-month prevalence rate for agoraphobia among a community sample of adolescents ages 13–17 years was 1.8% (Kessler, Avenevoli, Costello, et al., 2012); the lifetime prevalence of agoraphobia in this same sample was 2.4% (Merikangas et al., 2010). One possible reason for the disparity in terms of prevalence estimates and the general lack of current data pertaining to agoraphobia in the absence of panic disorder is that those with agoraphobia only have been found to be least likely to seek clinical attention for their symptoms (Wittchen et al., 2008). Evidence has also suggested that agoraphobia in the absence of panic disorder does not tend to aggregate in families, but might potentially contribute to the familial transmission of panic disorder (Nocon et al., 2008).

Associated Characteristics

Both panic attacks and panic disorder have been associated with increased risk of suicidal ideation and suicide attempts (Goodwin & Roy-Byrne, 2006). However, it has been suggested that major depression, commonly comorbid with panic disorder, might interact with panic symptoms and suicide attempts in multiple ways. For example, the co-occurrence of panic disorder and depression could result in subsequent suicide attempts; conversely, the co-occurrence of panic disorder and suicide attempts could indicate an especially severe case of depression; finally, depression might result from panic disorder, with suicide attempts indicating particularly severe cases of comorbid anxiety and depression (Goodwin & Roy-Byrne, 2006). Given the higher prevalence of suicide attempts observed in cases of comorbid panic and depression (25%) than in cases of depression (16%) or panic disorder (5.2%) alone, it seems that the association between panic and suicide attempts is best explained by the co-occurrence of depression with panic disorder (Roy-Byrne et al., 2000). More recent findings are consistent with the general hypothesis that depression may be a mediator between anxiety disorders and suicidal ideation (Greene, Chorpita, & Austin, 2009).

Respiratory illnesses also appear to be commonly associated with panic disorder. In a longitudinal study conducted with a community sample, being female, having respiratory illnesses at age 15, or having parents who had experiences with respiratory illnesses at age 18 were factors associated with increased risk of developing subsequent panic disorder with agoraphobia (Craske, Poulton, Tsao, & Plotkin, 2001). For boys, high levels of emotional reactivity, a personal history of asthma, or a greater incidence of colds and ear infections by age 3 were associated with an increased risk of later panic disorder with agoraphobia. Findings from this study suggested that experiences with respiratory illness during childhood positively differentiated individuals with and without panic disorder with agoraphobia by ages 18 and 21 from nondisordered controls (Craske et al., 2001).

Common Comorbidities

Panic disorder is frequently comorbid with other anxiety disorders (Biederman et al., 1997), as well as with depressive disorders (Bittner et al., 2004). In a longitudinal community-based study, the presence of panic disorder was associated with a greater likelihood of having at least one other DSM diagnosis (89.4% vs. 52.8%), any anxiety disorder (54.6% vs. 25.0%), any mood disorder (42.7% vs. 15.5%), and any substance disorder (60.4% vs. 27.5%) (Goodwin et al., 2004). Indeed, even the presence of panic attacks alone has been found to function as a nonspecific "risk marker" for psychopathology and comorbidity (Goodwin et al., 2004; Reed & Wittchen, 1998). Among clinical samples, significant rates of comorbid major depression (50%; Diler et al., 2004), separation anxiety (89%), and generalized anxiety (86%) have been reported (Doerfler et al., 2007). In addition to anxiety and depression, panic disorder has also been found to be comorbid with mania/hypomania, ADHD, and ODD (Doerfler et al., 2007).

The relation between SAD and panic disorder has been perhaps more closely studied than the comorbidity of panic with other diagnoses because researchers have sought to address whether separation experiences during childhood might contribute to the later development of panic (e.g., Gittelman & Klein, 1985; Mattis & Ollendick, 1997) or whether SAD might be a childhood expression of adult panic disorder. In a longitudinal study of children of parents both with and without major depression and panic disorder, Biederman and colleagues (2007) reported that SAD at baseline was the best predictor of panic disorder 5 years later. Moreover, childhood SAD has also been found to be the best predictor of childhood-onset panic disorder as reported retrospectively by adults (Biederman et al., 2005). However, although a range of studies provide support for a link between childhood SAD and the subsequent development of panic disorder, separation anxiety also

predicts other subsequent psychopathology, suggesting that it may be a nonspecific marker of later anxiety and depression rather than a specific risk factor for panic (Biederman et al., 2007; Craske et al., 2010). Children diagnosed with both disorders exhibit significantly greater levels of impairment, evidence more severe psychopathology, and have a higher rate of comorbidity than those diagnosed with SAD alone (Doerfler, Toscano, & Connor, 2008).

Epidemiology

The prevalence of panic disorder is lower among children and adolescents than other anxiety disorders (Hayward & Sanborn, 2002) with prevalence rates typically increasing during adolescence, particularly in girls (Wittchen et al., 2008). In clinical samples, prevalence rates for panic disorder have ranged from 2% (Diler et al., 2004) to 13% (Doerfler et al., 2007), whereas rates ranging from 1.6% (Reed & Wittchen, 1998) to 8.7% (Hayward et al., 2004) have been reported in community samples. Most recently, as reported in the National Comorbidity Survey Replication—Adolescent Supplement, the 12-month prevalence rate for panic disorder (with or without agoraphobia) among a community sample of adolescents ages 13–17 years was 1.9% (Kessler, Avenevoli, Costello, et al., 2012); the lifetime prevalence of panic disorder in this same sample was 2.3% (Merikangas et al., 2010). Conversely, much higher rates of panic attacks have been reported among nonreferred adolescents (e.g., Hayward et al., 2004; Wittchen et al., 2008), suggesting that as many as 16% of adolescents may have experienced a panic attack as defined by DSM (King et al., 1997).

Consistent with the pattern for adults with panic disorder, rates appear to be twice as high among adolescent girls as boys (King et al., 1997; Last & Strauss, 1989; Ollendick, Mattis, & King, 1994; Reed & Wittchen, 1998). In a longitudinal community-based study, Wittchen and colleagues (2008) noted an absence of gender differences prior to the age of 15 with respect to the rates of panic attacks observed; concerning panic disorder, although small gender differences are evident prior to age 14, differential rates of the disorder between boys and girls increased markedly between the ages of 14 and 25. Moreover, between the ages of 13 and 26 an increase in the incidence of new cases of panic disorder in girls was observed, whereas the increase of new cases among boys was less pronounced (Wittchen et al., 2008).

Developmental Course and Prognosis

At one time, panic disorder was considered an anxiety disorder of adulthood that did not occur in children and only rarely occurred in adolescents (see Kearney & Silverman, 1992; Moreau & Weissman, 1992; Nelles & Barlow, 1988). Children were thought to be incapable of forming catastrophic misinterpretations of bodily sensations—cognitions that are central to the disorder. However, over time findings have emerged supporting the existence of panic attacks and panic disorder in children and adolescents (e.g., Abelson & Alessi, 1992; Black & Robbins, 1990; Biederman et al., 1997; Doerfler et al., 2007; Hayward, Killen, Kraemer, & Taylor, 2000; Kearney, Albano, Eisen, Allan, & Barlow, 1997; Last & Strauss, 1989; Moreau & Follett, 1993; Moreau & Weissman, 1992; Ollendick, 1995; Ollendick et al., 1994). Historically, although studies have indicated the presence of panic disorder in children under the age of 13 (e.g., Biederman et al., 1997; Kearney et al., 1997), adolescents constituted the majority of these samples (e.g., Last & Strauss, 1989).

In their review of the literature specific to panic attacks and panic disorder in children, Moreau and Follett (1993) cited studies in which the onset of panic attacks occurred in children as young as between the ages of 1 and 5, but they noted that the highest rate of the onset of panic disorder appeared to be between the ages of 15 and 19. These authors also cited six case reports of panic disorder in a combined sample of 22 children, 12 of whom were under the age of 10 when symptoms of panic were first reported, as well as three studies of clinically referred children and adolescents in which 7 children and 27 adolescents were diagnosed with panic disorder (Moreau & Follett, 1993). Ollendick and colleagues (1994) similarly suggested that whereas panic attacks are common among adolescents, with 40–60% of adolescents surveyed reporting having experienced a panic attack, they are present but less frequently observed in children. Interestingly, Hayward and colleagues (1992) reported that among 754 children ages 10.3–15.6 years, the increased occurrence of panic attacks observed was associated with pubertal progression as assessed through the Tanner self-staging method, which is a means of determining an individual's level of pubertal development. Specifically, participants in this study were presented with standardized written and pictorial descriptions of five stages of physical development during puberty, and were asked to indicate which stage best depicted their pubertal

development. Overall, panic attacks were more commonly reported by girls evidencing advanced pubertal development, regardless of age (Hayward et al., 1992).

More recent studies have also documented the presence of panic disorder in children, but with similarly small numbers. Diler and colleagues (2004) observed that among 42 children diagnosed with panic disorder, 88% were age 13 or over. Biederman and colleagues (2007) similarly reported that six children in their sample experienced panic disorder with an onset prior to age 13. Two additional studies reported mean ages of onset of panic disorder during childhood (5.1 years [Biederman et al., 2005] and 11.4 years [Doerfler et al., 2008]); however, the first study was of a sample whose family members were diagnosed with panic disorder or agoraphobia, and the second was of a clinic-referred sample whose referrals were typically under the age of 10. Together these findings converge to suggest that cases of childhood panic disorder are few in number, in the context of a diagnosis that has a very low prevalence rate relative to the other anxiety disorders in this age group (Diler et al., 2004; Hayward & Sanborn, 2002; Reed & Wittchen, 1998; Wittchen et al., 1998, 2008).

The course for childhood panic disorder is typically chronic, and continuity has been found between child and adult presentations of this disorder (Biederman et al., 1997). In a community-based study employing retrospective and longitudinal prospective data collected at two time points 19.7 months apart from adolescents who were ages 14–17 at baseline, panic disorder was found to be one of the most stable anxiety disorders, even when both threshold and subthreshold diagnoses at the baseline and follow-up assessments were taken into account (Wittchen, Lieb, Pfister, & Schuster, 2000). Moreover, panic disorder was associated with one of the lowest complete remission rates (50%) (Wittchen et al., 2000), suggesting a particularly chronic and unremitting course for this disorder in the absence of intervention. In data taken from the original National Comorbidity Survey, Goodwin and Hamilton (2002) observed that individuals who had panic disorder with an early onset (at or prior to age 20) accompanied by fear (defined as feeling afraid of subsequent attacks after the first panic attack) had significantly earlier onsets of a range of comorbid disorders, had families with higher rates of psychological disorders, and had an increased risk for and lethality of suicide attempts relative to those whose panic attacks did not fit these criteria. Similarly, examination of data from the Harvard–Brown Anxiety Research Project, a prospective 15-year longitudinal study of anxiety disorders, revealed that adults with an early age of onset (less than 20 years) of panic disorder were more likely to have comorbid major depressive disorder, generalized anxiety disorder, and social phobia at baseline; and that adults with early-onset panic disorder with agoraphobia were more likely than those with late onset of these disorders to experience recurrence of symptoms after a period of remission (Ramsawh, Weisberg, Dyck, Stout & Keller, 2011). Interestingly, none of the other anxiety disorders in this study evidenced differences between early and late onset, suggesting that early-onset panic disorder represents a particularly serious condition.

Generalized Anxiety Disorder

Core Symptoms

The hallmark feature of generalized anxiety disorder (hereafter abbreviated as GAD) is extreme, uncontrollable worry about several events and activities, occurring more days than not, for at least 6 months (see Table 8.7). Unrealistic and excessive worrying about future events was present in over 95% of a clinic sample of children with overanxious disorder of childhood and adolescence (OAD) (Strauss, Lease, Last, & Francis, 1988).[2] The uncontrollable worry characteristic of GAD may be focused on a number of general life concerns, including the future, past behavior, and competence in areas such as sports, academics, and peer relationships. The most frequently reported worries of a clinical sample of children with GAD included tests/grades, natural disasters, being physically attacked, future school performance, and being bullied or scapegoated by peers (Weems, Silverman, & La Greca, 2000). It is not uncommon for children with GAD to worry about a number of adult concerns as well, such as the family finances (Bell-Dolan & Brazeal, 1993). Children with GAD may experience worry concerning performance in school, athletics, social relationships, and so on, often to the point of being perfectionistic (Bell-Dolan & Brazeal, 1993; Strauss, 1990). Consequently, these children impose exceedingly high standards for achievement on themselves and are excessively self-critical if they fail to meet these standards.

Several studies have sought to discover what distinguishes normative from clinical worry in children and adolescents. For example, research has demonstrated that although nonreferred children also worry about

TABLE 8.7. DSM-5 Diagnostic Criteria for Generalized Anxiety Disorder

A. Excessive anxiety and worry (apprehensive expectation), occurring more days than not for at least 6 months, about a number of events or activities (such as work or school performance).
B. The individual finds it difficult to control the worry.
C. The anxiety and worry are associated with three (or more) of the following six symptoms (with at least some symptoms having been present for more days than not for the past 6 months):

   Note: Only one item is required in children.

   1. Restlessn or feeling keyed up or on edge.
   2. Being easily fatigued.
   3. Difficulty concentrating or mind going blank.
   4. Irritability.
   5. Muscle tension.
   6. Sleep disturbance (difficulty falling or staying asleep, or restless, unsatisfying sleep).

D. The anxiety, worry, or physical symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.
E. The disturbance is not attributable to the physiological effects of a substance (e.g., a drug of abuse, a medication) or another medical condition (e.g., hyperthyroidism).
F. The disturbance is not better explained by another mental disorder (e.g., anxiety or worry about having panic attacks in panic disorder, negative evaluation in social anxiety disorder [social phobia], contamination or other obsessions in obsessive–compulsive disorder, separation from attachment figures in separation anxiety disorder, reminders of traumatic events in posttraumatic stress disorder, gaining weight in anorexia nervosa, physical complaints in somatic symptom disorder, perceived appearance flaws in body dysmorphic disorder, having a serious illness in illness anxiety disorder, or the content of delusional beliefs in schizophrenia or delusional disorder).

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low-frequency events (e.g., being robbed, stabbed, shot at) (Silverman, La Greca, & Wasserstein, 1995), children with GAD may not recognize that such events have a low probability of occurrence. Other research has found that the self-reported intensity of worry, as opposed to the number of worries, differentiated clinic-referred children from nonclinical controls (Muris, Meesters, Merckelbach, Sermon, & Zwakhalen, 1998; Perrin & Last, 1997; Weems et al., 2000). Furthermore, intensity of worry is most predictive of clinician ratings of impairment for children with GAD (Layne, Bernat, Victor, & Bernstein, 2009). In fact, these studies demonstrated that nonreferred children report just as many worries as clinical samples, suggesting that the intensity of worry may be the mechanism leading to a sense of uncontrollability over the worry process (Weems et al., 2000).

Early cognitive theories conceptualized worry as an avoidant coping strategy in response to perceived future threats (Borkovec, 1994; Borkovec, Alcaine, & Behar, 2004). According to these theories, worry is a cognitive approach to identifying ways to prepare for the worst or to stop bad things from happening. Furthermore, avoidance models of worry suggest that worry as a coping strategy is negatively reinforced by the reduction of somatic responses and emotional processing of negative events, and that this reduction maintains future worry. However, a growing body of research suggests that worry actually causes physiological activation (for a thorough review, see Newman & Llera, 2011), thus calling into question the avoidance theory of worry. Newman and Llera (2011) have proposed a revised "contrast avoidance" model of worry to account for these discrepant findings. They suggest that those with GAD employ worry as a strategy to avoid a negative contrast. In other words, individuals with GAD prefer to feel chronically distressed, instead of experiencing a shift from a positive state to a negative state or from a moderately negative state to an extremely negative state (e.g., "If I expect the worst, I won't be disappointed"; Borkovec & Roemer, 1995). Newman and Llera argue that worry in their model is not reinforced by reduction in somatic responses, but rather by relief when the negative event does not occur. Research is needed to examine whether these cognitive models of worry apply to children.

In addition to emphasizing excessive and uncontrollable worry, DSM-5 outlines six specific somatic symptoms, of which one is required to make the diagnosis in children and adolescents (i.e., restlessness, fatigue, trouble concentrating, irritability, tensed muscles, and/or disturbed sleep; see Table 8.7). Similar to adults with GAD, many children with GAD are referred for treatment by their pediatricians or by gastrointestinal specialists because of significant somatic complaints (Bell-Dolan & Brazeal, 1993). In one study of children with GAD, the most common symptoms associated with worry included restlessness, difficulty concentrating, and sleep disturbance (Layne et al., 2009); another study found that children with a primary diagnosis of GAD experienced greater sleep disturbances than children with other primary anxiety disorder diagnoses (Alfano, Pina, Zerr, & Villalta, 2010). Some research has suggested that other symptoms, such as headaches, stomachaches, muscle tension, sweating, and trembling, are commonly reported among children with GAD (Eisen & Engler, 1995); however, Tracey, Chorpita, Douban, and Barlow (1997) found the muscle tension symptom to be infrequently endorsed by both children and their parents in a clinical sample evaluated with DSM-IV criteria. Similarly, Comer, Pincus, and Hofmann (2012) found in a large sample of 650 anxious children that muscle tension showed the lowest sensitivity across DSM-IV associated symptoms and had the lowest prevalence among children with GAD. On the other hand, irritability and restlessness demonstrated favorable diagnostic value in this study. Furthermore, Comer and colleagues found that in their sample, fatigue, difficulty concentrating, and sleep disturbances (which some argue overlap with symptoms of depression) continued to be related to a diagnosis of GAD even after depression was controlled for.

To explore further the distinction between somatic and worry symptoms of GAD, Higa-McMillan, Smith, Chorpita, and Hayashi (2008) examined symptoms reported on the ADIS-C/P in a clinically referred sample of 289 children and adolescents. Confirmatory factor analysis supported a two-factor model of GAD, in which worry symptoms clustered together on a separate factor from somatic symptoms. Higa-McMillan and colleagues also found that the GAD somatic factor was almost as strongly related to social phobia and major depressive disorder factors as it was to the GAD worry factor; this finding complements work by Tracey and colleagues (1997), who found that the negative predictive power of the somatic criterion for a diagnosis of GAD was low because children with other anxiety disorders also endorsed somatic symptoms. Lending further support to the idea that somatic complaints are not especially good indicators of GAD, Kendall and Pimentel (2003) found that parents consistently reported more somatic symptoms in their offspring than the children reported in themselves, and Tracey and colleagues and Kendall and Pimentel also found that adolescents reported more somatic symptoms than children. Thus it appears that somatic symptoms may not play as significant a role as worry in the phenomenology of GAD in young children as they do in adolescents and adults; this may be due to developmental differences, since younger children are still learning to become aware of somatic experiences and to link these to feelings of anxiety and worry. Nevertheless, the disparity in findings between this work and that of Comer and colleagues (2012) described above suggests the need for further research.

Associated Characteristics

Children and adolescents with GAD experience a number of associated symptoms and characteristics. For instance, in a clinical sample of 157 referred children and adolescents with GAD, feelings of tension, apprehensive expectation, negative self-image, need for reassurance, and irritability were among the most common associated symptoms, occurring in more than 75% of the sample (Masi et al., 2004). Children and teens with GAD also lack perceived control over their environment, and this relation exists even after adjustment for general negative affect (Frala, Leen-Feldner, Blumenthal, & Barreto, 2010).

A growing body of research suggests that intolerance of uncertainty (abbreviated in this discussion as IU) is a cognitive vulnerability factor of worry and GAD in adults (e.g., Dugas, Buhr, & Ladouceur, 2004), and recent work suggests that IU may play a role in GAD among children (Comer et al., 2009; Fialko, Bolton, & Perrin, 2012). IU is described as the tendency to hold a negative set of beliefs about uncertain events and their consequences or the inability to tolerate ambiguity (Koerner & Dugas, 2008). IU is considered a cognitive disposition that may confer risk for GAD because it is a higher-order vulnerability factor that predisposes individuals toward other cognitive processes involved in the maintenance of worry in adults. These processes include thought suppression and distraction strategies (i.e., cognitive avoidance [CA]); viewing events as

threats that will be difficult to cope with (i.e., negative problem orientation); and beliefs that worrying can help to solve problems and prevent feared outcomes (i.e., positive beliefs about worry [PB]) (Borkovec, 1994; Dugas, Gagnon, Ladouceur, & Freeston, 1998). Fialko and colleagues (2012) recently tested Dugas and colleagues' (1998) model of IU, examining whether worry frequency mediated the hypothesized relation between cognitive processes (IU, PB, and CA) and anxiety in a sample of 515 children and adolescents. They found that among adolescents ages 13–19, Dugas and colleagues' model fit relatively well, with IU acting as a higher-order vulnerability factor for both CA and PB. They also found support for a direct path between IU and anxiety, as well as between CA and anxiety. They concluded that IU and CA are significant risk factors not only for worries but also for anxiety. Furthermore, in children ages 7–12, they found that IU had indirect paths to anxiety via CA and worry, as well as a direct path to anxiety similar to the adolescent sample. However, they did not find support for PB in the child sample, suggesting that PB may develop over time. Taken together, it appears that IU and CA play a significant role in worries and potentially GAD in children and adolescents, just as they do in adults. In fact, functional magnetic resonance imaging research has demonstrated that IU is positively correlated with activity in frontal and limbic regions during uncertainty tasks in adolescents, further implicating this trait in the development and maintenance of GAD (Krain et al., 2008).

Common Comorbidities

Among the anxiety disorders, GAD is one of the most frequently comorbid (e.g., Masi et al., 2004). For instance, in a clinic-referred sample at a specialty clinic for anxiety and related concerns, GAD was not only the most common diagnosis (37%), but also one of the most common comorbid diagnoses (15.6%; the rate for SOC was 15.8%) (Leyfer et al., 2013). In addition, children and adolescents with GAD are often comorbid for a number of other psychiatric disorders. In the Leyfer and colleagues (2013) study of clinic-referred children, 71% of children with GAD had a comorbid diagnosis; SOC was the most common comorbid diagnosis (33.1%), followed by specific phobia (16.9%), SAD (15.4%), and depression (12.3%). However, patterns of comorbidity seem to change somewhat by sample, perhaps reflecting referral patterns. For instance, in the Masi and colleagues (2004) sample of 157 clinically referred children and adolescents with GAD, depression was the most common comorbid psychiatric diagnosis, occurring in 56% of their sample. Other comorbid conditions included specific phobia (42%), SAD (31.8%), social phobia (28%), externalizing disorder (21%), obsessive–compulsive disorder (19.7%), panic disorder (16.6%), and bipolar disorder (11%). In this sample, children with GAD were more likely than adolescents to have a comorbid diagnosis of SAD, and boys with GAD were more likely than girls to have a comorbid externalizing disorder (Masi et al., 2004).

Masi and colleagues' (2004) finding that depression is the most common comorbid diagnosis among children and adolescents with GAD is consistent with other research, which suggests that GAD may have a stronger relation to unipolar depression than it does to the other anxiety disorders. For instance, in the Higa-McMillan and colleagues (2008) study, GAD evidenced a stronger relation to depression than it did to social phobia. This finding is consistent with a substantial body of evidence in adults (e.g., Brown, Chorpita, & Barlow, 1998; Moffitt et al., 2007) as well as a study by Lahey and colleagues (2008), which also demonstrated that GAD is structurally more closely linked to the depressive disorders than to other anxiety disorders. Furthermore, epidemiological research suggests that adolescent GAD predicts depression in young adulthood (Copeland, Shanahan, Costello, & Angold, 2009).

Epidemiology

Although GAD is not uncommon in children and adolescents, with rates in community samples ranging from 0.16 to 10.8% (Cartwright-Hatton, McNicol, & Doubleday, 2006), it was the least common anxiety disorder among teens ages 13–18 reported in the National Comorbidity Study Replication—Adolescent Supplement, with 12-month prevalence rates of 1.1% and lifetime rates of 2.2% (Kessler, Avenevoli, Costello, et al., 2012; Merikangas et al., 2010). When OAD was removed from DSM-IV and replaced with GAD, community prevalence rates dropped, suggesting that some children who would have received a diagnosis of OAD in the past remain undiagnosed with GAD criteria (Beesdo, Knappe, & Pine, 2009). Nevertheless, in a recent study, GAD was the most common anxiety disorder diagnosis (37.1%) among children referred to a specialty anxiety clinic (Leyfer et al., 2013).

Developmental Course and Prognosis

Given that OAD was a diagnosis specific to childhood in DSM-III and DSM-III-R, as well as the fact that it was removed as a diagnosis from DSM-IV, research on the developmental course and prognosis for OAD and GAD in childhood are somewhat conflicting, despite some research suggesting a high degree of overlap between the two conditions (e.g., Kendall & Warman, 1996; Tracey et al., 1997). For instance, studies examining DSM-III and DSM-III-R diagnoses suggested that OAD may begin as early as age 4 years (Beitchman, Wekerle, & Hood, 1987), with the reported mean age of onset ranging from 8.8 years (Last et al., 1992) to 13.4 years (Last, Hersen, et al., 1987). On the other hand, research on GAD suggests that onset is much later—in the late teens and early 20s (Wittchen, Zhao, Kessler, & Eaton, 1994). Moreover, whereas research on OAD has found that older children present with a higher total number of overanxious symptoms and self-report significantly higher levels of anxiety and depression than younger children (Strauss et al., 1988), research on GAD suggests that there are no differences in the number or type of symptoms reported by children and adolescents with GAD (Masi et al., 2004).

Research on symptoms of GAD in community samples has also produced mixed findings on the developmental course of GAD symptoms. For instance, in one study symptoms of other anxiety disorders decreased or stabilized over the course of development, while symptoms of GAD increased among girls with age (Hale, Raaijmakers, Muris, van Hoof, & Meeus, 2008). In contrast, in another study GAD symptoms decreased between late childhood and early adolescence, followed by a slight increase in middle adolescence onward (van Oort, Greaves-Lord, Verhulst, Ormel, & Huizink, 2009). van Oort and colleagues (2009) attributed these mixed findings to the different methodologies and measures used by the two studies, and argued for additional research to sort out these differences.

SITUATIONAL AND CONTEXTUAL FACTORS

Race and Ethnicity

There is some research examining whether there are racial and ethnic differences in the presentation of anxiety symptoms among children and adolescents. In the majority of studies, the groups most commonly contrasted are European Americans, African Americans, and Hispanics/Latinos (e.g., Creveling, Varela, Weems, & Corey, 2010; Hill & Bush, 2001; Latzman et al., 2011; Walton, Johnson, & Algina, 1999; Wren et al., 2007). These examinations have yielded somewhat equivocal findings, which are particularly challenging to reconcile because of between-study variations in methodology and participants. In addition, findings across these studies generally suggest that only a small proportion of the variance observed in child anxiety is attributable to race. For example, among a normal sample of kindergarten-age children and their mothers, Hill and Bush (2001) observed similar reports of child anxiety from African American and European American mothers, but higher levels of self-reported anxiety among European American children relative to African American children. Conversely, Walton and colleagues (1999) reported that African American mothers reported lower levels of anxiety than did European American mothers, whereas African American children reported higher levels of anxiety than did European American children. However, children in Walton and colleagues' study were older (ages 10–18), and half of the sample was chronically ill. Indeed, although Walton and colleagues reported an informant × race interaction, this interaction depended on the setting of the assessment, suggesting that differences between racial groups with respect to child and maternal reports were most pronounced in anxiety-producing situations (e.g., being in a medical or dental clinic). Moreover, the informant × race interaction was present for only those children with chronic health concerns. Interestingly, in this sample child sex was also associated with child reports of anxiety, but the observed effects were dependent on both the informant (child or mother) and the setting (stressful or nonstressful).

Similarly, Latzman and colleagues (2011) observed variations for race, age, and sex in self-reported anxiety on the Revised Children's Anxiety and Depression Scale (RCADS)—a measure of anxiety and depression symptom dimensions. Specifically, in a normal school-age sample (grades 2–12), African American girls endorsed more symptoms of obsessive–compulsive disorder in elementary and middle school, whereas European American girls endorsed greater numbers of social phobia symptoms in high school. For elementary school boys, more symptoms of obsessive–compulsive disorder were observed for African American boys than for European American boys. When the data

were examined categorically and clinical cutoff scores were used, significant differences were observed only for girls: African American elementary school girls more frequently endorsed clinical levels of obsessive–compulsive disorder symptoms, and European American high school girls more frequently endorsed clinical levels of panic symptoms. However, Latzman and colleagues specifically noted that these differences, although statistically significant, were small in magnitude.

Austin and Chorpita (2004) also observed ethnic group differences for specific symptoms of anxiety in a large school-based sample of children and adolescents (N = 1,126). Comparing European American, Chinese American, Filipino American, Native Hawaiian, and Japanese American school children, all ranging in age from 7 to 18, the authors did not observe any significant between-group differences on the temperamental variable of negative affectivity underlying anxiety and depression. However, significant between-group differences were noted for separation anxiety, panic, social phobia, and obsessive–compulsive symptoms as assessed by the RCADS. Specifically, Native Hawaiians scored significantly higher than Filipino Americans, Japanese Americans, and European Americans on the separation anxiety scale, and scored significantly higher than Japanese Americans and European Americans on the panic scale. Filipino Americans scored significantly higher than Japanese Americans and European Americans on the panic scale and significantly higher than European Americans on the social phobia scale. Chinese Americans scored significantly higher than Native Hawaiians and European Americans on the social phobia scale. Finally, Native Hawaiian and Filipino Americans reported significantly higher levels of obsessive–compulsive symptoms than Japanese Americans and European Americans. Ethnicity was also found to be related to clinically elevated levels of panic and separation anxiety, such that the Native Hawaiian and Filipino American groups had proportionally more cases of clinical elevations in these domains than did Chinese Americans, Japanese Americans, and European Americans.

Conversely, in a primary care sample of children ages 8–13, Wren and colleagues (2007) noted no effects of ethnicity on the reporting of anxiety across European American, Latino, African American, Asian/Pacific, and biracial groups. However, effects of child sex and age and parental education on reports of child anxiety were observed. Similarly, in a large school-based sample (N = 1,961) of children and adolescents ages 8–18 years, Okamura and colleagues (2014) did not observe ethnic differences with respect to child-reported anxiety. However, significant ethnic group differences were observed in comparison to European American children when child anxiety was assessed via parent report. Specifically, relative to European American children, Chinese American parents reported significantly more symptoms of obsessive–compulsive disorder and rated their children as significantly higher with respect to total anxiety. Filipino American parents also reported that their children experienced significantly more symptoms of separation anxiety, panic, and total anxiety than did parents of European American children. Finally, Japanese American parents endorsed significantly more symptoms of social phobia and total anxiety for their children compared with European American parents, and Native Hawaiian parents endorsed significantly higher levels of panic symptoms for their children when compared with European American parents.

In spite of somewhat inconsistent findings with respect to the influence of race on symptoms of child anxiety, some interesting variability with respect to the relation between parenting variables and child anxiety has been reported in the context of ethnic differences. Specifically, Creveling and colleagues (2010) found perceived maternal control (e.g., the extent to which mothers made decisions for or directed the activities of their children) to be significantly related to the children's feelings of autonomy, self-confidence, and anxiety for African American, Latino, and European American children. However, among the European American children only, the relation between maternal control and child anxiety was fully mediated by a child's feeling unloved or misunderstood. Lacking confidence in one's own abilities partially mediated this relation only among European American children. For Latino children, feeling unloved or misunderstood only partially mediated the effect of maternal control on child anxiety, but neither feeling unloved nor lacking confidence mediated this relation among African American children. Finally, although ethnicity did not moderate the relations between maternal control and anxiety or between maternal control and feelings of autonomy and self-confidence, it did interact significantly with maternal control to influence feeling unloved and misunderstood; specifically, maternal control was

more strongly associated with feeling unloved and misunderstood for European American children than for African American children (Creveling et al., 2010).

Similarly, Hill and Bush (2001) observed a differential effect between African American and European American families for the extent to which parental efficacy (e.g., feelings of confidence in the parenting role) was associated with child anxiety. Specifically, in this sample of normal kindergarten-age children and their mothers, Hill and Bush observed that feelings of confidence in parenting abilities were positively associated with positive parenting practices, such as communication, and negatively associated with negative parenting practices, such as inconsistent discipline; moreover, parents who reported higher levels of efficacy had children reporting lower levels of anxiety. However, this relationship was stronger for European American families than for African American families (although the two groups did not differ in terms of mean levels of parenting efficacy), leading the authors to suggest that parental efficacy might only indirectly affect child anxiety (through positive parenting practices), or that additional extrafamilial supports might be available to African American children that compensate for lower maternal efficacy. It is important to note that no differences between African American and European American parents were noted with respect to specific parenting behaviors, including negative communication, enforcement, hostile control, inconsistent discipline, love withdrawal, and parenting efficacy. Overall, these authors suggest that parenting practices and their influence on child anxiety are generally similar across the two ethnic groups studied (Hill & Bush, 2001).

Socioeconomic Status

Recent studies examining the relation between socioeconomic status (SES) and anxiety have noted an association, although in some instances the size of this effect is small and in other instances variables often correlated with family SES (e.g., prenatal drug exposure, household density) are more strongly related to child anxiety status than is SES per se. Several studies have yielded evidence suggesting an inverse relation between familial SES and child anxiety. In a normal school sample of 216 Filipino adolescents in Hawaii, anxiety was associated with various indicators of lower status, including the education and employment of the primary family earner (Guerrero, Hishinuma, Andrade, Nishimura, & Cunanan, 2006). Similarly, Vine and colleagues (2012), in a sample of 498 school children ages 11–13, observed higher levels of physical anxiety and separation/panic anxiety (as measured by the Multidimensional Anxiety Scale for Children, or MASC) among children from lower-income families. Indeed, even after controlling for numerous other familial risk factors (including parental divorce, parental unemployment, and exposure to stressful events), Melchior and colleagues (2010) found low family income to be a significant predictor of childhood depression and anxiety among a normal sample of 941 French children ages 4–18. Specifically, children whose families had experienced low income at any time during the 8-year follow-up period were nearly twice as likely to present with internalizing symptoms as those whose families had not. Moreover, children in families whose income had either declined during the study period or remained persistently low were more likely to present with internalizing symptoms than children in families whose income had been persistently high during this time frame.

In a longitudinal study of an individual's social position (defined by current or most recent occupation for one's parent or oneself during childhood and adulthood, respectively), lower social position during childhood was associated with greater risk for adult anxiety and depression; however, this relation became nonsignificant after adjustments for adult social position and childhood psychological disorder (Stansfeld, Clark, Rodgers, Caldwell, & Power, 2011). Conversely, adult social position was associated with greater risk of anxiety and depression, even after adjustments for childhood social position and childhood disorder. Stansfeld and colleagues (2011) suggest that these findings provide only limited support for an "accumulation of risk" model, in which childhood social position confers a risk of later adult psychological disorder. However, these authors indicated that their findings provide support for a "health selection" model, whereby anxiety and depression during childhood might influence later social position in part because of difficulties in obtaining upward mobility through education and later employment opportunities. Finally, when assessing child anxiety via parent report, Okamura and colleagues (2014) noted significant inverse relations between familial SES (as defined by parental education and occupation) and total anxiety, panic, and obsessive–compulsive scores as measured by a parent version of the RCADS, such

that higher SES was associated with fewer caregiver-reported symptoms.

Other research has challenged these associations noted between family SES and child anxiety. For example, although Dirks, Boyle, and Georgiades (2011) found that psychopathology more generally accounted for a statistically significant but small proportion of variability in adult SES (2.78%), in their study neither parent- nor teacher-rated child anxiety was associated with later adult SES. Similarly, Leech, Larkby, Day, and Day (2006) followed children from the prenatal period through age 10 and observed multiple significant predictors of anxiety over time, including lower IQ scores, attention problems, prenatal exposure to marijuana, household density during prenatal development, and injuries during childhood; however, neither race nor SES was a significant long-term predictor of anxiety. Casting further doubt on the findings mentioned above, Farrell, Sijbenga, and Barrett (2009) found that instead of low SES being a risk factor for anxiety, higher anxiety was associated with higher SES. Although this effect was small, children (ages 8–12) in this study who attended high-SES schools reported higher levels of anxiety on the Spence Children's Anxiety Scale (SCAS) than did their counterparts in low-SES schools. Whether this finding is truly contradictory to those reported above is unclear, however, given that the findings of Vine and colleagues (2012) indicated a negative association between household income and child anxiety, but a positive association between neighborhood income and child anxiety. To explain these findings, Vine and colleagues suggest "group density" theories in which individuals of similar disadvantaged circumstances living together, typically in the context of low levels of income inequality, demonstrate more positive mental health outcomes. As such, the positive associations between SES and anxiety noted by both Farrell and colleagues and Vine and colleagues reflect characteristics of the larger environment in which a child resides, rather than characteristics of the specific home setting. Vine and colleagues also suggest that future studies examine potential interactions between family and neighborhood SES and their influence on anxiety.

Gender

Historically, girls have presented with higher rates of internalizing symptoms than boys, and this has been the case for anxiety in general across development. Indeed, multiple recent studies have supported higher levels of self-reported anxiety among girls than among boys in samples drawn from the United States (Okamura et al., 2014; Wren et al., 2007), Canada (Auerbach, Richardt, Kertz, & Eberhart, 2012; Jacques & Mash, 2004), Australia (Farrell et al., 2009), and Norway (Derdikman-Eiron et al., 2011; Leikanger, Ingul, & Larsson, 2012). This gender difference has also been found in studies using various self-report measures of anxiety, including the Screen for Child Anxiety Related Emotional Disorders (SCARED) (Leikanger et al., 2012; Wren et al., 2007); the MASC (Auerbach et al., 2012); the State–Trait Anxiety Inventory for Children (STAIC) (Jacques & Mash, 2004); the Revised Children's Manifest Anxiety Scale (RCMAS) (Farrell et al., 2009); the SCAS (Farrell et al., 2009); and the RCADS (Chorpita, Yim, Moffitt, Umemoto, & Francis, 2000; Okamura et al., 2014). However, although gender differences were observed in self-reported anxiety among a sample of normal children ages 8–13, Wren and colleagues (2007) and Ebesutani, Okamura, Higa-McMillan, and Chorpita (2011) both observed that such differences were not present when children were assessed via parent report. Okamura and colleagues (2014) also failed to observe significant gender differences for total anxiety scores when children were assessed via parent report, but did observe significantly higher parent reports of girls' social phobia symptoms relative to boys'. In addition, two studies noted interactions between gender and age: 15-year-old girls reported a greater increase in symptoms of social phobia than did boys (Leikanger et al., 2012); and older girls (those in grades 10 and 11) reported higher levels of anxiety than both older boys and younger girls (those in grades 4 and 5) (Jacques & Mash, 2004).

Perhaps more informative to understanding the nature of gender differences in child anxiety, however, is a recent set of findings suggesting that gender role orientation (i.e., how closely children identify with masculine or feminine roles and behaviors), rather than biological sex, accounts for more variability in anxiety symptom presentation. Muris, Meesters, and Knoops (2005) observed a positive association between femininity as identified by scores on the Children's Sex Role Inventory (Boldizar, 1991) and preference for girls' toys and activities, as well as self-reported anxiety and fear, in a sample of 209 school children ages 10–13. Although a masculine gender role orientation was negatively associated with fear, there was no significant relation observed between masculinity and

anxiety. Indeed, although girls did report more symptoms of fear and anxiety than boys did in this study, the relation between biological sex and anxiety was not observable after gender role orientation was taken into account. Moreover, the relation between gender role orientation and fear and anxiety was stronger for girls than for boys, suggesting that gender role orientation might play a larger role in understanding the expression of fear and anxiety for girls than for boys (Muris et al., 2005).

Carter, Silverman, and Jaccard (2011), in a sample of 175 clinic-referred children ages 9–13, also observed significantly higher levels of anxiety endorsed by girls than by boys, but in addition reported that both pubertal development and gender role orientation were significant predictors of anxiety symptomatology. Specifically, both boys and girls who self-reported more advanced pubertal development also self-reported higher levels of femininity and anxiety, whereas both boys and girls who endorsed higher levels of masculinity self-reported lower levels of anxiety. Similar to the findings reported by Muris and colleagues (2005), Carter and colleagues also reported that pubertal development and gender role orientation explained more variability in anxiety than did biological sex, suggesting that early pubertal development may act as a risk factor for anxiety, whereas identification with a masculine gender role orientation may serve as a protective factor. Finally, Palapattu, Kingery, and Ginsburg (2006), in a normal sample of 114 African American adolescents ages 14–19, observed a negative relation between masculinity and anxiety and a positive relation between femininity and anxiety. As reported in other studies, Palapattu and colleagues also observed higher levels of anxiety reported by girls compared with boys; however, gender role orientation explained a significant proportion of additional variance in anxiety scores beyond that accounted for by biological sex, and was considered to be more important than biological sex in explaining observed anxiety symptomatology. These authors also noted that self-esteem acted as a protective factor with respect to anxiety in this sample, and that this relation was most marked among those endorsing high levels of femininity (Palapattu et al., 2006). Together, these findings suggest rather reliable differences between girls and boys with respect to their experience of symptoms of anxiety, but also indicate that the traits encompassing feminine and masculine gender role orientations might better explain individual differences in anxious symptomatology.

Age

Findings with respect to age differences in anxiety generally suggest stability over time, although the nature of the anxiety does change across development (Weems & Costa, 2005). Specifically, younger children generally report more fears than do older children (Broeren & Muris, 2009), whereas generalized anxiety (Broeren & Muris, 2009) and social anxieties (Ranta et al., 2007; Weems & Costa, 2005) tend to peak during adolescence, particularly among girls (Leikanger et al., 2012). Specifically, Weems and Costa (2005), in a cross-sectional study of 145 normal children in three age groups (6–9, 10–13, and 14–17), noted that concerns regarding separation were most common in the youngest age group; fears related to death and danger were most prevalent in the middle age group; and social and performance concerns were those most often reported by the oldest cohort of adolescents. Similarly, Broeren and Muris (2009), in a normal sample of 226 Dutch children, noted higher fear scores among younger children (ages 4–5) and higher generalized anxiety scores among older children (ages 6–9). With respect to fear, in a sample of 388 school children ages 4–13, an inverse relation between anxiety sensitivity (i.e., the belief that symptoms of anxiety can be harmful; Reiss, Peterson, Gursky, & McNally, 1986) and age was also observed, such that older children reported less fear associated with physical symptoms of anxiety (Muris, Mayer, Freher, Duncan, & van den Hout, 2010). The extent to which specific symptoms are associated with anxiety also changes with age (Boylan, Miller, Vaillancourt, & Szatmari, 2011). Specifically, in a sample of 1,329 children ages 4–7 who were studied prospectively for a period of 8 years, the factor structure of anxiety and depression remained stable across development, whereas the specific items related to each factor changed with age. These findings suggest that the presence of anxious symptomatology is relatively stable over time, and that only the specific expression of fears and worries tends to change with development (Weems & Costa, 2005). Along those lines, Broeren and Muris concluded that (with the exception of specific fears, which clearly exhibit an age-related effect) the overall contribution of developmental factors to the expression of anxiety symptoms is small, and that other factors play a more important role in explaining the development and maintenance of anxiety disorders.

More generally, diagnoses of anxiety have also been observed to be stable over time (Carballo et al., 2010)

with specific symptoms aggregating into disorder-specific clusters among children as young as ages 2–3 (Mian, Godoy, Briggs-Gowan, & Carter, 2012). Carballo and colleagues (2010) followed a sample of 1,869 children between the ages of 2 and 18 at first diagnosis prospectively for a period of 14 years. They noted high diagnostic stability across time for all of the *International Classification of Diseases*, 10th revision (ICD-10) anxiety disorders studied, including phobic disorders, social anxiety disorders, obsessive–compulsive disorder, stress-related disorders, and "other" anxiety disorders. Moreover, Turner and Barrett (2003) demonstrated that the differentiation between anxiety and depression was stable across age. Similarly, Mian and colleagues (2012), in a sample of 1,110 children ages 22.6–47.9 months, found that symptoms of anxiety in this age group consistently aggregated into symptom clusters matching current diagnostic categories of generalized anxiety, obsessive–compulsive symptoms, separation anxiety, and social phobia. Such findings suggest that even at this early stage of development, specific clinical presentations of anxiety can be observed. Finally, in a review of behavioral genetic studies of anxiety, Franić, Middeldorp, Dolan, Ligthart, and Boomsma (2010) noted that the heritability of anxiety increases over time, as the influence of shared environmental factors lessens throughout the maturation from childhood to adolescence. Moreover, these authors suggest that the temporal stability of anxiety may be stronger than has previously been reported in longitudinal studies of anxiety, given the use of different reporters across development: Parents are often queried to assess the symptomatology of younger children, whereas older children typically provide self-reports of their experience of anxiety (Franić et al., 2010). Taken together, findings with respect to age differences in the presentation of anxiety suggest relative stability over time in the context of changing specific presentations across age.

ETIOLOGY

Genetics

Symptoms of anxiety aggregate in families (e.g., Turner, Beidel, & Costello, 1987); that is, anxious children are more likely to have anxious parents (e.g., Rosenbaum et al., 1992), and anxious parents are more likely to have anxious children (e.g., Beidel & Turner, 1997). Given that parents and children typically share both genetic material and a familial environment, the challenge has been to determine the respective contributions of each of these factors to the development of anxiety. Twin studies are one of the most common means of obtaining estimates of the heritability of specific phenotypic presentations and allow for the variance in a given phenotype to be attributed to three sources: (1) additive genetic influences, (2) common or shared environmental factors, and (3) nonshared environmental experiences (Gregory & Eley, 2007). As defined by Gregory and Eley (2007) in their comprehensive review of the genetic literature specific to child anxiety, additive genetic effects represent the sum of the effects of specific alleles, whereas shared environmental factors consist of experiences that effectively increase similarity among family members. In contrast, nonshared environmental factors represent those experiences that result in family members differing from one another (in most models, these factors also include measurement error).

Interestingly, the relative contributions of genetic and shared environmental factors appear to be inversely related to one another over the course of development (Bartels et al., 2007). Measuring anxiety with broad-syndrome self-report, teacher report, and parent report scales, Bartels and colleagues (2007) observed in a sample of twins followed from birth to age 12 years that genetic influences tended to decrease over development, while shared environmental influences increased (see also Eley et al., 2003; Hallett, Ronald, Rijsdijk, & Eley, 2009). Although the relative contributions of these influences vary across development, genetic factors explained the largest proportion of variability in anxiety among young children (Bartels et al., 2007). In contrast, nonshared environmental contributions remained more constant across development, but tended to account for the least amount of variance in anxiety presentations (Bartels et al., 2007). These effects were reported for both boys and girls, with somewhat stronger genetic effects observed for boys than girls, but findings have not yet suggested that different genes are responsible for different expressions of anxiety between the sexes (Bartels et al., 2007; Franić et al., 2010; Kendler, Gardner, & Lichtenstein, 2008).

Genetic and Environmental Contributions to Anxiety

In two studies assessing the relative contributions of genetic and environmental factors to anxiety-related dimensions (e.g., negative cognitions, negative affect, fear, social anxiety, obsessive–compulsive behaviors)

(Eley et al., 2003; Hallett et al., 2009), genetic factors were found to account for the largest proportion of variability, consistent with findings reported by Bartels and colleagues (2007). Specifically, across three different developmental time points from ages 4 to 9, genetic influences accounted for 39–64% of the variance in phenotypic presentation (Eley et al., 2003; Hallett et al., 2009). In contrast, shared environmental factors accounted for the lowest proportion of variability (3–21% across these three age groups), but, consistent again with observations made by Bartels and colleagues, the influence of shared environmental factors was lowest among the 4-year-old sample (range = 3–17%) and highest among the 9-year-old sample (range = 11–23%); the converse was true of the genetic influences, which were highest among 4-year-olds (range = 39–64%) and lowest among 9-year-olds (range = 46–58%). Nonshared environmental effects consistently accounted for approximately one-third of the variance in presentation (range = 22–43%) (Eley et al., 2003; Hallett et al., 2009).

More specifically, for 4-year-olds, obsessive–compulsive behaviors and shyness/inhibition were the behaviors most influenced by genetic factors (with 54% and 64% of the variance attributed to genetic influences, respectively), whereas shared environmental influences were strongest for separation anxiety (with 35% of the variance being attributed to such influences) (Eley et al., 2003). Among older children, negative affect (i.e., general emotional distress common to both anxiety and depression, comprising feelings of fear, anger, and sadness; Joiner et al., 1996; Watson & Clark, 1984) was the factor least influenced by genetic factors (with heritability estimates of .50 at age 7 and .46 at age 9), whereas social anxiety at age 7 (.61) and fear at age 9 (.58) yielded the highest heritability estimates (Hallett et al., 2009).

In research examining the symptom syndromes of specific phobia, separation anxiety, and social phobia among a twin sample ages 6–6½ years, the heritability estimate was significant for specific phobia (46%), but not for separation anxiety (21%) or social phobia (14%) (Eley, Rijsdijk, Perrin, O'Connor, & Bolton, 2008). Although genetic, shared environmental, and nonshared environmental influences each significantly contributed to specific phobia, only nonshared environmental influences were significantly associated with separation anxiety (59%) and social phobia (76%) (Eley, Rijsdijk, et al., 2008). Similarly, in another study, separation anxiety symptoms were attributable largely to nonshared environmental factors (50%, in contrast to 22% genetic and 28% shared environmental factors), and specific phobia symptoms were most attributable to genetic factors (58%, in contrast to 19% shared and 23% nonshared environmental influences) (Bolton et al., 2006). Interestingly, however, when these symptom presentations met diagnostic criteria, the largest proportion of variability in both SAD and specific phobia was due to genetic factors (73% and 60%, respectively). For both disorder categories, shared environmental influences failed to contribute to the variance, whereas approximately one-third of variance was attributable to nonshared environmental influences (Bolton et al., 2006).

In contrast to the findings reported above, Ogliari and colleagues (2006, 2010) observed that the best-fitting multivariate models for their twin data were those in which contributions were made only by genetic and nonshared environmental factors to each of four diagnostic presentations of anxiety assessed by the SCARED (Birmaher et al., 1997). Specifically, for generalized anxiety, social phobia, panic, and separation anxiety, approximately half (49–60%) of the variability observed in these presentations was attributable to genetic factors, whereas 40–51% of variability was attributable to nonshared environmental factors. However, as noted by the authors, these discrepant findings might be due in part to methodological differences between the two sets of studies—namely, the use of child self-report questionnaires assessing DSM-IV symptom criteria with a considerably smaller sample (i.e., 378 twin pairs; Ogliari et al., 2006, 2010), in contrast to maternal reports of anxiety-related behaviors in relatively larger samples (i.e., samples ranging from 854 to 4,564 twin pairs; Eley et al., 2003; Eley, Rijsdijk, et al., 2008; Hallett et al., 2009). Yet, using parent and child reports obtained via the Achenbach CBCL and Youth Self-Report form, respectively, Kendler and colleagues (2008) also failed to find evidence of shared environmental influences on symptoms of anxiety and depression, instead reporting significant genetic contributions with heritability estimates ranging from 72 to 89%. Clearly, continued research is required to elucidate the role of shared environmental factors in the phenotypic expression of anxiety.

Genetic and Environmental Influences on Comorbidity

In addition to looking at the relative contributions of genetic, shared environmental, and nonshared environmental influences to specific anxiety-related dimen-

sions (i.e., general distress or negative mood, separation anxiety, fears, obsessive–compulsive behaviors, and shyness/inhibition), Eley and colleagues (2003) examined how these three factors influenced shared variance among these anxiety-related dimensions and thus might contribute to the comorbidity of anxiety disorders. Shared genetic contributions accounted for 12–62% of the covariance between factors, with general distress and shyness/inhibition sharing considerable overlap with the other scales. In contrast, obsessive–compulsive behaviors shared little genetic overlap with the other scales. Shared environmental factors accounted for 43% of the overlap between separation anxiety and fears and between fears and obsessive–compulsive behaviors, while accounting for 78% of the covariation between separation anxiety and obsessive–compulsive behaviors. Across scales, nonshared environmental influences tended to account for relatively low levels (10–36%) of overlap between the behaviors (Eley et al., 2003). Hallett and colleagues (2009) observed that the highest proportion of variability in symptom overlap was accounted for by shared environmental factors (22–57%) and genetic factors (24–57%), with less of the overlap between phenotypes being attributable to nonshared environmental influences (11–36%). Moreover, the results of Hallett and colleagues' study on the one hand suggest genetic specificity, such that rather than identifying a single underlying factor related to multiple lower-order factors, the data supported independent factors that did not share high levels of genetic overlap. On the other hand, relatively high correlations were observed between the negative cognitions subscale and subscales for each of the other anxiety-related behaviors, suggesting that 42–57% of the overlap of each scale with negative cognitions was attributable to genetic factors. Together, such findings are in contrast to the "generalist genes" theory, which suggests that genes confer only a general risk for anxiety, whereas environmental influences are responsible for specific presentations. Specifically, the findings of Hallett and colleagues suggest that genetic influences are active at both a general level (e.g., negative cognitions) and a specific level (e.g., social anxiety). Collectively, the findings reported by Eley and colleagues and Hallett and colleagues indicate that both genetic and shared environmental factors contribute to comorbidity between anxiety symptom presentations, with nonshared environmental influences playing a smaller role.

With respect to the "symptom syndrome" phenotypes of specific phobia, separation anxiety, and social phobia (defined by meeting the DSM-IV symptom criteria for a specific disorder except for the diagnostic criterion regarding level of impairment), shared environmental influences contributed significantly to the comorbidity of each of these syndromes with the other. Specifically, correlations among the syndrome pairs ranged from .98 to .99. The comorbidity between specific phobia and social phobia represented the only case in which nonshared environmental effects exerted a significant influence ($r = .33$) (Eley, Rijsdijk, et al., 2008). The relations between separation anxiety and either specific phobia or social phobia were not significantly accounted for by genetic factors (Eley, Rijsdijk, et al., 2008). Findings that shared environmental influences contribute to the comorbidity among these three syndromes suggest that specific aspects of the family environment (e.g., those that are shared and serve to make family members more similar to one another) may have a general influence on multiple anxiety presentations; conversely, the more modest contributions of genetic factors to the overlap of these syndromes suggest that different biological processes may underlie these varying phenotypic presentations (Eley, Rijsdijk, et al., 2008).

Similar to those findings reported above with respect to genetic and environmental influences on anxiety, Ogliari and colleagues (2006, 2010) found no evidence that shared environmental influences contribute to observed comorbidity in anxiety presentations. These authors report considerable genetic influences on comorbidity (ranging from 40% for the overlap of generalized anxiety and social phobia to 61% for the overlap between social phobia and panic), with only modest influences of nonshared environmental factors (ranging from 1% for social phobia and panic to 34% for generalized anxiety and panic) (Ogliari et al., 2006, 2010). Again, as indicated above, such differences across studies could be attributable to methodological variations across the studies. Accordingly, further study is required to ascertain not only the relative contributions of genetic and environmental influences to anxiety symptomatology and comorbidity, but also the specific role that shared environmental factors play in these phenotypes and their overlap.

Genetic Influences across Development

In the context of efforts to ascertain the relative contributions of genetic and environmental factors to anxiety, the changing role of genetic influences over the

course of development cannot be ignored. Kendler and colleagues (2008) report support for a dynamic model of genetic influences on anxiety, in which new genetic effects continue to emerge across development (innovation) while the overall impact of genetic factors declines with increasing age (attenuation).

Other studies have examined the nature of genetic influences across development in the context of heterotypic (i.e., an earlier disorder predicts a different subsequent disorder) and homotypic (i.e., an earlier disorder predicts the same disorder later in time) continuity. For example, findings from a recent study suggest heterotypic continuity between SAD during childhood and adult-onset panic attacks, such that these two phenotypes are linked in a way that has not been observed for OAD during childhood and later panic attacks (Roberson-Nay, Eaves, Hettema, Kendler, & Silberg, 2012). Furthermore, in an investigation of homotypic and heterotypic continuity and the extent to which genetic and environmental factors influence these relations during development, stability in anxiety-related symptoms over time (homotypic continuity) was largely attributable to genetic factors, whereas shared environmental factors exerted the greatest influence over heterotypic continuity (Trzaskowski, Zavos, Haworth, Plomin, & Eley, 2012). Specifically, in their sample of twin pairs (the same sample investigated by Hallett et al., 2009) assessed at ages 7 and 9, Trzaskowski and colleagues (2012) found within-trait correlations over time ranging from .45 for negative affect to .54 for social anxiety, with 57–67% of this continuity attributable to genetic factors. Conversely, only 8% (negative cognitions) to 28% (negative affect) of this continuity was attributable to shared environmental influences, and only 13% (fear) to 26% (negative cognitions) was attributable to nonshared environmental factors. In contrast, heterotypic continuity was most influenced by shared environmental factors, which accounted for 21% (negative cognitions at age 7, negative affect at age 9) to 62% (negative affect at age 7, fear at age 9) of the covariance between these traits over time. Genetic influences on heterotypic continuity were generally lower (28–66%; genetic factors did explain 66% of the covariance between negative cognitions at age 7 and negative affect at age 9), as were nonshared environmental influences (4–28%). With respect to the strong contribution of genetic factors to the relation between early negative cognitions and later negative affect, Trzaskowski and colleagues indicate that the scales assessing these traits contain several symptoms that are shared between anxiety and depression; accordingly, the heterotypic continuity observed between these traits may be indicative of the more general relation between anxiety and depression over time. Moreover, the substantial influence of shared environmental factors on the relation between early negative affect and later fear suggests that parents may play a significant role in the development of fear during childhood. Most importantly, perhaps, these findings illustrate that the relative contributions of genetic and environmental factors to the homotypic and heterotypic continuity of anxiety vary as a function of the specific traits assessed (Trzaskowski et al., 2012).

In an effort to identify individuals at risk for specific disorders, researchers have begun studying "endophenotypes," which are "intermediate phenotypes that are more proximal to the genes influencing a disorder than its signs and symptoms, and can be considered risk markers of a disorder" (Gregory & Eley, 2007, p. 208). One endophenotype specific to anxiety might be anxiety sensitivity, reported by Eley, Gregory, Clark, and Ehlers (2007) to be heritable among a sample of 8-year-old twins and to share considerable genetic overlap with symptoms of panic. As such, it might serve as a useful indicator of risk for the development of panic. Anxiety sensitivity has also been found to demonstrate a stability over time that is largely due to genetic factors (61%), whereas nonshared environmental influences (39%) are associated with specific variations at individual assessment points (Zavos, Gregory, & Eley, 2012). More specifically, in their investigation of 1,300 twin and sibling pairs across three time points (midadolescence, late adolescence, and early adulthood), Zavos and colleagues (2012) observed moderate estimates of heritability for anxiety sensitivity across development, suggesting genetic continuity, but also noted new genetic influences emerging in late adolescence, consistent with Kendler and colleagues' (2008) findings of genetic innovation. Across all time points, shared environmental contributions were nonsignificant (Zavos et al., 2012). These findings suggest support for both learning and trait hypotheses, such that the considerable contribution of nonshared environmental factors at each time point (41–54%) underscores the importance of learning in the development and expression of such symptoms, whereas the genetic stability of these symptoms indicates a trait-like variable (Zavos et al., 2012). However, these findings must be interpreted with caution, given the equivocal support that has been observed for the validity of the construct of anxiety sensitivity in children; specifically, no empirical support currently exists

to discriminate this sensitivity from fear or trait anxiety in children (e.g., Chorpita & Daleiden, 2000; Chorpita & Lilienfeld, 1999). Accordingly, rather than providing data with respect to an endophenotype of anxiety, these findings might instead refer to the general construct—or phenotype—of trait anxiety.

The Role of Specific Genes in Anxiety

As Gregory and Eley (2007) note in their review of the literature, research attempting to identify specific genes responsible for specific anxiety presentations has been limited by the fact that numerous genes are typically responsible for any given phenotypic expression. Gregory and Eley state that so-called "linkage studies," in which specific genes responsible for specific phenotypic expressions are sought, are of limited utility; in contrast, however, "association studies," based on comparing the frequencies of alleles in identified case and control participants, can be more informative with respect to specific genetic influences on anxiety presentations. Accordingly, a small group of recent studies have suggested that the serotonin transporter (5-HTT) allele might be implicated in the development of anxiety. As noted in their review of these studies among children and adolescents, Murray, Creswell, and Cooper (2009) indicate that the findings yielded to date in this area of inquiry are contradictory and inconsistent. Specifically, some studies have failed to find a significant relation between the 5-HTT gene and features of anxiety (Schmidt, Fox, Rubin, Hu, & Hamer, 2002). In other instances, relations between the 5-HTT allele and anxiety-related behaviors have been observed, but with different forms of the allele (e.g., Arbelle et al., 2003; Battaglia et al., 2005), suggesting that additional factors might moderate an existent relation between this gene and anxiety symptom presentations (Murray et al., 2009).

Indeed, a gene × environment interaction emerged between the 5-HTT gene and maternal reports of low social support, such that the short 5-HTT allele was associated with higher levels of behavioral inhibition during childhood, but only in the context of low social support (Fox et al., 2005). Similarly, a gene × environment interaction was observed by which the 5-HTT gene interacted with prenatal maternal anxiety symptoms to influence the risk for later emotional difficulties (Tiemeier et al., 2012). Finally, evidence of another significant gene × environment interaction was supported: Stressful life events presented a greater risk for anxiety and depression in the context of a specific 5-HTT genotype (i.e., one that is associated with lower serotonin transcriptional efficiency) (Petersen et al., 2012).

In addition, one genetic disorder—22q11.2 deletion syndrome, or 22qDS—may be linked to the anxiety disorders. Specifically, in a review study of children and adolescents (ages 4–19) diagnosed with 22qDS, across seven independent studies 39% of participants met diagnostic criteria for one or more anxiety disorder, whereas only 17% of controls did; indeed, of the psychiatric disorders reported in these studies, anxiety disorders were the most common (Jolin, Weller, & Weller, 2012). Six of these studies included data with respect to specific DSM-IV anxiety disorders, indicating that most common among children with 22qDS was specific phobia (31%), followed by GAD (13%), SAD (9%), and obsessive–compulsive disorder (8%). Collectively, such findings are far from conclusive with respect to identifying specific genes that are active in the expression of anxiety, but they do suggest potential avenues for future study.

Neurobiology

Although it is known from animal research and psychopharmocological treatment research that several neurotransmitters (e.g., gamma-aminobutyric acid, norepinephrine, serotonin, substance P) are implicated in the anxiety disorders, most research on the neuropsychopathology of child anxiety has focused on the neuroanatomy of the brain. This research on neuroanatomy of psychological disorders, known as "affective neuroscience" (Vasa & Pine, 2004), examines structural differences in the brains of individuals with and without anxiety (or inhibited temperament) with magnetic resonance imaging (MRI) and the way the brain functions in individuals with and without anxiety disorders with functional MRI (fMRI) and positron emission tomography (PET) scans. Structural MRI techniques focus primarily on the size of different brain matter, whereas the functional imaging techniques allow researchers to examine how the brain responds to certain stimuli or events. As is typical for this type of research, animal models are frequently used to develop hypotheses about neural circuits in humans (LeDoux, 1995, 1998).

Brain Structure and Function

In a recent large study ($N = 265$) of personality traits and brain structure in healthy adults, among the Big

Five personality traits (i.e., Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness), Neuroticism was identified as the trait most clearly linked to brain structure (Bjornebekk et al., 2013). Neuroticism has been shown to be a risk factor for the development of psychopathology, especially anxiety and depression (e.g., Bienvenu, Hettema, Neale, Prescott, & Kendler, 2007; Cox, MacPherson, Enns, & McWilliams, 2004; Hettema, Neale, Myers, Prescott, & Kendler, 2006). In the Bjornebekk and colleagues (2013) study, higher anxiety, depression, and vulnerability to stress were associated with smaller total brain volume, decrease in white matter microstructure, and smaller cortical surface area in the frontotemporal regions.

End Here

AMYGDALA

With regard to specific brain regions among individuals with anxiety disorders, research has primarily implicated the amygdala, a part of the limbic system located in the temporal lobe responsible for processing emotional reactions and memories. The location of the amygdala allows it to integrate information from sensory inputs from the cortex, thalamus, and hippocampus, and to send out information through the hypothalamus, brainstem, and cortex. In addition to focusing on the amygdala, contemporary models of anxiety disorders highlight a network of brain regions, including the insular cortex, prefrontal cortex (PFC), hippocampus, orbitofrontal cortex (OFC), and anterior cingulate cortex (ACC) (Craske, Rauch, et al., 2009). Using MRI, Schienle, Ebner, and Schafer (2011) found that adults with GAD had larger volumes of the amygdala and the dorsomedial PFC than healthy adults had, and self-reports on symptom severity were positively correlated with volumes of the dorsomedial PFC and the ACC. Similarly, in an MRI study of children and adolescents with GAD, right and total amygdala volumes were larger than those of healthy controls, whereas intracranial, cerebral, cerebral gray and white matter, temporal lobe, hippocampal, and basal ganglia volumes and measures of the midsagittal area of the corpus callosum did not differ between groups (De Bellis et al., 2000). Another structural MRI study has implicated the superior temporal gyrus (STG), a ridge on the temporal cortex, in GAD in children. In this study, children and adolescents with GAD had larger total matter, white matter, and gray matter of the STG than healthy controls had (De Bellis et al., 2002). Furthermore, these investigators reported more pronounced asymmetry (i.e., right side larger than left) in total and STG white matter volumes in children and adolescents with GAD than in healthy controls, and there was a significant correlation between STG white matter asymmetry and child self-reported anxiety.

Not all findings are consistent, however. For example, in one study gray matter volume in the amygdala was significantly reduced in children and adolescents with anxiety disorders compared with healthy controls (Milham et al., 2005). It is unclear why these findings contradict most other findings on the amygdala in adult and child samples. The small sample size, mixed anxiety disorder sample, and/or disorder severity of the sample (children with anxiety disorders were classified as "treatment-resistant") may have led to the contradictory findings. Nevertheless, given how little research has been conducted to date in child samples, as well as the fact that most studies have relatively small sample sizes, additional research is needed to resolve the contradictory findings.

Adding to these findings on amygdala volume differences, functional imaging studies have consistently found that the amygdala and associated regions are activated during fear conditioning experiments in animals (LeDoux, 1998, 2000) and in healthy adults (Büchel & Dolan, 2000; LaBar, Gatenby, Gore, LeDoux, & Phelps, 1998; Schneider et al., 1999). Furthermore, fMRI studies using face processing paradigms show preferential activation of the amygdala and related structures in response to fearful versus neutral or happy faces in normal adults (Breiter et al., 1996; Morris et al., 1996), and the amygdala and associated regions demonstrate more activity in individuals with anxiety disorders than in individuals without anxiety disorders upon exposure to feared stimuli (Nitschke et al., 2009). According to Craske, Rauch, and colleagues (2009), the amygdala plays an important role in the assessment of threat, as well as in the formation of associations regarding danger in the environment and mediation of responses to threat. They suggest that exaggerated sensitivity of the amygdala mediates abnormal threat assessment, abnormalities in learning about danger in the environment, and/or exaggerated fear responses. For instance, when viewing masked angry faces, children with GAD showed greater right amygdala activation than healthy controls did, and this activation was positively correlated with anxiety severity (Monk et al., 2008). Likewise, when viewing fearful expressions, adolescents with GAD showed increased right amygdala responses, par-