CALIFORNIA STATE UNIVERSITY SAN MARCOS

THESIS SIGNATURE PAGE

THESIS SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE

MASTER OF ARTS IN
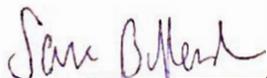
PSYCHOLOGICAL SCIENCE

THESIS TITLE: The Day-to-Day Associations Between Anxiety and Impairment in Preschool-Aged Children

AUTHOR: Kathryn Layton

DATE OF SUCCESSFUL DEFENSE: July 17th, 2018

THE THESIS HAS BEEN ACCEPTED BY THE THESIS COMMITTEE IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS
IN PSYCHOLOGICAL SCIENCE

Sara Bufferd	_signature_	7/17/18
THESIS COMMITTEE CHAIR	SIGNATURE	DATE
William Tsai	_signature_	7/17/18
THESIS COMMITTEE MEMBER	SIGNATURE	DATE
Anna Woodcock	_signature_	7/17/18.
THESIS COMMITTEE MEMBER	SIGNATURE	DATE
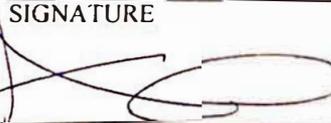
Day-to-Day Associations Between Anxiety and Impairment in Preschool-Aged Children

Kathryn M. Layton

California State University San Marcos

Table of Contents

Abstract

Anxiety often emerges in early childhood and is associated with impairment in functioning and relationships. Additionally, early emerging anxiety often persists overtime and may be associated with long term impairment. However, behaviors related to anxiety are developmentally normative during early childhood. Therefore, it can be difficult to distinguish typical anxiety behaviors from clinically concerning anxiety. One factor that may influence whether anxiety is problematic is the extent to which the behaviors cause the child distress and/or interfere with the child's functioning and relationships. Further, sleep quality has been associated with clinically anxious behavior in childhood and can be related to the level of impairment/distress that is experienced. The goal of the current study is to examine the day-to-day associations between children's social and separation anxiety, related distress and impairment, and sleep quality to better understand whether behaviors typically considered normative in early childhood may be clinically concerning. Parents of preschool-aged children (3-5-years-old) completed an online daily diary to report the frequency of children's anxious behavior each day for 14 consecutive days. To assess daily distress and impairment, parents rate the extent to which social and separation anxiety behaviors interfered with their children's ability to follow daily routines or get along with others. Additionally, parents reported daily levels of distress for themselves and their child, their parent-child relationship quality, as well as their child's sleep quality on the previous night. Separation and social anxiety were related to impairment and distress within the same day. Increased separation and social anxiety on a particular day were not related to increased levels of impairment and distress the following day, however increased social anxiety on particular day predicted decreased social anxiety the following day. Additionally, decreased sleep quality predicted next day separation anxiety and associated impairment as well as parent-child distress.

Based on the present findings, child practitioners should consider children at risk for clinically concerning anxiety if they are experiencing both child and parent impairment or distress associated with such behaviors, particularly if children are experiencing decreased sleep quality in conjunction with higher than typical separation anxiety behaviors.

Day-to-Day Associations Between Anxiety and Impairment in Preschool-Aged Children

Anxiety in early childhood is common, with estimates suggesting that up to one in five preschool-aged children may meet criteria for an anxiety disorder (Bufferd, Dougherty, Carlson, Rose & Klein, 2011). In particular, separation and social anxiety are among the most common forms of early emerging anxiety (Angold & Costello, 2009; Bufferd et al., 2011; Egger & Angold, 2006). However, symptoms of separation and social anxiety are developmentally typical during the preschool period (ages 3 to 5; Bufferd, Dyson, Hernandez, & Wakschlag 2016; Gullone, 2000; Muris, Merckelbach, Gadet, & Moulaert, 2000; Muris, Meesters, Merckelbach, Sermon, & Zwakhalen, 1998). For example, many young children exhibit behaviors related to these conditions, such as distress when separating from caregivers to which they are closely attached, or being shy or nervous in social situations. Given that separation and social anxiety behaviors can be typical during the preschool period of development, it is difficult to determine when such behaviors may be cause for clinical concern or warrant treatment. The level of impairment in daily functioning and relationships due to children's anxious behavior can be an indicator as to when such behavior may raise clinical concern. There is a fair amount of literature linking impairment and anxiety in preschool-aged children (Allen, Blatter-Meunier, Ursprung, & Schneider, 2010a; Blossom et al., 2013; Knappe et al., 2010; Towe-Goodman, Franz, Copeland, Angold, & Egger, 2014); however, more research is needed to gain a more nuanced understanding of the relationship between separation and social anxiety behaviors and related impairment on a daily basis (e.g., how levels of anxiety and impairment on one day are related to anxious behavior and impairment the following day) to identify when developmentally typical behaviors may be clinically concerning.

Further, sleep related problems have been identified as correlates of preschool anxiety and up to 80% of children with anxiety experience at least one sleep problem, such as frequent night awaking, night terrors, and longer sleep latency. (Alfano, Beidel, Turner, & Lewin, 2006; Mindell & Barrett, 2002; Warren et al., 2003). However, relatively little is known about whether sleep may impact the relationship between anxious behavior and impaired functioning. Therefore, children's anxiety may be related to sleep disturbances, but the way in which they impact anxiety and associated functional impairment warrants further exploration. Examining daily associations between anxiety and sleep difficulties may provide another clue as to when anxious behavior can be considered problematic. For example, anxiety may be increased and may be more problematic on days following nights of poor sleep.

The current study seeks to use a daily diary method to assess separation and social anxiety behaviors and impairment in preschool-aged children to gain a more nuanced understanding of how these constructs operate day-to-day to gain further insight as to when and under what conditions typical anxious behaviors may be considered problematic or cause for clinical concern. Early emerging anxiety can persist into school-age, adolescence, and adulthood and carries greater risk for impairment throughout the lifespan than when these problems arise later in development (Bufferd et al., 2011; Egger & Angold, 2006; Franz et al., 2013; Mian, Godoy, Briggs-Gowan, & Carter, 2012); However, early intervention can offset such risks (Hirschfeld-Becker & Biederman, 2002; Kennedy, Rapee, & Edwards, 2009; Rapee, Kennedy, Ingram, & Sweeney, 2005). Considering separation and social anxiety behaviors are normative, and that there is greater risk for persistence and long-term impairment when clinically concerning anxiety develops during the preschool period, it is critical to distinguish between typical and atypical separation and socially anxious behaviors to improve identification efforts,

continue to enhance prevention, and early intervention efforts. Symptoms of Separation and Social Anxiety

Separation anxiety is characterized as fear in response to separation from home or from caregivers to which the child is attached (American Psychiatric Association, 2013). Children with separation anxiety may fear that harm will come to themselves (e.g., being kidnapped or injured) or to their caregivers during periods of separation, which can lead to displays of fear and protest or refusal of separation. Separation anxiety may also cause anticipatory fear of separation, manifested in separation nightmares, trouble sleeping, and physical symptoms such as stomachaches and headaches.

Social anxiety in childhood is characterized by fear of social situations in which the child is exposed to novel peers and adults, situations, and objects (American Psychiatric Association, 2013), although some children continue to express hesitation even with more familiar individuals and settings. Children with social anxiety feel distress in such situations, which can cause them to withdraw, cry, or "freeze up." These children often avoid or try to avoid social situations or endure them with distress; such avoidance and distress may prevent or restrict interactions with their environment and other people. Distress caused by social anxiety often leads to isolation, but the child's behavior typically does not reflect a desire to avoid others: children with social anxiety typically wish to interact with their environment and peers but fear scrutiny and embarrassment that may accompany social interaction. Other symptoms of social anxiety can include poor eye contact and concentration, sweating, and trembling in social situations (Stein & Stein, 2008).

Prevalence, Continuity, and Comorbidity

Separation and social anxiety are among the most common forms of specific preschool-

aged anxiety disorders identified across studies (Bufferd et al., 2011; Bufferd et al., 2012; Costello, Egger, & Angold, 2005; Earls, 1982; Keenan, Shaw, Walsh, Delliquadri, & Giovannelli; 1997; Mian et at., 2012;). Separation anxiety disorder (SAD) is estimated to occur in about 2-5% of preschool-aged children, and social anxiety in about 1-2.5%. Although the rates of diagnosed anxiety disorders in early childhood are relatively low, the symptoms of separation and social anxiety are far more common given they are relevant to typical development and have adaptive value (Beesdo, Knappe, & Pine, 2009).

The preschool period is marked by rapid developmental changes in cognition, language, and emotions, which has led some to believe that children with anxiety "grow out of" their symptoms. However, there is evidence to suggest that for many children, the experience of anxiety can persist across the preschool period into school age, adolescence, and adulthood (Battaglia et al., 2016; Bufferd et al., 2012; Egger & Angold, 2006; Franz et al., 2013; Kessler, Chui, Dmler, & Walters, 2005). Some preschool-aged children with social anxiety continue to exhibit the same behavior in school-age (Buffered et al., 2012; Egger & Emde, 2011). Further, many socially anxious adults retrospectively report that their symptoms emerged prior to 10 years of age (Kessler et al., 2005). Separation anxiety is less stable as children enter school-age, but these children have a higher risk of developing other forms of anxiety (e.g., obsessive compulsive disorder, specific phobias) and other conditions (e.g., depression, Attention Deficit Hyperactivity Disorder [ADHD]) compared to children without a history of separation anxiety (Kearny, Sims, Pursell, & Tillotston, 2003; Lewiston, Holm-Denoma, Small, Seeley & Joiner, 2008; Lewisohn, Zinbarg, & Lewisohn, 1997).

Not only are separation and social anxiety disorders present and persistent in some preschool aged-children, they are often comorbid with other anxiety disorders and forms of

psychopathology (Bufferd et al., 2011; Costello, Egger, & Angold, 2004; Dougherty et al., 2013; Egger & Angold, 2006; Franz et al., 2013). For example, Franz and colleagues (2013) reported that separation anxiety and social anxiety disorder were most commonly comorbid with depression, ADHD, and generalized anxiety disorder (GAD).

Factors that Contribute to Early Emerging Anxiety

Several factors have been linked to the development of early childhood anxiety disorders including children's temperament, parenting behavior, and parental psychopathology. Although temperament, parenting behavior, and parental psychopathology are presented as distinct factors, each factor overlaps and interacts in contributing to children's anxiety.

Temperament. Temperament reflects inherent individual differences in emotional reactivity, and is thought to be analogous to personality in adulthood (Gagne, Vendlinksi, & Goldsmith, 2009; Rothbart & Bates, 2006;). Anxious children often exhibit temperamental styles characterized by high behavioral inhibition (BI), high negative emotionality (NE), and low positive emotionality (PE) (defined below; Dougherty et al., 2013; Klein, Dyson, Kujawa, & Kotov, 2012; Muris & Ollendick, 2005; Perez-Edgar & Fox, 2005).

Behaviorally inhibited children are slow-to-warm up to new people and situations (Biederman et al., 1993; Hudson & Rapee, 2000; Hudson, Dodd, Lyneham, & Bovopoulous, 2011; Kagan, Reznick, & Snidman, 1987) and are at considerable risk for developing anxiety. Children who demonstrate high BI show the greatest risk for developing anxiety compared to children who demonstrate low BI (Kagan, Reznick, & Gibbons, 1989; Rothbart & Bates, 2006). Further, stability of BI appears to confer risk; in a longitudinal study assessing BI in children between the ages of two and seven years of age, Hirschfield et al. (1992) found that children who

were behaviorally inhibited across childhood had higher rates of anxiety disorders than children who did not show consistent BI.

Although a behaviorally inhibited temperamental style is common across most forms of childhood anxiety, BI has been particularly implicated in the development of social anxiety. Several studies have demonstrated BI to be a reliable predictor of social anxiety in childhood (Broeren et al., 2013; Frenkel, et al., 2015; Hudson et al., 2011). For example, Beiderman and colleagues (2001) conducted an observational study assessing behavioral inhibition in a group of two to six-year-old children and found that children who were behaviorally inhibited were 3.7 times more likely to have met the criteria for social anxiety disorder than children who did not exhibit BI. Seventeen percent of children without social anxiety disorder were identified as behaviorally inhibited, whereas only 5% of children with social anxiety disorder were not behaviorally inhibited. Additionally, BI has been shown to be the most reliable temperamental predictor of the persistence of separation and social anxiety across the preschool-period when rated by parents and in a laboratory setting (Bufferd et al., 2016).

Other temperamental traits often characteristic of anxious children are tendencies of high NE and low PE (Bufferd et al., 2016; Dougherty et al., 2013; Klein et al., 2012; Muris & Ollendick, 2005; Perez-Edgar & Fox, 2005). Children with high NE are prone to distressing feelings such fear, frustration, anger, and sadness, and children with low PE tend to exhibit little pleasure when interacting with others and their environment. Dougherty and colleagues (2013) observed preschoolers in a laboratory setting during tasks designed to elicit differing aspects of temperament and found that, in addition to showing higher levels of BI, children who met criteria for anxiety disorders exhibited more negative and less positive emotionality during the laboratory tasks than children without anxiety disorders. However, other studies assessing

children and adults suggest that low PE may be specific to social anxiety whereas high NE is related to all types of anxiety (Hughes & Kendall, 2009; Watson, Clark, & Carey, 1988). For example, Hughes and Kendall (2009) measured NE and PE in children 7-14-years-old diagnosed with any anxiety disorder and reported that anxiety was significantly associated with NE; social anxiety was predicted by low levels of PE, whereas PE did not predict other types of anxiety. Similar results were reported in a study in which the individual symptoms of anxious disorders and emotionality were assessed: high NE was related to all anxiety disorders but low PE was only associated with social anxiety (Watson, Clark, & Carey, 1998).

Taken together, the literature suggests that anxious children have temperamental styles most reliably characterized by high BI and NE, whereas low PE may be a facet of temperament specific to preschool-aged children with anxiety and older children with social anxiety. It is important to note that temperament captures normal variation in emotionality; therefore, not all children exhibiting temperamental traits related to anxiety will develop anxiety and not all children with anxiety disorders display these traits. Other factors such as parenting behavior and parental psychopathology contribute to the development of early emerging anxiety and may interact with children's temperament to increases risk for anxiety (Shamir-Essakow, Ungerer, & Rapee, 2005).

Parenting behavior. Parenting style and the quality of parent-child interactions have been examined in relation to early emerging anxiety. An authoritative parenting style, marked by limit setting and emotional responsiveness, has been identified as the most optimal parenting style to reduce negative emotional and behavioral outcomes, including anxiety, in children (Darling & Steinberg, 1993; Vignoli, Croity-Belz, Chapeland, Fillipis, & Garcia, 2005; Vostanis et al., 2006). When parental behavior is not aligned with authoritative parenting practices, children may

be at greater risk for developing anxiety. Specifically, parental intrusiveness and controlling/critical behavior may contribute to childhood anxiety (Hudson & Rapee, 2005; Messer & Beidel, 1994; Rapee, 1997). Consistent intrusive and controlling parental behavior may deprive children opportunities to learn how to cope in anxiety-provoking situations, thus limiting their social and emotional growth. Without such opportunities, children may feel ill-equipped to navigate typical developmental experiences as well as challenges, which may cause or exacerbate anxious behavior. For example, Messer and Beidel (1994) assessed 10-year-old children with anxiety disorders and found that children reported that their parents limited their independence more than children who did not have an anxiety disorder. An observational study assessed interactions between preschool-aged children and their parents during difficult cognitive tasks assigned to the child and found that parents of anxious children displayed considerably more intrusiveness behavior during the task that children who had not been diagnosed with anxiety disorders (Hudson & Rapee, 2001). Furthermore, child-reported and observational findings are also supported by parental report of controlling and intrusive behavior and anxiety in children (Brown, Choprita, & Barlow 1998; Nilzon & Palmerus, 1997).

Additionally, parents under stress may be more likely engage in suboptimal parenting behavior/interactions with their children (Phelps, Belsky, Crnic, 1998; Rodgers, 1998). As such, it is not surprising that high parental stress has also been linked to anxiety in early childhood (Crawford & Manassis, 2001; Doughery et al., 2013). Furthermore, parents experiencing anxiety themselves are more likely to experience stress and engage in suboptimal parenting behavior, thereby transmitting both environmental and genetic risk for anxiety to their children (Berg-Nielson, Vikan, Dahl, 2002).

Despite the clear link between suboptimal parenting behavior and parent/child interactions, meta-analytic studies suggest that relatively little variation in children's behavior can be explained by these aspects of parenting behavior (McLeod et al., 2007; Rothbaum & Weisz, 1994). However, both the quality of parenting children receive, and the development of childhood anxiety are closely linked to parental psychopathology, another factor that has been identified to play a role in the development of early emerging anxiety.

Parental psychopathology. Children of parents experiencing psychopathology are at greater risk of developing anxiety themselves and parents of anxious children are also at greater risk of having an anxiety disorder when compared to the general population (Bogels et al., 2006; Hudson & Rapee, 2000; Lieb, et al., 2000; Ollendick & Hirshfled-Becker, 2002; Wittchen et al., 1999). Genetic studies have estimated anxiety to be around 30-50% heritable and is among the most highly heritable disorders commonly occurring in childhood (Bogels et al., 2006; Eley et al., 2003; Hettema et al., 2001).

Beidel and Turner (1997) found that children are at a greater risk for anxiety disorders if parents reported a lifetime occurrence of either anxiety, depression, or a combination of both; children of parents with a lifetime history of anxiety and/or depression were three to seven times more likely to meet criteria for an anxiety disorder than children of parents without anxiety or depression. Similarly, McClure, Brennan-Hammen, & LeBrocque (2001) reported a three-fold increase in risk for anxiety disorders in children of mothers with comorbid anxiety and depression when compared to healthy controls. However, the highest rates of childhood anxiety are associated with parents reporting a lifetime history of only anxiety disorders, illustrating specific familial transmission of anxiety (Beidel & Turner, 1997).

Further, twin studies have found social anxiety disorder to be more common in monozygotic twins than in dizygotic twins (Bogels et al., 2006; Hettema et al., 2001; Hudson & Rapee, 2000). Twin studies have also demonstrated that some specific features of social anxiety are heritable as well. Stein, Jang, & Livesley (2002) reported that the fear of negative evaluation, a primary feature of social anxiety, is more common in monozygotic twins than dizygotic twins., suggesting that the propensity to develop social anxiety disorder and specific behaviors related to social anxiety are genetically transmitted.

Although separation anxiety typically has an early and impactful onset (e.g., Kessler et al., 2005), which may be considered evidence of a relatively strong genetic basis of the disorder, few studies have examined the heritability of separation anxiety. Because separation anxiety may present after significant life stressors (Keller et al., 1992), such as moving to a new place, it may be that children with separation anxiety have a general predisposition for anxiety and that environmental factors may play a role in developing symptoms specific to separation anxiety disorder. Topolski and colleagues (1997) reported that shared environments among twins accounted for 40% of the variation in separation anxiety disorder, suggesting a mild to moderate environmental contribution.

Parental anxiety disorders also present environmental risks for the development of early emerging anxiety in children through learning pathways. Anxious parents may exhibit behavior such as withdrawal in and avoidance of feared situations and may inadvertently teach their children to respond to situations in a similar manner and/or may exacerbate a child's existing anxious behavior (Bogels et al., 2006; Leib et al., 2000). Such modeled behavior may maintain childhood anxiety by teaching children that the world is an unsafe place, that they cannot manage fearful situations themselves, and that they should avoid situations in which they are fearful or

uncomfortable. When children adapt such response patterns that are learned and maintained through parental modeling, children have fewer opportunities to "face their fears" and overcome distress, and have difficulty learning that they can cope and even enjoy themselves in such situations once exposure has taken place (e.g., birthday parties, play dates) (Booth-Laforce et al., 2012; Hudson & Rapee; 2012).

Sleep related problems. Quality sleep in early childhood is important for a variety of reasons, including emotional regulation, memory, and cognitive evelopment (Gomez & Edgin, 2015). For example, Non-rapid eye movement (NREM) sleep which is associated with quality sleep (Adrillion et al., 2012; Krystal & Edinger, 2008), has been linked to increased levels of learning and memory consolidation in children (Kurdziel, Duclos, & Spencer, 2013). Further sleep problems have been linked to a variety of behavior and psychiatric issues across age groups (Alfano & Gamble, 2009, Gregory & O' Conner, 2002).

Associations between anxiety in childhood and several SRPs such as difficulty falling asleep, nightmares, and aversion to sleeping alone have been identified (Alfano et al., 2006; Mindell & Barrett, 2002; Warren et al., 2003). Although SRPs are most commonly reported in children with generalized anxiety disorder (GAD), there is evidence that children with separation and social anxiety experience significant sleep issues as well. In a study of 6-17-year-old children diagnosed with either GAD, SAD, or social anxiety disorder, the total number of SRPs experienced was associated with severity of anxiety symptoms and impaired functioning across all anxiety diagnoses (Alfano, Ginsberg, & Kingery, 2007). Additionally, 88% of children were reported to have at least one SRP and over half were reported to have three or more, whereas about 50% typically developing children without anxiety experience SRPs (Polimeni, Richdale, & Francis, 2005). In a similar study, children and adolescents (8-16-year-olds) referred for

treatment for anxiety disorders experienced a greater number of sleep problems than healthy controls and nearly all anxious children had at least one sleep complaint (Alfano et al., 2006). In a study examining SRPs in a sample of anxious, depressed, and healthy control children, anxious children more frequently reported SRPs and showed the greatest latency to fall asleep (Forbes et al., 2008). Taken together, these findings suggest that SRPs may be a common clinical feature across all anxiety disorders including separation and social anxiety in childhood, and that sleep related problems may be uniquely associated with anxiety in children compared to other psychological disorders like depression.

   Sleep issues may play a role in the relationship between anxiety in childhood and impaired daily functioning (i.e., how problematic the behavior is for the child in their daily life; impairment is further defined in a later section of this paper). Despite many studies demonstrating a relationship between anxiety and SRPs in childhood, few studies describe how sleep may be related to impaired functioning associated with anxiety; For example, it is unknown whether SRPs may hinder children's ability to cope with typically anxious behaviors thus driving impaired daily functioning or if impairing anxious behavior hinders quality of sleep. Aflano et al., (2007) reported that the total number of SRPs was associated with impaired functioning in a sample of anxious children, such that children reported to have a higher number of SRPs were more impaired by their anxiety than children with fewer SRPs. Hudson, Gradisar, Gamble, Schniering, & Rebelo (2009) used a sleep diary to investigate whether sleep patterns differ between anxious and non-anxious school-aged children, and impaired functioning associated with sleep related problems (e.g., daytime tiredness and fatigue). The results of this study showed that anxious children went to sleep significantly later and had less sleep than non-anxious children but experienced no greater daytime tiredness or fatigue than non-anxious

children. Although this information demonstrates how anxiety in children varies depending on the presence and number of sleep issues, further links between sleep and functional impairment, such as how the frequency and severity of SRPs affects impairment associated specifically to anxious behaviors have yet to be identified.

The relationship between sleep and anxiety appears to be relatively stable across development. Gregory and O'Connor (2002) followed children from 4 through 15 years of age and found that sleep problems reported at age 4 were correlated with problematic internalizing behavior and predicted anxiety/depression when children were 15-years-old. Further, correlations between SRPs and anxious/depressive behavior were even stronger in adolescence than in childhood, suggesting that the relationship between sleep issues and SRPs in early childhood may contribute to worsening impairment in daily life and relationships across development. Taken together, this work highlights the importance of exploring the relationship between anxiety, sleep, and impairment earlier in development than previously investigated as very little research has explored SRPs and their relationship with anxiety in preschool-aged children.

Distinguishing typical and problematic anxiety

Anxiety can be problematic and functionally impairing in early childhood, and sleep disturbances may uniquely contribute to this relationship. To date, the clinical literature has focused on symptoms and disorders of anxiety. However, as behaviors related to anxiety in preschool-aged children are developmentally typical during this period yet are also symptoms of anxious disorders, it is difficult to distinguish between normative and clinically anxious behavior in young children. This differentiation is especially difficult for children exhibiting behavior

related to separation and social anxiety in early childhood given that these behaviors are particularly prevalent.

Typical anxiety behaviors and origins of anxious behavior. Commonly reported fears and worries in early childhood include being alone, separating from a parent, and meeting and interacting with unfamiliar adults and other children (Gullone, 2000; Muris, Merckelbach, Gadet, & Moulaert, 2000; Muris, Meesters, Merckelbach, Sermon, & Zwakhalen, 1998). As the preschool period is a time when children are developing increased cognitive skills and autonomy, they face novel and more demanding expectations of independence and socialization. For example, preschoolers often begin to separate from caregivers more frequently for events such as preschool instruction and playdates, and are expected to socialize with peers and adults more independently than before. Given that preschoolers are navigating these more challenging circumstances while still developing their coping and social skills, the anxious behaviors described above such as difficulty separating and fears about interacting with others can occur within this typical developmental timing; however, such behaviors are also symptoms of separation and social anxiety disorders. Therefore, the differentiation between developmentally typical and clinically significant anxiety is unclear given the occurrence of such behaviors is developmentally appropriate. In addition, these behaviors may serve adaptive functions that have been pertinent to the survival of our species, further complicating the identification of clinically significant behavior.

Humans tend to develop fears of situations that would have been threatening to the survival our evolutionary ancestors, and separation and socially anxious behaviors are thought to have evolutionary roots (Minka & Ohman, 2002; Ohman, 2006; Sloman, 2008; Sloman, Farvolden, Gilbert, & Price, 2006). Separation and social anxiety are thought to trigger different

brain processes developed for survival. The attachment system is activated in potentially threatening situations and promotes caregiving caregiver proximity. When the attachment system is activated during times of caregiver separation, children are thought to be programmed to respond with angry protest in the effort of halting the separation and maintaining closeness the caregiver (Sloman, 2008; Sloman et al., 2006). Socially anxious behaviors are related to the activation of the involuntary defense strategy (IDS), in which defeat within a social hierarchy leads (e.g., altercations, rejection by a potential mate) to submission and withdrawal behavior. Subsequent submissive behavior is designed to allow one to focus their energy elsewhere and develop more realistic goals (Gilbert, 2003; Huhnan, 2006; Sloman, 2000; Sloman, 2008). The IDS may only be able to handle a finite amount of defeat and disappointment; thus, when the threshold of resiliency is exceeded, situations that are less socially threatening are likely to provoke stronger responses than are appropriate (Post & Weiss, 1998).

Problematic anxiety and impairment. Given the potential adaptive nature of anxiety behavior and the relevance of these behaviors to the preschool period, it can be difficult to tell when anxiety may become maladaptive or problematic (Beesdo et al., 2009). When identifying clinical anxiety, atypical fear and worry behaviors are often considered in terms of the level of impairment of the behavior(s) on the child's daily functioning (Egger & Angold, 2006). Impairment due to children's separation and social anxiety can be thought of as distress that disrupts routines of daily functioning. For example, anxious children may refuse to attend preschool/daycare or family events, or avoid social situations with peers such as activities on the playground or birthday parties; or, they may endure these situations but with distress that can limit their ability to derive enjoyment and further develop emotionally, socially, and cognitively. Children's separation and social anxiety can also have adverse effects of the quality of

relationships with their family (e.g., parents, siblings) given the disruption to routines and the conflict that may be caused by disagreements about day-to-day activities. Further, families of children may feel pressure to alter their lives to accommodate and alleviate the child's anxious distress. Impairment/distress from separation and social anxiety may also impair children's ability to form new friendships causing children to become isolated.

The relationship between anxiety and impairment is well-established (Allen et al., 2010a; Blossom et al., 2013; Knappe et al., 2010; Towe-Goodman, Franz, Copeland, Angold, & Egger, 2014). Families of anxious children report up to 3.5 times more negative family impact (i.e., loss of income, fewer family outings) as a result of their child's behavior than families with non-disordered children (Towe-Goodman et al., 2014). For example, Allen and colleagues (2010a) assessed clinical separation anxiety using questionnaire items pertaining to fearful separation, and maternal thoughts and actions in response to separations (e.g., mother stayed at home with the child); mothers and children reported poorer quality of life when there were more instances of negative separation episodes, illustrating the impact SAD can have on families and relationships. Another study reported that anxiety negatively impacted family finances, relationships, and well-being (Towe-Goodman et al., 2014).

Limitations of the assessment of child anxiety and impairment

Given early identification of problematic anxiety provides a critical opportunity for intervention, reducing the risk of long-term impairment (Anticich, Barrett, Silverman, Lacherez, & Gillies, 2013; Lau & Rapee, 2011) it is critical that impairment due to anxious behaviors in early childhood be assessed as accurately as possible.

Although previous work has identified anxiety in early childhood (Bufferd et al., 2011; Bufferd et al., 2012; Costello, Egger, & Angold, 2005; Mian et at., 2012;) and discovered links

between anxiety and impairment (Allen et al., 2010b; Towe-Goodman et al., 2014), some of this work focusing on anxiety and child and family impairment includes methodological constraints that limit the extent to which conclusions can be drawn about characterizing typical to problematic functioning. Most studies have used questionnaires and clinical interviews that ask parents to report about the children's anxious behavior and functioning over the previous month or more (e.g., Preschool Aged Psychiatric Assessment [PAPA]; Egger & Angold, 1999; Early Childhood Inventory [ECI]; Gadow & Sprafkin, 1997). Such assessment methods have yielded important data about early childhood functioning, but may be prone to bias because of their retrospective nature (Bolger, Davis, & Rafaeli, 2003; Russell, Miller, & Ford, 2013; Tversky & Kahneman, 1982). When asking parents to recall behaviors and functioning over a long period of time, parents may misremember the information and potentially minimize the extent to which anxious behavior was impairing to child and family functioning, particularly when impairment is less severe and likely more difficult to recall (yet still problematic). Consequently, more mild to moderate levels of impairment that may cause difficulties may not be accurately captured using questionnaires and interviews with retrospective periods of a month or more.

Additionally, in self-report questionnaires, parents may be asked to compare their child's behavior to that of other children to report the relative frequency and impairment of their child's behavior; it may be challenging for parents to accurately recall both their child's and other children's behaviors. Moreover, some parents have less exposure to other similarly aged children than other parents, further limiting the utility of these judgements. Periods of shorter retrospection without requiring that parents compare their child to others when assessing the relationship between anxiety and impairment in preschool-aged children is needed to further this field of research.

The use of a daily diary method can address these limitations. A daily measure reduces retrospective recall bias associated with long primary reporting periods utilized in other measures of anxiety in childhood (Bolger, Davis, & Rafaeli, 2003). In addition to reducing retrospective recall bias, this method can eliminate the need for parents to compare their child's behavior to that of other children allowing for a more person-level understanding of when such behaviors become problematic (though some measures, such as the PAPA, a comprehensive clinical interview, eliminates the need for parents to compare their children's behaviors to that of other children as the interviewer assists with these judgements; however, these types of measures are still typically limited by long periods of retrospective recall required). Daily diary designs have been used to examine anxiety in older children and have proven to be a feasible and reliable method of assessing anxiety (Allen et al., 2010a; Beidel, Neal, & Lederer, 1991; Mesa, Beidel, & Bunnell, 2014) and other emotional/behavioral issues in children (Bull, Oliver, Tunnicliffe, & Woodcock, 2015; Colasante, Zuffiano, & Malti, 2016).

The literature also suggests that SRPs could benefit from increased use of daily diary research (Chorney, Detweiler, Morris, & Kuhn, 2007). Chorney and colleagues (2008) reviewed the literature on pediatric anxiety, depression, and sleep disturbances to improve assessment of SRPs when examining anxiety and depression in children. Because there is considerable symptom overlap between anxiety and SRPs, they suggested that each construct is measured separately to examine the associations between the constructs. The use of a daily diary would allow for assessment of more nuanced information to further understand the nature of the link between anxiety, impairment, and SRPs in early childhood.

The Current Study

Behaviors related to separation and social anxiety are prevalent and often developmentally appropriate in early childhood (Bufferd et al, 2016; Muris et al., 1998). However, separation and social anxiety are also symptoms of psychopathology, making it difficult to distinguish between typical and clinical levels of anxiety. There is currently no empirical information to guide this distinction, only clinical judgement of the relative frequency and impact of behavior. Data are needed to better understand when typical separation and social anxiety behaviors may become problematic.

The current study seeks to examine the day-to-day associations between the frequency of children's social and separation anxiety and impairment to better understand when behaviors typically considered normative may be clinically concerning by examining spillover effects. Spillover effects in this study can be thought of as how anxious behavior and impairment/distress on one day influence each other on a day-to-day basis. Although there is an emerging area of research in adults describing the perpetuation of social anxiety via daily maladaptive emotion regulation strategies (Farmer & Kashdan, 2012, Kashdan & Farmer, 2014, Kashdan et al., 2014), this is the first study to date that will examine the daily relationships, or spillover effects, of anxious behavior and impairment in early childhood. It is important to examine the day-to-day associations between anxiety and impairment in preschool-aged children to identify how increased child anxiety within the context of a day can affect anxious behavior and functioning on subsequent days; this nuanced information may help clarify how individual increases in typical anxious behavior may drive risk for clinically concerning anxiety. Both functional impairment and parent and child distress will be measured. Impairment refers to the extent to which the behaviors interfered with the child's and family's day and routines. Distress overlaps with impairment, but refers more specifically to the experience of emotional difficulty or

suffering as a result of the anxious behavior. In the present study, distress is measured as the extent to which the parent had difficulty parenting the child, the child experienced the day as stressful, and the quality of the parent-child relationship.

An additional goal of this study is to identify whether quality of sleep is related to the day-to-day associations between anxiety and impairment in early childhood. SRPs have been linked to anxiety in other studies, but the specific nature of how poor sleep quality contributes to childhood separation and social anxiety and impairment is unknown. The current study will examine how sleep quality impacts anxiety, impairment, and parent and child distress on a daily basis.

Hypotheses

Hypothesis 1: Individuals levels of anxiety, functional impairment, and parent and child distress, and sleep quality will vary significantly day-to-day, demonstrating that these constructs are not static, and spillover effects may be present.

Hypothesis 2: When children are reported to show more anxiety behaviors on a particular day relative to their average level of behavior, parents will report greater levels of the corresponding anxiety behavior the following day.

Hypothesis 3: When children are reported to show greater impairment on a particular day relative to their average level of impairment, parents will report greater levels of impairment the following day.

Hypothesis 4a: When children are reported to show more anxiety behaviors on a particular day relative to their average level of behavior, parents will report greater levels of functional impairment and child and parent distress within the same day.

Hypothesis 4b: When children are reported to show more anxiety behaviors on a particular day relative to their average level of behavior, parents will report greater levels of functional impairment and child and parent distress the following day.

Hypothesis 5: When children are reported to have poorer sleep quality on a particular night relative to their average level of sleep quality, parents will report greater levels of anxiety behaviors, functional impairment related to anxious behavior, and child and parent distress the following day.

I expect that when children are reported to experience increased anxiety, impairment, and distress and decreased sleep quality relative to their average level of behavior and sleep quality there will be same-day and spillover effects associated with these deviations.

Method

Participants

An analyses of power revealed that 158 participants would be needed to detect a small effect size using a repeated measures MANOVA, as the G*Power program is unable to calculate power for multilevel analysis. Participants were 299 parents of 3-5-year-old children (52.9% female; 56.9% Caucasian/White, 16.6% Hispanic, 8.6% African-American/Black, 6.6% Asian, 11.4% multi-ethic/other) recruited via flyers posted around the campuses of California State University San Marcos and the University of Maryland, College Park. To be included in the study, parents must have been at least 18 years of age, be able to read, write, and speak English, have at least 50% legal custody of their child, and reliable nightly internet access. Additionally, parents must have had a child without any major medical or developmental disabilities (e.g., autism, cerebral palsy) as such disabilities may be linked to less developmentally typical emotional/behavioral experiences.

Measures

Electronic Daily Diary

Parents completed a 14-day online daily diary in which they reported about their child's behaviors related to separation and social anxiety and associated impairment, parent and child distress, and child sleep quality. In total 291 parents (97.3% completed at least one daily diary, 277 (92.6% completed at least 10 daily diaries, and 213 (71.2%) completed all 14 diaries ($M =$ 13.19, $SD =$ 2.26). The daily dairy completion rate was similar to or higher than other daily diary studies in which parents reported about their children's emotional and behavioral functioning (Allen et al., 2010; Colassente, Zuffiano, & Malti, 2016). The diary items measuring anxiety include 12 questions that assess separation and social anxiety (Appendix A). All diary items were derived from the Early Childhood Inventory (ECI; Gadow & Sprafkin, 1997) and the Preschool Aged Psychiatric Assessment (PAPA; Egger & Angold, 1999), both of which are reliable and valid measures of anxiety in preschool-aged children (Gadow, Sprafkin, & Nolan, 2002; Egger & Angold, 1999; Egger et al., 2006).

Daily Separation Anxiety. Eight items assessed symptoms of separation anxiety. Parents were asked to report the exact frequency of each behavior each day. Example items include "*Your child tried to avoid going to daycare, school, or somewhere else without you or another caregiver in order to stay with you or another caregiver*" and *"Your child seemed afraid to go to sleep unless he/she was near you or another caregiver."* The frequencies of each behavior were summed to create a total social anxiety score each day ($M = 0.48$, $SD = 1.07$, $Min = 0$, $Max = 12$; Average across 14 days: $M = 5.52$, $SD = 7.63$, $Min = 0$, $Max = 47$).

Daily Social Anxiety. Four items assessed symptoms of social anxiety. Parents were asked to report the exact frequency of each behavior each day. Example items include *"Your*

child seemed shy or quiet around new people" and "Your child cried or froze up and/or withdrew from interacting with others in a social situation." The frequencies of each behavior were summed to create a total social anxiety score each day ($M = 0.42$, $SD = 1.06$, $Min = 0$, $Max = 20$; Average across 14 days: $M = 6.32$, $SD = 8.50$, $Min = 0$, $Max = 54$).

Impairment: Daily Functional Impairment. Parents rated the extent to which the separation and social anxiety behaviors were impairing (i.e., interfered with the child's ability to follow daily routines or get along with others) each day on 5-point scale (range = 1 – 5; Not at all/behavior did not occur– a great deal). Impairment was rated for each separation and social anxiety behavior categories (*Overall, how much did the behaviors described in this section distress you and/or your child, interfere with your child's ability to follow routines, and/or get along with others today?*) (Separation: $M = 1.12$, $SD = 0.21$, $Min = 1$, $Max = 4$; Social: $M = 1.08$, $SD = 0.18$, $Min = 1$, $Max = 5$).

Impairment: Daily Parent and Child Distress. Parents reported daily levels of distress for themselves (*Parenting my child was difficult and/or stressful today*) ($M = 1.54$, $SD = 0.40$, $Min = 1$, $Max = 5$) and their child (*How stressful was the day for your child?*) ($M = 1.49$, $SD = 0.39$, $Min = 1$, $Max = 5$) as well as parent-child relationship quality (*How well did you get along with your child today?*) ($M = 4.36$, $SD = 0.45$, $Min = 1$, $Max = 5$) each day. These variables were rated each day on a 5-point scale from one to five (range = 1 – 5; Not at all stressful – extremely stressful; Not at all – a great deal).

Sleep Quality. Parents reported sleep quality on a 5-point scale (range = 1 – 5; Not at all restful – extremely restful) each day based on the child's sleep the night before (*How restful was your child's sleep last night?*) ($M = 4.02$, $SD = 0.51$, $Min = 1$, $Max = 5$).

Procedure

Parents were told the goal of the study was to learn more about children's day-to-day emotions and behaviors. Informed consent was provided verbally by phone with research staff and documented electronically via the online measures. Detailed training was provided to each parent on accurate completion of the daily entries prior to starting the study. Parents were sent emails to remind them to complete the diary for that day after their child went to sleep each evening; if a diary entry was not completed, an additional telephone reminder was provided to the parent the follow morning to ask them to complete the missed diary entry before noon that day to report about the day before. Compensation for participation was based on the parent's total number of completed entries over the 14-day period. A bonus was provided when parents completed all entries on time.

Results

The goal of the current study to examine the day-to-day associations between the frequency of children's separation and social anxiety, impairment, and sleep quality to better understand when behaviors typically considered normative may be clinically concerning. Children's daily anxiety, impairment, and sleep quality will be compared to their unique average rather than to average of the entire sample. Participants who completed at least one dairy ($n = 291$; 97.3%) were included in analysis.

Descriptive statistics were computed for each variable, including demographic variables and the main study variables: (1) Independent Variables (IVs): daily total separation anxiety behavior frequency and daily total social anxiety behavior frequency, and (2) Dependent Variables (DVs): daily separation and social anxiety functional impairment, daily child and parent distress, and sleep quality (descriptives reported in the method section).

All analyses were run in Mplus version 8 statistical software. Analyses performed within Mplus are robust to non-normally distributed data, which was necessary for the present study as most of the variables were positively skewed.

Effect sizes for each model were computed by taking the difference of the variance components in the null and conditional models, divided by the variance component of the null model (R^2).

Preliminary Analyses: Hypothesis 1

First, baseline models were computed to determine intraclass correlations (ICCs), or the ratio of the between-person variance to the total variance observed in each variable, to assess whether multilevel analyses could be conducted. All variables demonstrated an acceptable proportion of between-person variance ranging from .20 to .35, with separation anxiety and sleep quality demonstrating the highest between-person variability (see Table 1). Based on these ICCs, these data were deemed suitable for multilevel analysis (Bliese, 1998).

Additionally, there was significant within-level variation in each of the variables of interest, suggesting that individuals vary in their levels of anxiety, impairment/distress, and sleep quality (Table 1). This finding lends supports to the first hypothesis that there would be significant day-to-day variation in anxiety, impairment/distress, and sleep quality.

Primary Analyses: Hypotheses 2 – 5

To test the remaining hypotheses, several multilevel models were conducted with intercepts and slopes included as outcomes to model daily variability in children based on group-level characteristics. All level one predictor variables were group mean centered to isolate any within-person effects (each construct of interest served as a level one predictor variable for each relevant research question). As each child served as cluster of data, group mean centering

allowed for children's daily deviations to be compared to their own average level behavior rather than to the average level of behavior in the sample. The Diary day (i.e., time) variable, served as the level two predictor in each model. To assess spillover effects, independent variables were time-lagged by one day and dependent variables were left as is, such that data from the previous day was being compared to data the day following. All days were considered in each of the analyses.

Hypothesis 2: Prospective Anxiety Associations

Inconsistent with the hypothesis, greater than average separation anxiety relative to each child's average level of behavior on a particular day did not predict separation anxiety the following day ($B = -.05$, $SE = 0.03$, $p = .09$, $R^2 = .02$). Also, inconsistent with the hypothesis, greater than average social anxiety relative to the mean level of behavior each day predicted a *decrease* in social anxiety behaviors the following day ($B = -0.08$, $SE = 0.03$, $p = .01$, $R^2 = .01$).

Hypothesis 3: Prospective Impairment Associations

When parents reported increases in functional impairment associated with separation anxiety relative to their child's mean, they reported decreases in functional impairment related to separation anxiety the following day ($B = -.08$, $SE = 0.03$, $p < .01$, $R^2 = .07$). There was no relation identified between increased social anxiety functional impairment on a particular day and next day social anxiety functional impairment ($B = -.004$, $SE = 0.02$, $p = .80$, $R^2 = .08$).

Hypothesis 4a: Same Day Anxiety and Impairment Associations

When parents reported increased anxious behavior relative to their child's mean, they also experienced increases in impairment and distress within the same day. Parent-reported increases in children's anxiety behaviors on a particular day relative to children's mean levels of behavior predicted increased levels of functional impairment (separation anxiety: $B = .16$, $SE =$

0.02, $p < .001$, $R^2 = 0.35$; social anxiety: $B = .15$, $SE = 0.02$, $p < .001$, $R^2 = 0.44$), child stress (separation anxiety: $B = 0.14$, $SE = 0.02$, $p < .001$, $R^2 = .09$; social anxiety: $B = 0.09$, $SE = 0.02$, $p < .001$, $R^2 = .04$), and parenting stress (separation anxiety: $B = 0.14$, $SE = 0.02$, $p < .001$, $R^2 = .08$; social anxiety: $B = 0.06$, $SE = 0.01$, $p < .001$, $R^2 = .05$) within the same day. Only increases in children's separation anxiety predicted decreases in parent-child relationship quality within the same day (separation anxiety: $B = -.10$, $SE = .02$, $p < .001$, $R^2 = .07$); the relation between children's increases in social anxiety and same day parent-child relationship quality reached marginal significance (social anxiety: $B = -0.02$, $SE = 0.01$, $p = .07$, $R^2 = .06$). These results support the hypothesis that when children are reported to demonstrate greater anxious behavior relative to their average level of behavior, they will also demonstrate increased impairment and distress within the same day.

Hypothesis 4b: Prospective Anxiety and Impairment Associations

Greater than average separation and social anxiety behavior in individuals did not predict increased next day impairment and distress on the following day, thus lending no support to the hypothesis that when parents reported their children to experienced greater anxious behaviors relative to their mean level of behavior they would experience increases in impairment and distress the following day (see Table 2).

Hypothesis 5: Prospective Sleep, Anxiety, and Impairment Associations

Lastly, it was found that when children were reported to experience decreased sleep quality relative to their average level of sleep quality, parents reported increases in the frequency of children's separation anxiety behaviors ($B = -.14$, $SE = 0.03$, $p < .001$, $R^2 = .08$) and functional impairment ($B = -.03$, $SE = 0.01$, $p < .001$, $R^2 = .04$) the following day. These relationships were not identified for social anxiety or associated impairment (social anxiety: $B = -.005$, $SE = 0.03$, p

=.86, R^2 = .06; impairment: B = -0.002, SE = 0.003, p = .75, R^2 = .05). In addition, when parents reported their children to have decreased sleep quality relative to their average level of sleep quality, parents reported increased child stress (B = -.08, SE = .02, p <.001, R^2 = 0.03) and parenting stress (B = -.07, SE = 0.02, p < .001, R^2 = .04), and decreased relationship quality (B = .08, SE = .02, p <.001, R^2 = .05) the following day.

Discussion

The current study sought to use a daily diary method to assess anxious behavior, impairment, and sleep quality in preschool-aged children to gain more nuanced understanding of when and under what conditions typical anxious behaviors may be considered problematic. Specifically, day-to-day relations between these constructs were analyzed to examine potential spillover effects of higher levels of anxious behavior, anxious impairment, and lower levels of sleep quality. These data can contribute to the effort to better distinguish between typical anxious behavior and clinical symptoms.

It was hypothesized that when children showed greater separation or social anxiety on a particular day relative to their average level of behavior, parents would report greater levels of the corresponding behavior the following day. The findings did not support this hypothesis; instead, there was no relationship between increased separation anxiety on a particular day and next day levels of separation anxiety. Further, and also in the opposite direction of what was predicted, it was found that when children experienced greater social anxiety relative to their average level of behavior, they experienced less social anxiety the following day. A potential explanation for these results may be regression towards the mean. Regression towards the mean is a measurement phenomenon associated with repeated measures design with identical measurement often utilized in both developmental research and clinical research given these

fields are often interested in change over time (Baltes, Reese, & Nesselroade, 1977; James, 1973). It is a phenomenon in which scores that deviate from the mean at one time point tend to fall closer to the mean on the subsequent measurement (Nesselroade, Stigler, & Baltes, 1980). For example, in clinical research, significant reduction in psychological symptoms based on pre/post-test measurements administered to assess change after treatment, may be due in part to mean regression rather than solely to the efficacy of the treatment (Hsu, 1989; James, 1973). However, it has been suggested that mean regression is less of a possibility when there is measurement at multiple time points as opposed to traditional pre/post measurement (Nesselroad et al., 1980); therefore, mean regression is unlikely to explain the results in the present study given 14 time points of data collected per participant. Another possible explanation is that common antecedents of socially anxious behavior (e.g., playdates, birthday parties) may have been inconsistent across the diary period. Although these data did not support the study hypothesis, the findings suggest there is day-to-day variation in the levels of anxious behavior (i.e., decreases in social anxiety from day-to-day) exhibited in preschool-aged children.

It was also hypothesized that when children experienced greater impairment and distress on a particular day relative to their average level of impairment/distress, parents would report greater levels of impairment the following day. Greater levels of impairment and distress than what is typical for children on particular day did not predict levels of impairment and distress the following day. Regression towards the mean and/or potential inconsistent day-to-day antecedents of impairment may contribute to these null findings. For example, when parents and children experienced a difficult day that elicited greater impairment/distress due to anxious behaviors, they may have worked to achieve more of an equilibrium the following day by limiting situations/experiences that may have exacerbated children's anxiety the day prior. However,

there are no studies that have examined the daily pattern of impairment/distress in children and parents as results of anxious behaviors, so these explanations offered are speculative.

I further hypothesized that when children experienced greater separation or social anxiety relative to their average on a particular day, parents would report greater levels of impairment and distress the following day. It was found that more than typical socially anxious behavior did not predict levels of impairment and distress the following day and that more than typical separation anxiety behavior predicted decreased separation anxiety impairment the following day. Although these relationships were not predicted, these findings are somewhat consistent with studies that have explored ego resiliency differences in anxious and non-anxious children. Specifically, children with anxiety disorders or anxious tendencies have been found to be less likely to be resilient when faced with challenges than children without such tendencies (Eisenberg et al., 1997, Huey & Weiz, 1997, Wolfson, Field, & Rose, 1987). Given our community sample was largely typically functioning, the lack of positive associations between impairment on a particular day and levels of anxious behavior the day prior may illustrate children's ability to cope with the distress related to spikes in anxious behaviors such that they are no longer impaired by the behavior the following day. Further, the lack of associations from one day to the next supports the tenant that anxious behavior in early childhood is typical and does not significantly interfere with day-to-day functioning in children experiencing non-clinical levels of anxiety. Additionally, the day following a difficult day for a child, parents may make efforts to reduce their anxiety and impairment the day following. It is possible that these results would be significant in a clinical sample of children experiencing more significant levels of anxiety. However, the goal of this study was to investigate day-to-day associations between

anxiety and impairment to improve understanding of typical development; thus, investigation in a community sample was warranted.

The relationships between anxious behavior and impairment/distress within the same day were also investigated. It was hypothesized that when children were reported to show greater separation and social anxiety behavior relative to their average level of behavior, their parents would report greater levels of impairment the same day. Consistent with the hypothesis, we found that when parents reported greater levels of separation and social anxiety behaviors than what is typical for their children, they also reported greater impairment and distress within the same day. These findings are consistent with other studies that link anxious behavior in children to impairment in child/family functioning (Allen et al., 2010a; Blossom et al., 2013; Knappe et al., 2010; Towe-Goodman et al., 2014). Towe-Goodman et al. (2014) found that families of clinically anxious children experienced significantly greater negative family impact than families of typically functioning children. Allen et al. (2010a) also found that there was a significant relationship between children's SAD behavior and mothers' quality of life such that as separation anxiety behavior increased, mother's quality of life decreased. Therefore, consistent with this work, the current study identified within-day associations between children's anxiety behaviors and impairment and distress for children and families.

Lastly, effects of decreased sleep quality to the subsequent day were examined. It was hypothesized that when children experienced decreased sleep quality relative to their average level of sleep quality, their parents would report increased anxious behavior, impairment, and distress the following day. Consistent with this hypothesis, it was found that when children experienced decreased sleep quality relative to their average level of sleep quality, their parents reported increased separation anxiety behaviors, impairment associated with separation anxiety,

child stress, and parenting stress, and lower parent-child relationship quality. These findings are consistent with the literature linking impairing anxiety and decreased sleep quality in a broader context. For example, anxious youth assessed in a laboratory setting were found to have decreased sleep quality below that of depressed youth and healthy controls (Forbes, 2008). Additionally, Alfano and colleagues (2006) found that children with greater SRPs were more impaired by their anxious behavior than children with fewer SRPs. However, this is the first study to my knowledge to examine the immediate effects of sleep quality on children's anxious behavior and impairment the subsequent day.

Sleep quality did not influence the association between social anxiety and social anxiety impairment. Based on previous literature, it was expected that this study would identify a relationship between sleep quality and next day social anxiety and impairment. For example, Alfano et al. (2007) observed increased severity of anxious symptoms and impairment when SRPs were present across all anxiety diagnoses including social anxiety; however, these associations were found in a sample of school-aged children (6 – 17 years old). The present study investigated these associations in a community sample of preschool-aged children; therefore, it is possible that SRPs are not related to anxiety in samples with less symptomatology and/or in younger children compared to other samples. Given that the relationship between SRPs and anxious symptomology strengthens across development (Gregory & O' Conner, 2002), it is possible that decreased sleep quality does not meaningfully impact social anxiety and impairment during the preschool period and may become more problematic as children develop.

Finally, when the parameter estimates of analyses with separation and social anxiety in this study are compared, the relationships between separation anxiety and impairment and distress appear to be larger, suggesting that impairment associated with separation anxiety

behavior is more salient during this developmental period. Additionally, there were observed

relationships between sleep quality and separation anxiety and associated impairment, whereas

there were no observed relationships between sleep quality and social anxiety. Taken together,

these results suggest that social anxiety is less relevant/more developmentally normative during

the preschool years. Indeed, several studies reporting the prevalence rates of anxiety disorders in

early childhood have reported the rates of separation anxiety disorder to be higher than those of

social anxiety disorder (Bufferd et al., 2011; Egger & Angold, 2006; Franz et al., 2013). Given

the strong evaluative component of social anxiety (Schlenker & Leary, 1982), preschool-aged

children may be less affected by socially anxious behavior as young children's cognitive

development and self-awareness may not yet be sensitive to concerns of negative social

evaluation. Conversely, separation anxiety disorder is characterized by fears of separating from a

caregiver to a child is attached (American Psychiatric Association, 2013). Given preschoolers

depend heavily on their caregivers for their emotional and physical needs, the components of

separation anxiety are extremely relevant during this stage of development (Gullone, 2000;

Milrod et al., 2014; Murris et al., 2000). The findings in this study are consistent with these

developmental observations.

Strengths

This study had several strengths associated with the use of a daily diary method. The 14-

day daily diary allowed for the examination of the daily associations and spillover effects of

anxious behaviors and impairment. This examination of the prospective relations between these

constructs would not have been possible with a cross-sectional questionnaire, and the daily diary

method minimizes the error introduced by memory recall. For example, other measures of

anxious and behavior and impairment in children ask parents to report over the previous one to

three months or more (e.g., PAPA, ECI), which may introduce greater retrospective recall bias than a diary method (Bolger et al., 2003, Van Den Brink et al., 2001). The current study was part of a larger study that employed both the daily diary method and a cross-sectional survey to assess anxiety and impairment in the sample of preschool-aged children. In a set of unpublished analyses comparing these methodological approaches, it was found that the correlations between parent reported anxious behavior and impairment were significantly larger when assessed with the daily diary than when compared to measures with a longer period of recall. These data support the use of daily diary method to assess anxious behavior and associated impairment in young children as a means of (ideally) obtaining the most accurate information about the links between these constructs. An additional strength of this study was that it a was multisite study with participants from two geographic regions, suggesting that the results may generalize to individuals with a variety of demographic characteristics.

Limitations

The current study also had some limitations. First, few items were used to assess impairment, distress, and sleep quality respectively. Although there were several examples given to guide the parent in their ratings on the functional impairment items, and more items were not feasible given the frequency with which parents were completing the measures (i.e., nightly), the items may have not captured the full scope of functional impairment and/or distress children and parents may have experienced each day. For example, individual items assessing the various domains of impairment (e.g., relationships, ability to follow daily routines) may have yielded more nuanced information than a single item assessing impairment across each domain. Further, additional sleep items such as number of hours slept, and sleep latency, which are constructs that are related to restful sleep, may have provided more variation in reports of sleep quality.

Additionally, the data were zero-inflated, such that many parents reported that their children did not experience anxious behavior most days. Although, a community sample was needed for the purposes of this study, it is possible that there was underrepresentation of children experiencing anxiety and impairment, thus not allowing the measures to fully capture the hypothesized day-to-day relationships between anxious behavior and impairment. Indeed, the mean level of impairment, a main tenant of concerning anxiety, was very low in this study. In future research, additional focus should be given to recruiting (and possibly over-representing) a more diverse group of children in terms of behavioral functioning allowing for greater opportunity to detect spillover relations between anxiety and impairment if indeed present.

Finally, parental sleep quality was not assessed in the study. Research has suggested that parental sleep/wake patterns can directly relate to sleep patterns exhibited in children via genetic and psychosocial influences (Ferber, 1990; Gau, Merikangas, 2004; Zhang, Li, Fok, & Wing, 2010). Similarly, children's sleep quality has been found to predict maternal sleep quality and maternal sleep quality has been linked to maternal mood disturbances, stress, and daytime functioning (Meltzer & Mindell, 2007). Consequences of decreased sleep quality in parents, such as mood difficulties and stress, have been linked to anxious behavior in preschool-aged children (Beidel & Turner, 1997; Crawford & Manassis, 2001; Dougherty et al., 2013). As such, it is possible that parental patterns of sleep quality impacted the relationships between anxious behavior, child and family impairment/distress, and sleep quality in this study; however, without such data on parental sleep, no conclusions about this point can be made. Future research examining the day-to-day relationships between anxious behavior, impairment, and sleep quality in young children could include measures of parental sleep quality to identify whether poor parental sleep quality is an additional daily risk factor for problematic anxiety in early childhood.

Conclusion

This study aided in the mapping the developmental patterns of anxious behavior, impairment, distress, and sleep during preschool age, which can contribute to efforts to distinguish between developmentally typical and clinically concerning behavior. Results supported the hypotheses that when children experience higher anxious behavior than what is typical for themselves, that they and parents experience greater impairment or distress. Further, and contrary to study hypotheses, this study found that increased socially anxious behavior on a particular day may lead to a decrease in such behavior the following day. Lastly, decreased sleep quality on a particular night contributed to increased separation anxiety and parent-child impairment and distress the following day. Based on the present findings, child practitioners should consider children at risk for clinically concerning anxiety if they are experiencing both child and parent impairment or distress associated with such behaviors, particularly if children are experiencing decreased sleep quality in conjunction with higher than typical separation anxiety behaviors. It is important to follow-up with these children and parents to determine if the combination of anxiety behavior, associated impairment, and sleep quality predict later clinical symptoms. Further, replication of the current study using a larger sample size, and a more diverse sample in terms of behavioral and emotional functioning may allow for validation and/or expansion of the current results and enable additional risk factors (e.g., specific anxious behaviors, specific parent/child stressors) to be identified.

References

Alfano, C. A., Beidel, D. C., Turner, S. M., & Lewin, D. S. (2006). Preliminary evidence for
    sleep complaints among children referred for anxiety. *Sleep medicine*, *7*(6), 467-473.

Alfano, C. A., Gamble, A. L. (2009). The role of sleep in childhood psychiatric disorders. *Child
    and Youth Care Forum 38* (6), 327-340.

Alfano, C. A., Ginsburg, G. S., & Kingery, J. N. (2007). Sleep-related problems among children
    and adolescents with anxiety disorders. *Journal of the American Academy of Child &
    Adolescent Psychiatry*, *46*(2), 224-232.

Allen, J. L., Blatter-Meunier, J., Ursprung, A., & Schneider, S. (2010a). Maternal daily diary
    report in the assessment of childhood separation anxiety. *Journal of Clinical Child and
    Adolescent Psychology*, *39*(2), 252-259.

Allen, J. L., Blatter-Meunier, J., Ursprung, A., & Schneider, S. (2010b). The separation anxiety
    daily diary: Child version: Feasibility and psychometric properties. *Child Psychiatry &
    Human Development*, *41*(6), 649-662.

Angold, A., & Costello, E. (2009). Nosology and measurement in child and adolescent
    psychiatry. *Journal of Child Psychology and Psychiatry*, *50*(1-2), 9-15.

Anticich, S. A., Barrett, P. M., Silverman, W., Lacherez, P., & Gillies, R. (2013). The prevention
    of childhood anxiety and promotion of resilience among preschool-aged children: A
    universal school based trial. *Advances in school mental health promotion*, *6*(2), 93-121.

Baltes, P., Reese, H. W., & Nesselroade, J. R. (1977). Life-span developmental psychology:
    Introduction to research methods. Monterey, CA: Brooks.

Battaglia, M., Touchette, É., Garon-Carrier, G., Dionne, G., Côté, S. M., Vitaro, F., & Boivin, M.
    (2016). Distinct trajectories of separation anxiety in the preschool years: Persistence at

school entry and early-life associated factors. *Journal of Child Psychology and Psychiatry*, *57*(1), 39-46.

Bandell-Hoekstra, I. E., Abu-Saad, H. H., Passchier, J., Frederiks, C., Feron, F. J., & Knipschild, P. (2002). Coping and quality of life in relation to headache in Dutch schoolchildren. *European Journal of Pain*, *6*(4), 315-321.

Beesdo, K., Knappe, S., & Pine, D. S. (2009). Anxiety and anxiety disorders in children and adolescents: Developmental issues and implications for DSM-V. *Psychiatric Clinics of North America*, *32*(3), 483-524.

Beidel, D. C., Neal, A. M., & Lederer, A. S. (1991). The feasibility and validity of a daily diary for the assessment of anxiety in children. *Behavior Therapy*, *22*(4), 505-517.

Beidel, D. C., & Turner, S. M. (1997). At risk for anxiety: I. Psychopathology in the offspring of anxious parents. *Journal of the American Academy of Child & Adolescent Psychiatry*, *36*(7), 918-924.

Berg-Nielsen, T. S., Vikan, A., & Dahl, A. A. (2002). Parenting related to child and parental psychopathology: A descriptive review of the literature. *Clinical Child Psychology and Psychiatry*, *7*(4), 529-552.

Biederman, J., Hirshfeld-Becker, D. R., Rosenbaum, J. F., Hérot, C., Friedman, D., Snidman, N., & Faraone, S. V. (2001). Further evidence of association between behavioral inhibition and social anxiety in children. *American Journal of Psychiatry*, *158*(10), 1673-1679.

Biederman, J., Rosenbaum, J. F., Bolduc-Murphy, E. A., Faraone, S. V., Chaloff, J., Hirshfeld, D. R., & Kagan, J. (1993). A 3-year follow-up of children with and without behavioral inhibition. *Journal of the American Academy of Child & Adolescent Psychiatry*, *32*(4), 814-821.

Bliese, P. D. (1998). Group size, ICC values, and group-level correlations: A simulation. *Organizational research methods*, *1*(4), 355-373.

Bland, J. M., & Altman, D. G. (1994). Statistics notes: some examples of regression towards the mean. *British Medical Journal*, *309*(6957), 780.

Blossom, J. B., Ginsburg, G. S., Birmaher, B., Walkup, J. T., Kendall, P. C., Keeton, C. P., Langley, A. K., Piacentini, J. C., Sakolsky, D., & Albano, A. M. (2013). Parental and family factors as predictors of threat bias in anxious youth. *Cognitive Therapy and Research*, *37*(4), 812–819.

Bolger, N., Davis, A., & Rafaeli, E. (2003). Diary methods: Capturing life as it is lived. *Annual review of psychology*, *54*(1), 579-616.

Booth-LaForce, C., Oh, W., Kennedy, A. E., Rubin, K. H., Rose-Krasnor, L., & Laursen, B. (2012). Parent and peer links to trajectories of anxious withdrawal from grades 5 to 8. *Journal of Clinical Child & Adolescent Psychology*, *41*(2), 138-149.

Bögels, S. M., & Brechman-Toussaint, M. L. (2006). Family issues in child anxiety: Attachment, family functioning, parental rearing and beliefs. *Clinical Psychology Review*, *26*(7), 834–56.

Bufferd, S. J., Dougherty, L. R., Carlson, G. A., & Klein, D. N. (2011). Parent-reported mental health in preschoolers: Findings using a diagnostic interview. *Comprehensive Psychiatry*, *52*(4), 359-369.

Bufferd, S. J., Dougherty, L. R., Carlson, G. A., Rose, S., & Klein, D. N. (2012). Psychiatric disorders in preschoolers: Continuity from ages 3 to 6. *American Journal of Psychiatry*, *169*(11), 1157-1164.

Bufferd, S. J., Dyson, M. W., Hernandez, I. G., & Wakschlag, L. S. (2016). Explicating the "developmental" in preschool psychopathology. In D. Cicchetti (Ed.), *Developmental Psychopathology, Third Edition* (pp. 152-186). Hoboken, NJ: John Wiley & Sons.

Bull, L. E., Oliver, C., Tunnicliffe, P. L., & Woodcock, K. A. (2015). An informant report behavior diary for measuring temper outbursts in an intervention setting. *Journal of Developmental and Physical Disabilities*, *27*(4), 489-504.

Broeren, S., Muris, P., Diamantopoulou, S., & Baker, J. R. (2013). The course of childhood anxiety symptoms: Developmental trajectories and child-related factors in normal children. *Journal of Abnormal Child Psychology*, *41*(1), 81–95. doi:10.1007/s10802-012-9669-9

Brown, T. A., Chorpita, B. F., & Barlow, D. H. (1998). Structural relationships among dimensions of the DSM-IV anxiety and mood disorders and dimensions of negative affect, positive affect, and autonomic arousal. *Journal of Abnormal Psychology*, *107*(2), 179.

Chorney, D. B., Detweiler, M. F., Morris, T. L., & Kuhn, B. R. (2007). The interplay of sleep disturbance, anxiety, and depression in children. *Journal of Pediatric Psychology*, *33*(4), 339-348.

Colasante, T., Zuffianò, A., & Malti, T. (2016). Daily deviations in anger, guilt, and sympathy: A developmental diary study of aggression. *Journal of Abnormal Child Psychology*, *44*(8), 1515-1526.

Costello, E. J., Egger, H. L., & Angold, A. (2004). Epidemiology of Anxiety Disorders. *Phobic and anxiety disorders in children and adolescents: A clinician's guide to effective psychosocial and pharmacological interventions*.

Costello, E. J., Egger, H. L., & Angold, A. (2005). The developmental epidemiology of anxiety

disorders: Phenomenology, prevalence, and comorbidity. *Child and Adolescent*

Psychiatric Clinics of North America, *14*(4), 631-648.

Crawford, A. M., & Manassis, K. (2001). Familial predictors of treatment outcome in childhood

anxiety disorders. *Journal of the American Academy of Child and Adolescent*

Psychiatry, *40*(10), 1182-1189.

Darling, N., & Steinberg, L. (1993). Parenting style as context: An integrative

model. *Psychological Bulletin*, *113*(3), 487.

Dougherty, L. R., Tolep, M. R., Bufferd, S. J., Olino, T. M., Dyson, M., Traditi, J., & Klein, D.

N. (2013). Preschool anxiety disorders: Comprehensive assessment of clinical,

demographic, temperamental, familial, and life stress correlates. *Journal of Clinical Child*

& Adolescent Psychology, *42*(5), 577-589.

Earls, F. (1982). Application of DSM-III in an epidemiological study of preschool children. *The*

American Journal of Psychiatry.

Egger, H. L., Ascher, B. H., & Angold, A. (1999). *The Preschool Age Psychiatric Assessment:*

Version 1.1. Unpublished Interview Schedule. Durham, NC: Center for Developmental

Epidemiology, Department of Psychiatry and Behavioral Sciences, Duke University

Medical Center.

Egger, H., & Angold, A. (2006). Common emotional and behavioral disorders in preschool

children: Presentation, nosology, and epidemiology. *Journal of Child Psychology and*

Psychiatry, *47*(34), 313-337.

Eiesnberg, N., Guthrie, I. K., Fabes, R. A., Reiser, M., Murphy, B., Holgren, R., & Losoya, S. (1997). The relations of regulation and emotionality to resiliency and competent social functioning in elementary school children. *Child development*, *68*(2), 295-311.

Ferber, R. (1990). Sleep schedule-dependent causes of insomnia and sleepiness in middle childhood and adolescence. *Pediatrician*, *17*(1), 13-20.

Forbes, E. E., Bertocci, M. A., Gregory, A. M., Ryan, N. D., Axelson, D. A., Birmaher, B., & Dahl, R. E. (2008). Objective sleep in pediatric anxiety disorders and major depressive disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, *47*(2), 148-155.

Egger, H., Ascher, B., & Angold, A. (1999). Preschool Aged Psychiatric Assessment-Parent Interview. *Unpublished manuscript, Center for Developmental Epidemiology, Department of Psychiatry and Behavioral Sciences, Duke University Medical Center, Durham, NC*.

Egger, H. L., & Emde, R. N. (2011). Developmentally sensitive diagnostic criteria for mental health disorders in early childhood: The diagnostic and statistical manual of mental disorders—IV, the research diagnostic criteria—preschool age, and the Diagnostic Classification of Mental Health and Developmental Disorders of Infancy and Early Childhood—Revised. *American Psychologist*, *66*(2), 95.

Eley, T. C., Bolton, D., O'connor, T. G., Perrin, S., Smith, P., & Plomin, R. (2003). A twin study of anxiety-related behaviours in pre-school children. *Journal of Child Psychology and Psychiatry*, *44*(7), 945-960.

Farmer, A. S., & Kashdan, T. B. (2012). Social anxiety and emotion regulation in daily life: Spillover effects on positive and negative social events. *Cognitive behaviour therapy 41*(2), 152-162.

Franz, L., Angold, A., Copeland, W., Costello, E. J., Towe-Goodman, N., & Egger, H. (2013). Preschool anxiety disorders in pediatric primary care: Prevalence and comorbidity. *Journal of the American Academy of Child and Adolescent Psychiatry*, *52*(12), 1294-1303.

Frenkel, T. I., Fox, N. A., Pine, D. S., Walker, O. L., Degnan, K. A., & Chronis-Tuscano, A. (2015). Early childhood behavioral inhibition, adult psychopathology and the buffering effects of adolescent social networks: A twenty-year prospective study. *Journal of Child Psychology and Psychiatry*, *56*(10), 1065-1073.

Gadow, K. D., & Sprafkin, J. (1997). Early childhood inventory-4 norms manual. *Stony Brook, NY: Checkmate Plus*.

Gagne, J. R., Vendlinski, M. K., & Goldsmith, H. H. (2009). The genetics of childhood temperament. In *Handbook of behavior genetics* (pp. 251-267). Springer New York.

Gau, S. S. F., Soong, W. T., & Merikangas, K. R. (2004). Correlates of sleepwake patterns among children and young adolescents in Taiwan. *Sleep*, *27*(3), 512-519.

Gilbert, P. (2003). Evolution, social roles, and the differences in shame and guilt. *Social Research*, 1205-1230.

Gomez, R. L., & Edgin, J. O. (2015). Sleep as a window into early neural development: Shifts in sleep dependent learning across early childhood. *Child Development Perspectives, 9*(3) 183- 189.

Gullone, E. (2000). The development of normal fear: A century of research. *Clinical Psychology Review*, *20*(4), 429-451.

Gregory, A. M., & O' Connor, T. G. (2002). Sleep problems in childhood: A longitudinal study of developmental change and association with behavioral problems. *Journal of the American Academy of Child & Adolescent Psychiatry*, *41*(8), 964-971.

Hettema, J. M., Neale, M. C., & Kendler, K. S. (2001). A review and meta-analysis of the genetic epidemiology of anxiety disorders. *American Journal of Psychiatry*, *158*(10), 1568-1578.

Hirshfeld-Becker, D. R., & Biederman, J. (2002). Rationale and principles for early intervention with young children at risk for anxiety disorders. *Clinical child and Family Psychology Review*, *5*(3), 161-172.

Hirshfeld, D. R., Rosenbaum, J. F., Biederman, J., Bolduc, E. A., Faraone, S. V., Snidman, N., & Kagan, J. (1992). Stable behavioral inhibition and its association with anxiety disorder. *Journal of the American Academy of Child and Adolescent Psychiatry*, *31*(1), 103-111.

Hsu, L. M. (1989). Reliable changes in psychotherapy: Taking into account regression toward the mean. *Behavioral Assessment*.

Hudson, J. L., Dodd, H. F., Lyneham, H. J., & Bovopoulous, N. (2011). Temperament and family environment in the development of anxiety disorder: Two-year follow-up. *Journal of the American Academy of Child & Adolescent Psychiatry*, *50*(12), 1255-1264.

Hudson, J. L., Gradisar, M., Gamble, A., Schniering, C. A., & Rebelo, I. (2009). The sleep patterns and problems of clinically anxious children. *Behaviour research and therapy*, *47*(4), 339-344.

Hudson, J. L., & Rapee, R. M. (2000). The origins of social phobia. *Behavior Modification*, *24*(1), 102-129.

Hudson, J. L., & Rapee, R. M. (2001). Parent–child interactions and anxiety disorders: An observational study. *Behaviour research and therapy*, *39*(12), 1411-1427.

Hudson, J. L., & Rapee, R. M. (2005). Parental perceptions of overprotection: Specific to anxious children or shared between siblings? *Behaviour Change*, *22*(3), 185-194.

Hughes, A. A., & Kendall, P. C. (2009). Psychometric properties of the Positive and Negative Affect Scale for Children (PANAS-C) in children with anxiety disorders. *Child Psychiatry & Human Development*, *40*(3), 343-352.

Huhnan, K. L. (2006). Social conflict models: Can they inform us about psychopathology? *Hormones and Behavior, 50,* 640-646

James, K. E. (1973). Regression toward the mean in uncontrolled clinical studies. *Biometrics*, 121-130.

Kagan, J., Reznick, J. S., & Gibbons, J. (1989). Inhibited and uninhibited types of children. *Child Development*, 838-845.

Kagan, J., Reznick, J. S., & Snidman, N. (1987). The physiology and psychology of behavioral inhibition in children. *Child development*, 1459-1473.

Kashdan, T. B., Goodman, F. R., Machell, K. A., Kleiman, E. M., Monfort, S. S., Ciarrochi, J., & Nezlek, J. B. (2014). A contextual approach to experiential avoidance and social anxiety: Evidence from an experimental interaction and daily interactions of people with social anxiety disorder. *Emotion*, *14*(4), 769.

Kashdan, T. B., & Farmer, A. S. (2014). Differentiating emotions across contexts: Comparing

    adults with and without social anxiety disorder using random, social interaction, and daily

    experience sampling. *Emotion*, *14*(3), 629.

Kearney, C. A., Sims, K. E., Pursell, C. R., & Tillotson, C. A. (2003). Separation anxiety

    disorder in young children: A longitudinal and family analysis. *Journal of Clinical Child

    and Adolescent Psychology*, *32*(4), 593-598.

Keenan, K., Shaw, D. S., Walsh, B., Delliquadri, E., & Giovannelli, J. (1997). DSM-III-R

    disorders in preschool children from low-income families. *Journal of the American

    Academy of Child & Adolescent Psychiatry*, *36*(5), 620-627.

Keller, M. B., Lavori, P. W., Wunder, J., Beardslee, W. R., Schwartz, C. E., & Roth, J. (1992).

    Chronic course of anxiety disorders in children and adolescents. *Journal of the American

    Academy of Child & Adolescent Psychiatry*, *31*(4), 595-599.

Kennedy, S. J., Rapee, R. M., & Edwards, S. L. (2009). A selective intervention program for

    inhibited preschool-aged children of parents with an anxiety disorder: Effects on current

    anxiety disorders and temperament. *Journal of the American Academy of Child &

    Adolescent Psychiatry*, *48*(6), 602-609.

Kessler, R. C., Chiu, W. T., Demler, O., & Walters, E. E. (2005). Prevalence, severity, and

    comorbidity of 12-month DSM-IV disorders in the National Comorbidity Survey

    Replication. *Archives of General Psychiatry*, *62*(6), 617-627.

Klein, D. N., Dyson, M. W., Kujawa, A. J., & Kotov, R. (2012). Temperament and internalizing

    disorders. *Handbook of Temperament.*

Knappe, S., Beesdo-Baum, K., & Wittchen, H. U. (2010). Familial risk factors in social anxiety

    disorder: Calling for a family-oriented approach for targeted prevention and early

    intervention. *European Child & Adolescent Psychiatry*, *19*(12), 857-871.

Krystal, A. D., & Edinger, J. D. (2008). Measuring sleep quality. *Sleep Medicine*, *9*, S10-S17.

Kurdziel, L., Duclos, K., & Spencer, R. M. (2013). Sleep spindles in midday napes enhance

    learning in preschool aged children. *Proceedings of the National Academy of Sciecnes,*

    110(43), 17267-17272.

Lau, E. X., & Rapee, R. M. (2011). Prevention of anxiety disorders. *Current Psychiatry*

    Reports, *13*(4), 258-266.

Lewinsohn, P. M., Holm-Denoma, J. M., Small, J. W., Seeley, J. R., & Joiner, T. E. (2008).

    Separation anxiety disorder in childhood as a risk factor for future mental illness. *Journal*

    of the American Academy of Child & Adolescent Psychiatry, *47*(5), 548-555.

Lewinsohn, P. M., Zinbarg, R., Seeley, J. R., Lewinsohn, M., & Sack, W. H. (1997). Lifetime

    comorbidity among anxiety disorders and between anxiety disorders and other mental

    disorders in adolescents. *Journal of Anxiety Disorders*, *11*(4), 377-394.

Lieb, R., Wittchen, H. U., Höfler, M., Fuetsch, M., Stein, M. B., & Merikangas, K. R. (2000).

    Parental psychopathology, parenting styles, and the risk of social phobia in offspring: A

    prospective-longitudinal community study. *Archives of general psychiatry*, *57*(9), 859-

    866.

McClure, E. B., Brennan, P. A., Hammen, C., & Le Brocque, R. M. (2001). Parental anxiety

    disorders, child anxiety disorders, and the perceived parent–child relationship in an

    Australian high-risk sample. *Journal of Abnormal Child Psychology*, *29*(1), 1-10.

McLeod, B. D., Weisz, J. R., & Wood, J. J. (2007). Examining the association between parenting and childhood depression: A meta-analysis. *Clinical psychology review*, *27*(8), 986-1003.

Meltzer, L. J., & Mindell, J. A. (2007). Relationship between child sleep disturbances and maternal sleep, mood, and parenting stress: a pilot study. *Journal of Family Psychology*, *21*(1), 67.

Mesa, F., Beidel, D. C., & Bunnell, B. E. (2014). An examination of psychopathology and daily impairment in adolescents with social anxiety disorder. *PloS one*, *9*(4), 1-9.

Messer, S. C., & Beidel, D. C. (1994). Psychosocial correlates of childhood anxiety disorders. *Journal of the American Academy of Child & Adolescent Psychiatry*, *33*(7), 975-983.

Mian, N. D., Godoy, L., Briggs-Gowan, M. J., & Carter, A. S. (2012). Patterns of anxiety symptoms in toddlers and preschool-age children: Evidence of early differentiation. *Journal of Anxiety Disorders*, *26*(1), 102-110.

Milrod, B., Markowitz, J. C., Gerber, A. J., Cyranowski, J., Altemus, M., Shapiro, T., & Glatt, C. (2014). Childhood separation anxiety and the pathogenesis and treatment of adult anxiety. *American Journal of Psychiatry*, *171*(1), 34-43.

Mindell, J. A., & Barrett, K. M. (2002). Nightmares and anxiety in elementary-aged children: Is there a relationship? *Childcare, health and development*, *28*(4), 317-322.

Mineka, S., & Öhman, A. (2002). Phobias and preparedness: The selective, automatic, and encapsulated nature of fear. *Biological Psychiatry*, *52*(10), 927-937.

Montplaisir, J. (2007). Dyssomnias and parasomnias in early childhood. *Pediatrics*, *119*(5), e1016-e1025.

Muris, P., & Ollendick, T. H. (2005). The role of temperament in the etiology of child

      psychopathology. *Clinical Child and Family Psychology Review*, *8*(4), 271-289.

Muris, P., Meesters, C., Merckelbach, H., Sermon, A., & Zwakhalen, S. (1998). Worry in normal

      children. *Journal of the American Academy of Child and Adolescent Psychiatry*, *37*(7),

      703-710.

Muris, P., Merckelbach, H., Gadet, B., & Moulaert, V. (2000). Fears, worries, and scary dreams

      in 4-to 12-year-old children: Their content, developmental pattern, and origins. *Journal of*

      Clinical Child Psychology, *29*(1), 43-52

Nesselroade, J. R., Stigler, S. M., & Baltes, P. B. (1980). Regression toward the mean and the

      study of change. *Psychological Bulletin*, *88*(3), 622.

Nilzon, K. R., & Palmerus, K. (1997). The influence of familial factors on anxiety and

      depression in childhood and early adolescence. *Adolescence*, *32*(128), 935-944.

Öhman, A. (2009). Of snakes and faces: An evolutionary perspective on the psychology of

      fear. *Scandinavian Journal of Psychology*, *50*(6), 543-552.

Ollendick, T. H., & Hirshfeld-Becker, D. R. (2002). The developmental psychopathology of

      social anxiety disorder. *Biological Psychiatry*, *51*(1), 44-58.

Pérez-Edgar, K., & Fox, N. A. (2005). Temperament and anxiety disorders. *Child and Adolescent*

      Psychiatric Clinics of North America, *14*(4), 681-706.

Phelps, J. L., Belsky, J., & Crnic, K. (1998). Earned security, daily stress, and parenting: A

      comparison of five alternative models. *Development and Psychopathology*, *10*(1), 21-38.

Polimeni, M. A., Richdale, A. L., & Francis, A. J. P. (2005). A survey of sleep problems in

      autism, Asperger's disorder and typically developing children. *Journal of Intellectual*

      Disability Research, *49*(4), 260-268.

Post, R. M., & Weiss, S. R. (1998). Sensitization and kindling phenomena in mood, anxiety, and

    obsessive–compulsive disorders: The role of serotonergic mechanisms in illness

    progression. *Biological Psychiatry*, *44*(3), 193-206.

Rapee, R. M. (2002). The development and modification of temperamental risk for anxiety

    disorders: Prevention of a lifetime of anxiety? *Biological Psychiatry*, *52*, 947-957.

Rapee, R. M. (1997). Potential role of childrearing practices in the development of anxiety and

    depression. *Clinical Psychology Review*, *17*(1), 47-67.

Rapee, R. M., Kennedy, S., Ingram, M., Edwards, S., & Sweeney, L. (2005). Prevention and

    early intervention of anxiety disorders in inhibited preschool children. *Journal of

    Consulting and Clinical Psychology*, *73*(3), 488.

Rodgers, A. Y. (1998). Multiple sources of stress and parenting behavior. *Children and Youth

    Services Review*, *20*(6), 525-546.

Rothbart, M. K., & Bates, J. E. (2006). Temperament. *Handbook of Child Psychology*.

Rothbaum, F., & Weisz, J. R. (1994). Parental caregiving and child externalizing behavior in

    nonclinical samples: A meta-analysis. *Psychological Bulletin*, *116*(1), 55.

Russell, G., Miller, L. L., Ford, T., & Golding, J. (2014). Assessing recall in mothers'

    retrospective reports: Concerns over children's speech and language

    development. *Journal of Abnormal Child Psychology*, *42*(5), 825-830

Schlenker, B. R., & Leary, M. R. (1982). Social anxiety and self-presentation: A

    conceptualization model. *Psychological Bulletin*, *92*(3), 641.

Shamir-Essakow, G., Ungerer, J. A., & Rapee, R. M. (2005). Attachment, behavioral inhibition, and anxiety in preschool children. *Journal of Abnormal Child Psychology*, *33*(2), 131-143.

Sloman, L. (2000). How the involuntary defeat strategy contributes to depression. In: Sloman, L., Gilber P. (Eds.). Defeat and subordination; An Evolutionary Approach to Mood Disorders and their Therapy. Lawrence Erlbaum Associates, Mahwah, New Jersey, pp. 47-67.

Sloman, L. (2008). A new comprehensive evolutionary model of depression and anxiety. *Journal of Affective Disorders*, *106*(3), 219-228.

Sloman, L., Farvolden, P., Gilbert, P., & Price, J. (2006). The interactive functioning of anxiety and depression in agonistic encounters and reconciliation. *Journal of Affective Disorders*, *90*(2), 93-99.

Sprafkin, J., Volpe, R. J., Gadow, K. D., Nolan, E. E., & Kelly, K. (2002). A DSM-IV–referenced screening instrument for preschool children: The Early Childhood Inventory-4. *Journal of the American Academy of Child and Adolescent Psychiatry*, *41*(5), 604-612.

Stein, M. B., Jang, K. L., & Livesley, W. J. (2002). Heritability of social anxiety-related concerns and personality characteristics: A twin study. *The Journal of nervous and mental disease*, *190*(4), 219-224.

Stein, M. B., & Stein, D. J. (2008). Social anxiety disorder. *The Lancet*, *371* (9618), 1115-1125.

Topolski, T. D., Hewitt, J. K., Eaves, L. J., Silberg, J. L., Meyer, J. M., Rutter, M., & Simonoff, E. (1997). Genetic and environmental influences on child reports of manifest anxiety and symptoms of separation anxiety and overanxious disorders: A community-based twin study. *Behavior Genetics*, *27*(1), 15-28.

Towe-Goodman, N. R., Franz, L., Copeland, W., Angold, A., & Egger, H. (2014). Perceived

family impact of preschool anxiety disorders. *Journal of the American Academy of Child*

& Adolescent Psychiatry, *53*(4), 437-446.

Tverksy, A., & Kaheman, D. (1982). Evidential impact of base rates. In D. Kahneman, P. Slovic,

& A. Tversky (Eds.), *Judgement under certainty: Heuristics and biases* (pp. 153-160.

New York: Cambridge University Press.

Van den Brink, M., Bandell-Hoekstra, E. N. G., & Abu-Saad, H. H. (2001). The occurrence of

recall bias in pediatric headache: a comparison of questionnaire and diary

data. *Headache: The Journal of Head and Face Pain*, *41*(1), 11-20.

Vignoli, E., Croity-Belz, S., Chapeland, V., de Fillipis, A., & Garcia, M. (2005). Career

exploration in adolescents: The role of anxiety, attachment, and parenting style. *Journal*

of Vocational Behavior, *67*(2), 153-168.

Vignoli, E., Croity-Belz, S., Chapeland, V., de Fillipis, A., & Garcia, M. (2005). Career

exploration in adolescents: The role of anxiety, attachment, and parenting style. *Journal*

of Vocational Behavior, *67*(2), 153-168.

Vostanis, P., Graves, A., Meltzer, H., Goodman, R., Jenkins, R., & Brugha, T. (2006).

Relationship between parental psychopathology, parenting strategies and child mental

health. *Social Psychiatry and Psychiatric Epidemiology*, *41*(7), 509-514.

Warren, S. L., Gunnar, M. R., Kagan, J., Anders, T. F., Simmens, S. J., Rones, M., & Sroufe, A.

L. (2003). Maternal panic disorder: infant temperament, neurophysiology, and parenting

behaviors. *Journal of the American Academy of Child & Adolescent Psychiatry*, *42*(7),

814-825.

Watson, D., Clark, L. A., & Carey, G. (1988). Positive and negative affectivity and their relation to anxiety and depressive disorders. *Journal of abnormal psychology*, *97*(3), 346.

Wittchen, H. U., Stein, M. B., & Kessler, R. C. (1999). Social fears and social phobia in a community sample of adolescents and young adults: Prevalence, risk factors and co-morbidity. *Psychological Medicine*, *29*(2), 309-323.

Wolfson, J., Fields, J. H., & Rose, S. A. (1987). Symptoms, temperament, resiliency, and control in anxiety-disordered preschool children. *Journal of the American Academy of Child & Adolescent Psychiatry*, *26*(1), 16-22

Zhang, J., Li, A. M., Fok, T. F., & Wing, Y. K. (2010). Roles of parental sleep/wake patterns, socioeconomic status, and daytime activities in the sleep/wake patterns of children. *The Journal of Pediatrics*, *156*(4), 606-612.

Table 1

Intraclass Correlations and Within- Person Variability for Anxiety, Impairment, Distress, and Sleep Quality.

Variable	ICC	Within-Person Variation
Separation Anxiety Behavior	.35	.77[*]
Social Anxiety Behavior	.24	.86[*]
Separation Anxiety Impairment	.20	.13[*]
Social Anxiety Impairment	.22	.09[*]
Child stress	.24	.37[*]
Parenting Stress	.25	.40[*]
Parent-Child Relationship Quality	.29	.43[*]
Sleep Quality	.35	.42[*]

Note: [*]$p < .001$.

Table 2

Day-to-day Associations Between Separation Anxiety, Impairment, and Distress.

Variable	B	SE	p	R^2
Separation anxiety				
Separation anxiety impairment	-0.001	.007	.87	.07
Child stress	-0.01	.01	.55	.09
Parenting stress	-0.02	.01	.23	.08
Parent-child relationship quality	-0.002	.002	.28	.07
Social anxiety				
Social anxiety impairment	-0.01	.007	.09	.13
Child stress	-0.02	.01	.09	.04
Parenting stress	-0.02	.01	.23	.05
Parent-child relationship quality	-0.01	.002	.57	.06

Appendix A

Preschool Study Daily Diary

Instructions: We would like to know about you child's emotions and behaviors on a daily basis. Please complete each diary entry at night after your child goes to sleep. Provide a response to each question based on the same day only. For example, if you complete the diary after your child goes to bed at 8:00 pm, please think back to your child's behavior since he/she woke up that morning until 8:00pm that night. Please respond to each question for each behavior.

Section 1.

1. How frequently did your child get very upset when he/she expected to be separated from you and/or another caregiver today?

Enter Actual Frequency _____

2. How frequently did your child worry that you or another caregiver would be hurt or leave home and not come back today?

Enter Actual Frequency _____

3. How frequently did your child worry that some disaster (e.g., getting lost, kidnapped, etc.) would separate him/her from you or another caregiver today?

Enter Actual Frequency _____

4. How frequently did your child try to avoid going to daycare, school, or somewhere else without you or another caregiver in order to stay with you or the other caregiver today?

Enter Actual Frequency _____

5. How frequently did your child worry about being left home alone or with a sitter or other relative today?

Enter Actual Frequency _____

6. How frequently did your child seem afraid to go to sleep unless he/she was near you or another caregiver today?

Enter Actual Frequency _____

7. How frequently did your child have a nightmare last night about being separated from you or another caregiver (your child may have mentioned it in the morning, or woke up in the middle of the night to tell you about it)?

Enter Actual Frequency _____

8. How frequently did your child complain about feeling sick when expecting to be separated from your or another caregiver today?

Enter Actual Frequency _____

<u>**Section 2.**</u>

1. How frequently did your child seem shy or quiet around new people today?

Enter Actual Frequency _____

2. How frequently did your child seem shy with peers/other children today?

Enter Actual Frequency _____

3. How frequently was your child shy with family members and familiar adults today?

Enter Actual Frequency _____

4. How frequently did your child cry, "freeze up" and/or withdraw from interacting with others in a social situation today?

Enter Actual Frequency _____