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# The Effects of Parent Factors on Children's Separation Anxiety

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THE EFFECTS OF PARENT FACTORS ON CHILDREN'S SEPARATION  
ANXIETY

A Dissertation

Submitted to the Graduate Faculty of the  
Louisiana State University and  
Agricultural and Mechanical College  
in partial fulfillment of the  
requirements for the degree of  
Doctor of Philosophy

in

The Department of Psychology

by

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This dissertation is dedicated to my parents, Jon May and Carol Cohen, my siblings, Leah May and Joseph May, and my grandparents, Samuel Cohen and Bernice Cohen. Thank you for your support, guidance, and patience in allowing me to pursue this career and the critical and empirical mindset that you instilled in me early on. You have been instrumental in making my academic career possible thus far.

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## Table of Contents

Acknowledgements -----	iii
List of Abbreviations -----	v
Abstract -----	vi
Introduction -----	1
Method -----	21
Results -----	27
Discussion and Future Directions -----	37
References -----	44
Vita -----	61

## List of Abbreviations

SAD = Separation Anxiety Disorder

AS = Anxiety Sensitivity

OCD = Obsessive Compulsive Disorder

GAD = Generalized Anxiety Disorder

SP = Social Phobia

*DSM-IV-TR* = Diagnostic and Statistical Manual of Mental Disorders- Fourth Edition- Text  
Revision

SCARED- C/P = Screen for Child Anxiety Related Emotional Disorders- Parent and Child  
Versions

ASI-24 = Adult Somatization Index- 24

ASI-3 = Anxiety Sensitivity Index- 3

STAI- The State-Trait Anxiety Inventory

ADIS-C/P = Anxiety Disorders Interview Schedule- Child and Parent Versions

## Abstract

Parental anxiety is a well-known factor that contributes to the development of anxiety in children. However, little is known about how specific parental factors influence the development and trajectory of childhood anxiety. There is also a paucity of research on separation anxiety disorder specifically. Complicating matters, children who suffer from clinically significant separation anxiety tend to be younger and thus it is harder to obtain accurate information from this age group. The purpose of the present study was to determine the mechanism through which parental factors such as somatization, anxiety sensitivity, and separation anxious behaviors might influence the development of anxiety in young children (specifically separation anxiety). As a result, 50 children and their mothers completed measures asking about demographic variables, internalizing problems, anxiety sensitivity, and somatization. The results showed that only parental separation anxious behaviors uniquely influenced separation anxious behaviors in children. Results and implications of these findings may be used to direct further examination of influential parental factors and inform treatment by targeting anxious parental behaviors.

## Introduction

Separation anxiety disorder (SAD) is characterized by developmentally inappropriate fear of being separated from caregivers or one's home that is excessive, persistent, distressing, and impairing, and that lasts a minimum of 4 weeks (*DSM-IV-TR*; American Psychological Association, 2000). The onset of symptoms must be present before 18 years of age and must not be attributable to another Axis I disorder, a general medical condition, or the effects of a substance (*DSM-IV-TR*; American Psychological Association, 2000). SAD is associated with worries including the caregiver leaving and not returning, the caregiver getting hurt or injured, and not being able to see the caregiver again (e.g., being kidnapped themselves; Mattis & Pincus, 2004). The most frequent and highest rated separation related concerns involve personal safety and injury (Silverman, La Greca, & Wassertein, 1995), being alone (Farach, 2002), and sleeping alone (Farach, 2002). This dissertation examined possible parental factors that might influence whether a child develops separation anxiety. Mothers specifically were examined due to possible gender differences of the parent. Because parental anxiety is a known factor that influences child anxiety, overall parental trait anxiety was included in the analyses to help determine the unique influence of other factors. The influence of maternal somatization, anxiety sensitivity, and the child's ratings of their mother's separation anxiety were examined for the effects they have on the child's report of his or her own anxiety, as well as the parent's report of her child's anxiety.

The mean age of onset for SAD is estimated to be 7 years of age (Masi, Mucci, & Millepiedi, 2001), and the lifetime prevalence is estimated to be 5.2% (Kessler et al., 2005) with .7-12.9% prevalence in community samples and 11.4-33% prevalence in clinically referred samples (Costello, Egger, & Angold, 2004). In children, rates are much higher; community



samples of children ranged from 3 to 13% (Anderson, Williams, McGee, & Silva, 1987; Bird et al., 1988; Cohen, Cohen, & Brook, 1993) versus 1.8 to 2.4% for adolescents (Bowen, Offord, & Boyle, 1990; Cohen et al., 1993; Fergusson, Horwood, & Lynsky, 1993; McGee, Feehan, Williams, & Anderson, 1992). This is significant because SAD is most common in childhood (7-12 years old; Compton, Nelson, & March, 2000; Last, Perrin, Hersen, & Kazdin, 1992), but can also be problematic in adolescence and can continue throughout the lifespan if not treated during childhood. Shear and colleagues (2006) found that up to one third of children diagnosed with SAD still had clinically significant SAD in adulthood. When present in adolescents, SAD is associated with adjustment problems, eating disorders, and the onset and maintenance of depressive disorders (Ollendick, Lease, & Cooper, 1993).

SAD tends to get worse during significant life stressors involving separation from caregivers (Albano, Chorpita, & Barlow, 2003; Last, Hersen, Kazdin, Finkelstein, & Strauss; 1987). In one large-scale community survey, as many as 41% of children and adolescents reported separation concerns (Costello & Agnold, 1995). In anxiety disorder clinics specifically, SAD has been found to be as high as 47% (Last, Hersen, Kazdin, Finkelstein et al., 1987). Children with SAD also exhibit school refusal behavior (Egger, Costello, & Agnold, 2003): as many as 75% of children with SAD may engage in school refusal behavior (Kearney, 2001; Last & Strauss, 1990; Masi, Mucci, & Millepiedi, 2001).

SAD is more frequent in girls (Compton, et al., 2000; Last, Hersen, Kazdin, Finkelstein et al., 1987, Last et al., 1992); however, boys are more likely to be brought in for treatment because the symptoms might be seen as less socially acceptable (Compton et al., 2000). Separation worries are very common in children who have both internalizing and externalizing problems (Barrios & Hartmann, 1997; Perrin & Last, 1997; Weems, Silverman, & La Greca, 2000), and

are highly comorbid with depression; about one-third of children experience both a depressive disorder and SAD (Last, 1991; Last, Hersen, Kazdin, Finkelstein et al., 1987). SAD is also highly comorbid with other anxiety disorders; Generalized Anxiety Disorder (GAD) co-occurs with SAD about one third of the time (Kendall, Brady, & Verduin, 2001; Masi, Mucci, Favilla, Romano, & Poli, 1999) and these two disorders have many symptoms in common (e.g., frequent worry, somatic complaints). The prevalence of comorbid SAD and Obsessive Compulsive Disorder (OCD) range from 4 to 7% (Brynska & Wolanczyk, 1998; Spence, 1997) but are seen as high as 24 to 34% (Geller, Biederman, Griffen, Jones, & Lefkowitz, 1996; Valleni-Basile et al., 1994); in addition, comorbid SAD and OCD are associated with an earlier onset of Panic Disorder (Goodwin, Lipsitz, Chapman, Manuzza, & Fyer, 2001). Other disorders frequently comorbid with SAD include Social Phobia and Specific Phobias (Kendall et al., 2001; Last, Hersen, Kazdin, Finkelstein et al., 1987; Verduin & Kendall, 2003).

### **Etiology**

A theory of the etiology of anxiety disorders broadly, referred to as “triple vulnerabilities,” encompasses three components that lead to the development of emotional disorders (Barlow, 1991, 2000, 2002). Barlow (2000, 2002) describes the interaction between a biological diathesis, a generalized psychosocial vulnerability (impending uncontrollable and unpredictable threat of danger), and a specific psychological vulnerability (early learning experiences that focus on circumstantial anxiety). The first is a generalized biological vulnerability (sometimes known as temperament) that posits the development of anxiety and negative affect and involves genetic contribution. Thus, behavioral inhibition, the freeze response, might be activated in some individuals more than others in response to threatening stimuli. The second vulnerability is a generalized psychological vulnerability that encompasses

early life experiences. If a child's early experiences resulted in feeling an inability to control important life events, a child might develop negative affect and anxiety (Barlow, 2002). The third vulnerability is a specific psychological vulnerability. This is also a product of early life experiences, but results from learning to fear specific objects or situations from either modeling from parents/others, negative information, or a negative experience with the feared stimulus.

The third vulnerability, the development of fear of a specific stimulus, has been researched and outlined in great detail even before the "triple vulnerabilities" model had been fully developed. In 1977, Rachman outlined three pathways or learning experiences that lead to the development of childhood fears and have been demonstrated in research: aversive classical conditioning (Watson & Raynor, 1920; as cited in Albano, Chorpita, & Barlow, 2003), modeling (Gerull & Rapee, 2002; Mineka, Davidson, Cook, & Keir, 1984), and negative information transmission (Field & Lawson, 2008; Muris, Bodden, Merckelbach, Ollendick, & King, 2003; Muris, van Zwol, Huijding, & Mayer, 2010). Mowrer (1947) added an important maintaining factor to the first pathway—conditioned fear motivates the learning of a response to reduce fear—avoidance, which is negatively reinforced by a reduction of fear when contact with the stimulus is terminated or avoided. In recent years there has been an argument for a fourth pathway, a non-associative or nonspecific path that is not currently well-understood, possibly without a specific learning process (Davey, 2002; Poulton & Menzies, 2002). Muris, Merckelbach, de Jong, and Ollendick (2002) outlined a multifactorial model that involves a genetic vulnerability along with normal developmental fears, which then interact with environmental situations, leading to maladaptive fear that is maintained by cognitive biases.

These pathways can lead to problematic anxiety either individually or collectively: for example, multiple etiological experiences adding up over time (Field & Storksen-Coulson,

2007). The same pathway can lead to many different of problems (i.e., multifinality), and many different pathways can lead to the same problem (i.e., equifinality). It is important to note that there are individual differences that impact the development of problematic anxiety. Fear-inducing environmental situations interact with genetic predisposition, leading to problematic fear in some children and normal adjustment in others. Thus, it is the interaction of genetics and environmental situations that determines the developmental trajectory of the individual. A recent meta-analysis of twin data found that within family (genetic 43% and shared environmental 17%) factors explained a large portion of individual differences in separation anxiety. Heritability estimates were higher among females, whereas non-shared environmental effects were stronger for males (Scaini, Ogliari, Eley, Zavos, & Battaglia, 2013).

### **Assessment of Separation Anxiety Disorder**

Silverman and Ollendick (2005) recommend guidelines for a comprehensive evidence-based assessment of anxiety in children. Rating scales are first utilized to determine the amount, type, and severity of symptoms, administered to multiple informants across several settings (e.g., home and school). A structured or semi-structured diagnostic interview is then administered to determine the existence of a clinically significant disorder. Assessment of SAD often involves a clinical interview, usually the Anxiety Disorders Interview Schedule: Child and Parent (ADIS: C/P; Silverman & Albano, 1996), and self- and parent-report measures to assess specifically for types of anxiety such as the Screen for Child Anxiety Related Emotional Disorders: Child and Parent (SCARED: C/P; Birmaher et al., 1997), the Revised Children's Manifest Anxiety Scale and the Revised Children's Manifest Scale: Second Edition (RCMAS/RCMAS-2; Reynolds & Richmond, 1978, 2008), and the Multidimensional Anxiety Scale for Children (MASC; March et al., 1997), all of which have subscales examining separation fears. Observational data will also

provide information on how the child behaves when separating from the caregiver, especially during separate diagnostic interviews when the child must separate in the clinic and spend time with a therapist he may not know.

New and unique ways of measuring and studying SAD are being developed. Allen, Blatter-Meunier, Ursprung, and Schneider (2010) developed the Separation Anxiety Daily Diary to determine the frequency of anxiety provoking and non-anxiety provoking separations from parents. The diary also contains information about associated parental anxiety, the parent's thoughts, child behaviors, and the corresponding parental reactions. Parents showed acceptable compliance in filling out the diary, which also showed good convergent validity.

SAD has historically been viewed as a childhood disorder; however, there has been recent interest in SAD in adolescence and adults. Hock, Eberly, Bartle-Haring, Ellwanger, and Widaman (2001) developed a measure for parents called the Parents of Adolescents Separation Anxiety Scale. The measure consists of two subscales: Anxiety about Adolescent Distancing (AAD) and Comfort with a Secure Base Role (CSBR). Both subscales show distinctive patterns of change with child age. Healthy adult attachment styles were associated with lower AAD scores and higher CSBR scores. Children of parents with higher AAD scores reported lower quality of attachment to both mothers and fathers. This indicates that parental anxiety over separation is negatively associated with the quality of the parent-child relationship.

### **Parental and Child Reporting/Perception**

When clinicians assess for problems in children and adolescents it is not uncommon for the parent and child report to differ (Briggs-Gowan, Carter, & Schwab-Stone, 1996; Edelbrock, Costello, Dulcan, Conover, & Kala, 1986; Kazdin, French, Unis, & Esveldt-Dawson, 1983, Weissman et al., 1987). Researchers have even shown that discrepancies are more common for

internalizing behaviors and symptoms than externalizing behaviors and symptoms (Achenbach, McConaughy, & Howell, 1987; Herjanic & Reich, 1982; Stanger & Lewis, 1993). The discrepancy between parent- and child-report may be due to many reasons, one of which might be parental psychopathology. Moretti, Fine, Haley, and Marriage (1985) found a significant positive correlation between depressive symptoms in the parents and perception of depression in their children. Another study found that mothers that were more depressed were more likely to perceive their children as maladjusted (Griest, Wells, & Forehand; 1979). Schaughency and Lahey (1985) also found that maternal depression was a significant independent predictor of the mother's report of externalizing problems in their child. Frick, Silverthorn, and Evans (1994) found that 76% of children with an anxiety disorder according to parent-report had a mother with a history of an anxiety disorder. Seventy-three percent of mothers with an anxiety disorder rated their child as having one too. In addition, both parent and child reports of anxiety in the child were associated with a history of maternal anxiety. Briggs-Gowen and colleagues (1996) found that maternal anxiety and depression were associated with maternal reports of higher child symptomatology than was reported by the child or teacher. Krain and Kendall (2000) found a significant relationship between maternal depressive symptoms and the maternal report of child anxiety. It is important to keep in mind, however, that parents seeking treatment are likely to report more anxiety symptoms than their children. Biedel and Turner (1998) found anxious children often report fewer symptoms and less distress than their parents.

There is also low agreement between parent and child reporting of parenting behaviors (Bögels & van Melick, 2004; Bögels, van Oostern, Muris, & Smulders, 2001; Caster, Inderbitzen, & Hope, 1999; Tein, Roosa, & Michaels, 1994). Children report less healthy parenting than the parents do (Bögels et al., 2001; Sawyer, Sarris, Baghurst, Cross, & Kalucy,

1988). One study found that mothers gave a more positive impression of their parenting behaviors as well as their partners' behaviors compared to the child and the partner report (Bögels & van Melick, 2004). Thus maternal report may be underestimating maladaptive parenting, possibly due to positive impression management. Anxious children might also be more sensitive to rejection and thus perceive parental behaviors as more rejecting (Bögels & Brechman-Toussant, 2006). Similarly, one study found that children's perception of their father's parenting behaviors, rather than mothers, predicted children's anxiety symptoms (van Brakel & Muris, 2006)

### **The Link Between Child and Parent Anxiety**

Research has found a higher prevalence of anxiety, mood, and substance use disorders in parents of anxiety-disordered children relative to children with no psychological disorder. Family studies have found that parents with anxiety disorders have children with an elevated rate of anxiety disorders (Biedel & Turner, 1997; Biederman, Rosenbaum, Bolduc, Faraone, & Hirschfield, 1991; Merikangas, Dierker, & Szatmari, 1998; Turner, Beidel, & Costello, 1987). Similarly, studies have also found that children with anxiety disorders have parents with an increased incidence of anxiety disorders compared to the general population (Last, Hersen, Kazdin, Francis, & Grubb, 1987; Last, Hersen, Kazdin, Orvaschel, & Perrin, 1991). Turner and colleagues (1987) found that children of anxiety-disordered patients were more anxious and fearful and had more somatic complaints than children of non-disordered parents and parents with dysthymic disorder. This link has been found in diverse populations. Chapman, Petrie, Vines, and Durrett (2012) found that in a community based sample of 100 African American parents and their biological children, children with an anxious parent were four times more likely to meet criteria for both an anxiety disorder and other forms of psychopathology.

There are many explanations for the overlap in anxiety disorders in parents and their children. The first may be genetic transmission. Genetic studies have shown the heritability of an anxious predisposition to be as high as 50% and is attributable to factors such as behavioral inhibition, anxiety sensitivity, and fear of negative evaluation (Robinson, Kagan, Reznick, & Corley, 1992; Stein, Jang, & Levisley, 2002). The heritability specifically of anxiety disorders, however, is closer to 30% (Kendler, Neale, Kessler, Heath, & Eaves, 1992). It is important to keep in mind that while anxiety and anxious disposition can be inherited, the manifestation of anxiety is probably influenced by the interplay of the genetic factors along with family behavioral factors such as the reinforcement and modeling of anxious responses due to the anxiety of other family members. In fact, children's observation of parental anxiety may be influencing the development of the child's own anxiety as well. Muris, Steerneman, Merckelbach, and Meesters (1996) found a significant positive relationship between maternal fearfulness and fearfulness of the child, even when controlling for the trait anxiety of the mother. Importantly, the modeling of anxious behavior likely mediates this relationship; mothers who expressed their fear have children with the highest levels of fear with expression of fear uniquely accounting for a proportion of the variance of children's fearfulness.

### **Attachment and Anxiety**

The bond between children and their parents (i.e., attachment) can be another variable associated anxiety symptomatology. Research has found that a child's perception of how available and accessible a caregiver is to protect and comfort will affect how anxious a child is. Children can suffer from three different types of insecure attachment: anxious-avoidant (does not need and rejects intimate relationships), anxious ambivalent (preoccupied and anxious about relationships due to caregiver inconsistency; Ainsworth, Blehan, Waters, & Wall, 1978), and



disorganized attachment (contradictory and disoriented behaviors, often due to abuse; Main & Solomon, 1990). It is thought that anxious-avoidant attachment and disorganized attachment are “anxiously attached” (Bögels & Brechman-Toussaint, 2006). Crowell and Feldman (1991) found that mothers who were preoccupied were anxious and had difficulty leaving their child and thus did not prepare the child well for the separation. The children of these mothers were most anxious prior to the separation. Preoccupied and dismissing mothers and the children of both avoided interaction when reunited after a separation. Manassis, Bradley, Goldberg, Hood, and Swinson (1994, 1995) found mothers who suffered from an anxiety disorder had children who had higher rates of insecure attachment as well as behavioral inhibition. Warren, Huston, Egeland, and Sroufe (1997) found that children who were behaviorally inhibited and insecurely attached were more likely to develop anxiety disorders than children who were behaviorally inhibited and securely attached.

Rapee (2001) and Barlow (2002) both emphasized the child’s perception of control as well as their sense of autonomy and personal competence as mediating the effect family factors have on child anxiety. Therefore, children with disorganized attachment likely feel their environment is uncontrollable due to the extreme and unpredictable behavior of the parents, the anxious-ambivalent child might not be allowed to exercise their autonomy and personal competence by the parents’ over-involvement and problems separating from the child, and children with anxious-avoidant attachment might develop a negative view of the self and fear of negative evaluation due to their experience of rejection (Bögels & Brechman-Toussaint, 2006; Crowell & Feldman, 1991; Main & Solomon, 1990). Bögels and Brechman-Toussaint (2006) postulated that the father may be playing a stronger role in introducing the child to the world outside the family since father-child attachment is related to whether the child develops anxious

social behavior (Lamb, 1980); a secure attachment to the father might protect the child from social anxiety, whereas maternal attachment might be more related to separation anxiety due to the primary caregiver relationship with the child.

### **Parental Behaviors**

Parental over-control has been implicated as a possible factor in the development of child anxiety. Parental over-control is when parents engage in excessive regulation of their child's behavior, vigilance and intrusion, and discouragement of independent problem solving. These behaviors are thought to limit a child's autonomy, lead the child to feel their environment is uncontrollable, and create a limited sense of personal competence (Bögels & Brechman-Toussaint, 2006). The child's belief that his or her environment is uncontrollable and a limited personal competence are thought to contribute to the development of anxiety (Barlow, 2002; Chorpita, Albano, & Barlow, 1996; Chorpita, Brown, & Barlow, 1998; Rapee, 2001). Two reviews of the literature (Rapee, 1997; Wood, McLeod, Silgman, Hwang, & Chu, 2003) have come to the conclusion that there is a relationship between over-control and child anxiety. Bögels and van Melick (2004) using a multi-informant method approach also found results consistent with previous research that there is a relationship between parent over-control and child anxiety. Four studies used observational data to examine children with anxiety and found evidence that supported the relationship between parental control and child anxiety (Greco & Morris, 2002; Hudson & Rapee, 2001, 2002; Moore, Whaley, & Sigman, 2004).

Negativity within the child's environment is also thought to influence child anxiety; negative feedback might make children feel their environment is hostile and threatening, prevent feelings of competence, and increase negative outcome expectancies (Krohne, 1990, 1992; Krohne & Hock, 1991). Parental negativity is exhibited by a lack of warmth and acceptance,

parental criticism, and/or rejection of the child (Hock & Krohne, 1992; Krohne & Hock, 1991; Masia & Morris, 1998; Rapee, 1997; Wood, et al., 2003). Rapee (1997) and Wood and colleagues (2003) came to the conclusion that the evidence is inconsistent on the link between child anxiety and the absence of warmth and acceptance in the family. Bögels and van Melick (2004) found that the relationship between parental warmth and child anxiety was not as strong as the relationship between child anxiety and parental over-control. Two studies used observational methods and found a relationship between maternal warmth and acceptance and child anxiety (Hudson & Rapee, 2001; Moore, et al., 2004). No differences were seen in amount of fathers' negativity in high socially anxious children compared to children with low social anxiety (Greco & Morris, 2002).

Although parental over-controlling and negativity are often studied separately, researchers have proposed that the interaction of the two, high control and low warmth, might be the best predictor of child anxiety (Parker 1981, 1990; Parker, Tupling, & Brown, 1979; Silove, Parker, Hadzi-Pavlovic, Manicavasagar, & Blaszczynski, 1991). A lack of warmth alone might not have a strong effect on anxiety; however, a lack of warmth may interact with parental control to produce anxiety (Bögels & Brechman-Toussaint, 2006). Bögels and Brechman-Toussaint (2006) also postulated that the relationship between these factors might not be linear as is usually thought. Instead, a curvilinear relationship might exist where less parental control leads to too much autonomy too soon and more parental control leads to loss of appropriate autonomy by the child leading to anxiety at both ends of the spectrum. Similarly parents who exhibit too much acceptance may accommodate more and allow the child to avoid and withdraw from uncomfortable situations leading to the maintenance of anxiety while children who are not accepted by their parents become insecure and anxious as well. In addition, it is unknown

whether having a warm and accepting parent might offset the lack of warmth and acceptance by the other parent, thus serving as a protective factor against the development of anxiety.

### **Parental Beliefs**

Parent's beliefs about anxious responses in their children influence their reactions to these responses. Parental dysfunctional beliefs about child anxiety and parenting self-efficacy have been found to be positively associated with child anxiety, even after controlling for parent anxiety and depression (Herren, In-Albon, Schneider, 2013). Francis and Chorpita (2011) found that the parental beliefs about the harmfulness of the child's anxiety significantly mediated the relationship between parent and child anxiety, indicating that parental negative beliefs about their child's anxiety (i.e., that their child's anxiety is harmful) is influencing whether their own anxiety is associated with their child's anxious symptoms. One study found that the more parents perceived their two-year-old child as shy, the less they encouraged their child to be independent at age four (Rubin, Nelson, Hastings, & Asendorpf, 1999). Mothers of high anxious four-year-old children were found more likely to attribute social withdrawal to disposition, respond to child withdrawal with negative emotions, believe the anxious behavior would be difficult to change, and act in a more directive and over-controlling way to deal with the anxious behavior (Mills & Rubin, 1990, 1992, 1993; Rubin & Mills, 1990, 1992). Mills and Rubin (1993) found the same pattern of responses in a sample of mothers of nine-year-old anxious-withdrawn children compared to non-anxious peers of the same age, with the exception of the over-controlled management strategy. Rather, these mothers failed to respond to their children's anxious behavior. It is possible that as time goes on, mothers of anxious children develop a learned helplessness that inhibits them from believing their children's responses can change and thus do not try (Bögels & Brechman-Toussaint, 2006). Whether a parent is over-controlling or

does not respond, allowing avoidant behavior, the child does not learn to develop a sense of their own personal control over challenging situations (Barlow, 2002).

### **Somatic Symptoms**

Physical symptoms such as headaches, chest pain, and stomachaches, are impairing and often affect children. Recurrent abdominal pain has an especially large prevalence rate, 10-15% of school-aged children (Faull & Nicol, 1986; Zuckerman, Stevenson, & Bailey, 1987), as does non-cardiac chest pain, with the prevalence ranging from 7-15% in community samples (Campo & Fritsch, 1994). One large epidemiological study found that 10% of children experience weekly headaches (Egger, Angold, & Costello, 1998). Because children suffering from somatic symptoms must still attend school, a significant amount of impairment in functioning is found in both school and social realms (Carlsson, Larsson, & Mark, 1996; Martin-Herz, Smith, & McMahon, 1999).

Rarely are these somatic complaints found to have a medical, organic cause (Kaden, Shenker, & Gootman, 1991; Rowe, Dulberg, & Peterson, 1990; Selbst, Ruddy, & Clark, 1990; Sharkey & Clark, 1991; Walker, Garber, Van Slyke, & Greene, 1995). Symptoms often persist for years after testing has shown no identifiable medical explanation (Fyfe & Moodie, 1984; Selbst, Ruddy, Clark, Henretig, & Santulli, 1988; Selbst et al., 1990). Often these families make repeated visits to specialists to try and find an explanation for their child's pain, consuming family and medical resources (Zavaras-Angelidou, Weinhouse, & Nelson, 1992).

Internalizing disorders and somatic complaints are shown to be highly associated (Astrada, Licamele, Walsh, & Kessler, 1981; Beidel, Christ, & Long, 1991; Bernstein, et al., 1997; Egger, Costello, Erkanli, & Angold, 1999; Hyams, Burke, Davis, Rzepski, & Andrulonis, 1996; Kendall & Pimentel, 2003; Lipsitz, et al., 2004; Walker & Greene, 1989; Wasserman,

Whittington, & Rivara, 1988); half of adults with unexplained somatic symptoms meet criteria for an anxiety or mood disorder (Kroenke et al., 1994; Simon, Gater, Kisely, & Piccinelli, 1996). Subsequently, medically unexplained somatic symptoms may be appropriately accounted for by anxiety and mood disorders (Husain, Browne, & Chalder, 2007; Kroenke & Swindle, 2000). Non-psychiatric medical services account for more than half of the annual costs for anxiety disorders in the US (Greenberg, et al., 1999). Thus somatic symptoms are likely causing large amounts of distress and interference in children and adults with anxiety.

Panic attacks have also been observed in children and adolescents with SAD. Panic attacks are characterized by a discrete period of intense fear with four or more symptoms (e.g., palpitations, sweating, shaking, shortness of breath) that start abruptly and reach a peak within 10 minutes. Panic disorder, characterized by recurrent panic attacks and fear about having additional attacks along with a change in behavior to avoid having panic attacks, typically starts to manifest in early adulthood (Burke, Burke, Regier, & Rae, 1990). Panic attacks are exhibited in all anxiety disorders and are often cued by anxiety provoking stimuli. In children, Masi, Favilla, Mucci, and Millepiedi (2000) found that 73% of children (7-18 years) with panic attacks had an antecedent or associated separation anxiety. Children might also experience cued panic symptoms during separation (Garland & Smith, 1991; Vitiello, Behar, Wolfson, & McLeer, 1990). It is important to note that the panic experienced by children and adolescents when separating is cued by the separation anxiety and are not recurrent panic attacks that are uncued (i.e., “out of the blue”), and the associated worry about having future attacks is not present.

Worry about the implication of a panic attack (e.g., death, losing control, having a heart attack) is often not seen in children younger than 12 years of age (Kearney & Silverman, 1992; Nelles & Barlow, 1988). This is understandable, as younger children do not have the cognitive

development needed for this kind of association. In younger children, physical symptoms are more associated with anxiety than cognitive symptoms. Therefore, the physical manifestations of their anxiety are present (e.g., stomachaches, hyperventilation); however, the implications or attributions regarding their physical symptoms are not understood. Some studies have found that patients with panic disorder may have been somewhat somatic or even hypochondriacal before experiencing panic attacks (Ehlers, 1993; Fava, Grandi, & Canestrari, 1988; Schmidt, Lerew, & Jackson, 1997).

### **Anxiety Sensitivity**

Reiss and McNally (1985) defined anxiety sensitivity (AS) as a fear of the perceived physical, psychological, or social consequences of body sensations that are associated with anxious arousal. This includes the belief that anxiety sensations (e.g., racing heart) have severe and negative consequences (Reiss, 1991). These negative consequences could be, for example, that a racing heart indicates a serious physical problem. This theoretically leads to intensified anxiety in individuals with anxiety disorders and high AS because the symptoms experienced by these individuals are even more aversive causing a cycle of escalating anxiety (Barlow, Chorpita, & Turovsky, 1996). Research suggests that AS has also been shown to have some influence above trait anxiety on a person's tendency to respond with anxiety to threatening stimuli (McNally, 1994; Taylor, 1996). Therefore, it is thought that AS is important in the development and maintenance of anxiety disorders (Reiss, Silverman, & Weems, 2001; Taylor, 1999). A meta-analysis indicated that those with anxiety disorders have greater AS than controls (a large effect size was observed) and that AS is a risk factor for developing an anxiety disorder (Olatunji & Wolitzky-Taylor, 2009).

Cognitive models of anxiety in children have identified biases in interpretation, judgment, memory, and selective attention as working together at different stages of information processing to lead to the development and maintenance of anxiety and severe fearful reactions (Ginsburg & Drake, 2002; Lau, Calamari, & Waraczynski, 1996; Silverman, Fleisig, Rabain, & Peterson, 1991; Vasey & MacLeod, 2001; Watts & Weems, 2006). AS is an anxiety related interpretive bias leading to the child being predisposed toward negative interpretations of neutral, ambiguous, or potentially threatening stimuli and situations (Weems, Taylor, Marks, & Varela, 2010). These can be cognitive distortions such as catastrophizing (i.e., expecting the worst possible outcome), as well as negative interpretations of anxiety related sensations, which is the focus of research on anxiety sensitivity. High AS has been shown to predict the development of panic attacks in both children and young adults (Hayward, Killen, Kraemer, & Taylor, 2000; Schmidt, Lerew, & Jackson, 1999; Weems, Hayward, Killen, & Taylor, 2002). The association between AS and panic has been studied using biological challenges, manipulating participant's psychological state to provoke panic feelings and using CO<sub>2</sub> (McNally, 1994). Those with high AS reported more fear and shortness of breath compared to those with low AS (Schmidt & Mallott, 2006). Maller and Reiss (1992) found that at a 3-year follow-up, college students who were classified with high AS were five times more likely to have an anxiety diagnosis than those with low AS.

There are two theories of how AS develops. The first is that AS is trait-like (Reiss & Haverkamp, 1996), which would indicate that an individual's AS is expected to remain stable over time. The second explanation is that AS develops through learning processes (Schmidt, Lerew, & Joiner, 2000), which implies that through operant or classical conditioning, AS could change over time. It is likely that these models are not mutually exclusive, and it is a



combination of the two that leads to the development of AS. Stress has been implicated as a factor leading to the development of AS. One longitudinal study found that high levels of stress over a 5-week period led to increases in AS (Schmidt et al., 2000). McLaughlin and Hatzenbuehler (2009) also found that stressful life events were longitudinally associated with increased anxiety over separation in adolescents. A few studies, however, found that AS is relatively stable over time (Peterson & Plehn, 1999; Weems, Hayward, Killen, & Taylor, 2002).

The heritability of AS has been demonstrated as well. One twin study of AS found a heritability estimate of around 50% in a large population-based sample of adults, with non-shared environment explaining the remaining variance (Stein, Jang, & Livesley, 1999). Studies examining younger samples found the estimated heritability in children to account for 37% of the variance (Eley, Gregory, Clark, & Ehlers, 2007) and in adolescents the estimated heritability accounted for 47% of the variance (Zavos, Rijdsdijk, Gregory, & Eley, 2010).

## **Summary**

Taken all together, a review of the literature suggests that parental factors do have a significant influence on a child's development of anxiety. Anxiety influences parental behavior in both interactions as well as modeling, influencing a child's knowledge of the world and learned behavior. It is important to determine the mechanism through which parental anxious behavior operates for prevention and treatment purposes, especially given the negative long-term consequences of anxiety when left untreated. Two factors in particular, parental anxiety sensitivity and parental somatization, as well as the child's awareness of parental anxiety, likely influence a child's development of SAD. Developmentally, younger children often experience anxiety more through physical/somatic components than cognitive, and are likely influenced

heavily by modeling and interaction with their caregivers. Thus research of these factors and the application to the treatment of younger children is especially important.

### **Present Study and Rationale**

The purpose of the present study was to determine whether maternal anxiety sensitivity, somatic symptoms, and children's perception of maternal separation anxiety predict children's ratings of their own separation anxiety and mother's ratings of their child's separation anxiety. Often, whether due to genetic and/or learning factors, research has demonstrated that parental anxiety is related to child anxiety. Because this relationship is well known, it is important to determine whether other parent factors have a unique influence on a child's development of anxiety. Children who suffer from separation anxiety tend to be younger, and young children tend to express their anxiety through somatic symptoms. In addition parents who somaticize and who are sensitive to their own anxiety symptoms are likely modeling this behavior to their children. The child might be able to sense a parent's own anxiety over separation and this might negatively affect the child's ability to separate without anxiety. If children rate their mothers as exhibiting high anxiety over separation, the mother and child are likely more sensitive to the child's own separation anxiety. Thus it is likely that parental somatization, parental anxiety sensitivity, and the child's observation of maternal separation anxiety from the child play a role in the child's anxiety over separation as reported by both child and mother. In addition, findings could have identification implications for prevention or early diagnosis and treatment of separation anxiety.

## **Hypotheses**

**Hypothesis one:** Maternal trait anxiety, maternal somatization, and the child's ratings of maternal separation anxiety will each uniquely predict child ratings of their own separation anxiety. Children who have mothers that experience high trait anxiety, somatic symptoms, and anxiety over separation will rate themselves as more separation anxious.

**Hypothesis two:** Maternal trait anxiety, maternal somatization, and the child's ratings of maternal separation anxiety will each uniquely predict the mother's ratings of their child's separation anxiety. Children who have mothers that experience high trait anxiety, somatic symptoms, and anxiety over separation will be rated as more separation anxious by their mother.

**Hypothesis three:** Maternal trait anxiety, maternal anxiety sensitivity, and the child's ratings of maternal separation anxiety will each uniquely predict child ratings of their own separation anxiety. Children who have mothers that experience high trait anxiety, anxiety sensitivity, and anxiety over separation will rate themselves as more separation anxious.

**Hypothesis four:** Maternal trait anxiety, maternal anxiety sensitivity, and the child's ratings of maternal separation anxiety will each uniquely predict mother's ratings of their child's separation anxiety. Children who have mothers that experience high trait anxiety, anxiety sensitivity, and anxiety over separation will be rated as more separation anxious by their mothers.

## Method

### Participants

Based on effect size calculations from previous studies on the relationship between parental anxiety and parents' beliefs about their children's anxiety (e.g., Francis & Chorpita, 2011), a medium effect size was estimated ( $R^2 = .13$ ) for the overall model, with power ( $1 - \beta$ ) set at .80, alpha ( $\alpha$ ) < .05 using Sample Power analyses (Cohen, 1988). Additionally, it was determined how much each variable has to contribute uniquely to have a significant beta;  $R^2$  improvement was set at .13 in order to have ample power to detect a moderate effect size for any one predictor. As a result, based on an *a priori* power analysis, it was estimated that 50 participants would be needed in the study in order to detect significant effects should they exist. Therefore, 50 mother-child dyads were recruited through community centers such as the YMCA and a university clinic.

Because the mean age of onset for SAD is estimated to be around 7 years of age (Masi, Mucci, & Millepiedi, 2001) and SAD is most common in childhood (7-12 years old; Compton, Nelson, & March, 2000; Last, Perrin, Hersen, & Kazdin, 1992), the age range for eligibility was set between the ages of 7 and 12 years old. Missing values were replaced with the mean of remaining items within the same subscale or from the total measure for measures without subscales. Missing values were only replaced if fewer than 10% of items were missing. An examination showed very little missing data, thus no participants or measures were excluded from subsequent analyses. As a result, subsequent analyses included all 50 children and their mothers.

The children were 56% female, ranged in age from 7 to 12 years ( $M = 8.24$  years), and self-identified with the following races/ethnicities: 70% Caucasian, 18% African American, 4%

Asian, and 8% other. Their mothers ranged in age from 30 to 56 years of age ( $M = 38.2$  years). Participants were generally from a higher socioeconomic class, with a high mean income ( $M = \$130,575$ ) though there was great variability ( $SD = \$100,612.71$ ), likely due to two very high outliers (two participants with incomes of \$500,000). In addition, 20% of the sample chose not to disclose income. See Table 1 for full description of demographic variables.

Table 1: Descriptive statistics demographic analyses variables

	Age ( $M, SD$ )	Gender	Race	Income ( $M, SD$ )
Children	8.24, 1.47	56% Female (28) 44% Male (22)	70% Caucasian (35) 18% African American (9) 4% Asian (2) 8% Other (4)	N/A
Mothers	38.20, 5.60	100% Female 0% Male	78% Caucasian (39) 18% African American (9) 4% Asian (2)	130,575,100,612.71

## Measures

*Demographic Questionnaire.* The author created a demographic questionnaire to obtain background information. The questionnaire inquired about age, gender, and race of the participant, as well as other variables, and was included in the survey.

*Screen for Child Anxiety Related Emotional Disorders- Child/Parent (SCARED;* Birmaher et al., 1997; Birmaher et al., 1999). The SCARED is a self-report measure of child anxiety comprised of 41 items that measure five factors. The factors are composed of the following: 13 items measuring “panic/somatic” (e.g., “When I feel frightened, its hard to breathe”), 9 items measuring “generalized anxiety” (e.g., “I worry about things working out for me”), 8 items measuring “separation anxiety” (e.g., “I get scared if I sleep away from home”), 7 items measuring “social phobia” (e.g., “I feel nervous with people I don’t know well”), and 4 items measuring “school phobia” (e.g., “I get stomach aches at school”). The child responds using a 3-point scale that represents how they have been feeling for the last 3 months (0 = hardly

ever true, 1 = sometimes true; 2 = true or often true). Scores range from 0 to 82 with higher scores indicating higher levels of anxiety. The parent version has the same items but worded to reflect the parents view of the child (e.g. “My child gets stomachaches at school”).

The measures contain cut-off scores that may indicate the presence of a disorder or clinically significant symptoms of a disorder. For both the SCARED-P and SCARED-C, a score at or above 25 may indicate the presence of an anxiety disorder, scores higher than 30 are more specific. In addition a score of 7 or above on the Panic Disorder or significant somatic symptoms scale may indicate the disorder, a score of 9 or higher on the Generalized Anxiety Disorder scale may indicate the disorder, a score of 5 or higher on the Separation Anxiety scale may indicate the disorder, a score of 8 or higher on the Social Anxiety Disorder scale may indicate the disorder, and a score of 3 or more on the school avoidance scale may indicate significant school avoidance. Birmaher and colleagues (1977) found that internal consistency for the total score as well as each of the five factors is good, ranging from  $\alpha = .74$  to  $.93$ , as was test-retest reliability (intraclass correlation coefficients =  $.70$  to  $.90$ ) and discriminant validity (between anxiety and other disorders and also within anxiety disorders). The authors also found moderate parent-child agreement,  $r = .20$  to  $.47$ ,  $p < .001$  for all correlations.

For the current sample, internal consistency for the total score was good (SCARED-P  $\alpha = .90$ ; SCARED-C  $\alpha = .89$ ). Internal consistency for the five scales were good as well for the SCARED-P ( $\alpha = .65$  to  $.88$ ) and were good for 4 of the 5 scales of the SCARED-C ( $\alpha = .60$  to  $.79$ ). Internal consistency was poor for the separation anxiety scale on the SCARED-C ( $\alpha = .51$ ). For the current study, parent child agreement was moderate for most scales ( $r = .38$  to  $.52$ ,  $p < .01$  for all correlations) except for the panic ( $r = .26$ ) and separation ( $r = .22$ ) scales which were not significant.

In addition the authors created a *Child-rated Maternal Separation Anxiety Scale*. The authors created a measure with 8 new items corresponding to the 8 separation anxiety items, reworded to indicate maternal separation anxiety. For example, “I get scared if I sleep away from home” was reworded to “My mother does not let me sleep away from home.” Internal consistency for the sample was good ( $\alpha = .76$ ).

*The Anxiety Sensitivity Index-3 (ASI-3; Taylor, et al., 2007)*. The ASI-3 is a refined version of the ASI (Reiss, Peterson, Gursky, & McNally, 1986). The original ASI was a unidimensional measure that reflected the conceptualization of AS as a unitary construct (Reiss & McNally, 1985). Researchers have found, however, that AS might better be understood as a multidimensional construct, and the ASI-3 has been shown to better reflect the different components of AS (Carter, Sbrocco, & Ayati, 2009). The ASI-3 is an 18-item measure that examines fear of anxiety-related sensations and the negative consequences of arousal symptoms. There are 3 subscales (somatic, social, and cognitive) with 6 items corresponding to each. The items are rated on a five-point scale ranging from 0 “*very little*” to 4 “*very much*” and consist of items such as “It scares me when my heart beats rapidly.” Kemper, Lutz, Bahr, Ruddel, and Hock (2012) found that confirmatory analyses established a clear 3-factor structure that corresponds to the hypothesized somatic, cognitive, and social components. They also found the measure had good discriminant validity, accurately distinguishing patients with anxiety disorders from those without, as well as good convergent validity. Taylor and colleagues (2007) also found good concurrent and criterion-related validity. The measure’s subscales have also been shown to distinguish between types of anxiety, for example, those with panic disorder or agoraphobia score higher on the somatic subscale (Kemper et al., 2012). Taylor and colleagues (2007) found high intercorrelations among the factors ( $r = .70-.82$ ), with moderate to high

subscale correlations ( $r = .53-.62$ ). The measure also had good internal consistency ( $r = .79-.84$ ). For the current study, the total score was used and internal consistency for the total score was good ( $\alpha = .86$ ).

*The State-Trait Anxiety Inventory (STAI; Spielberger, 1983)*. The STAI consists of two 20-item measures, the state portion assess how respondents feel at the present moment, for example “I feel at ease” and “I feel upset” and the trait portion assess how the respondents generally feel, for example “I am a steady person” and “I lack self-confidence.” Respondents rate themselves on a 4-point Likert scale ranging from “not at all” to “very much so” for the state scale and “almost never” to “almost always” for the trait scale. The STAI has demonstrated excellent internal consistency with average alpha coefficients greater than .89, and the trait scale has evidenced excellent test-retest reliability (average  $r = .88$ ) at multiple time intervals (Barnes, Harp, & Jung, 2002). As would be expected the state scale has demonstrated lower temporal stability (average  $r = .70$ ) (Barnes et al., 2002). The measure has also demonstrated adequate convergent and discriminant validity with other state and trait anxiety measures and the trait scale has been shown to differentiate patient from control samples and the state scale has been shown to differentiate stressed respondents from control samples. Only the trait scale was used in the current study and internal consistency for the trait scale was good ( $\alpha = .92$ ).

*The Adult Somatization Inventory-24 (ASI-24; Walker, Beck, Garber, & Lambert, 2009)*. The ASI-24 was adapted from the Children’s Somatization Inventory-24 (CSI-24; Walker et al., 2009), a revised form of the Children’s Somatization Inventory (CSI; Walker, Garber, & Greene, 1991). The ASI measures the severity of somatic symptoms a person has experienced in the previous two weeks. The symptoms were taken from the *DSM-III* criteria for somatization disorder (American Psychiatric Association, 1980) and the Hopkins Symptom Checklist



(Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974). The measure consists of a list of 24 symptoms to be rated on a 4-point Likert scale with a total score ranging from 0 to 72. The longer scale shows adequate internal consistency with a sample of parents with alpha reliability coefficients of .89 for mothers and .93 for fathers. The child version of the longer measure has shown good construct and discriminant validity (Walker et al., 1991). Walker and colleagues (2009) found that the correlation between the CSI and the CSI-24 is very high ( $r = .99, p < .001$ ), and internal consistency of the CSI-24 is good. For the current study, the internal consistency for the total score was good ( $\alpha = .89$ ).

### **Procedure**

Permission was obtained from the Institutional Review Board at Louisiana State University to recruit, consent, assent (for the children), and gather information from participants and their children. Participants were recruited through community centers such as the YMCA and a university clinic. Participants completed a consent and child assent form prior to completing the questionnaires. The child and mother then completed the self-report measures (the measures were counterbalanced to avoid any ordering effects). The measures took about 15 minutes for the mother and about 10 minutes for the child to complete. When the mother indicated problematic worry, participants were offered further evaluation and treatment free of cost and contact information for treatment services, though only one parent expressed interest.

## Results

### **Clinical Description of the Sample**

In order to determine the influence of maternal factors on child anxiety, it was important to recruit children that varied along the spectrum of anxiety. If a nonclinical sample alone were examined, there would be a increased likelihood of a restricted range and the entire spectrum of anxiety might not be sampled. Thus recruitment was necessary in both clinical and nonclinical samples. Thus, due to a mix of community and clinic-referred methods of recruitment, it was expected that obtained participants would compose a partially clinical sample. The sample contained 22% clinic-referred participants.

A diagnostic interview was not conducted and diagnostic measures cannot definitively ascertain diagnostic status of the participants. However, based on self- and parent-report measures, a portion of the sample reported experiencing significant anxiety symptoms. Based on the child report, 50% of the children (25 out of 50) reported experiencing clinically significant symptoms of anxiety on the SCARED-Child. For the SCARED-Child subscales— 72% (36 out of 50) reported clinically elevated symptoms on the separation subscale, 30% (15 out of 50) reported clinically elevated symptoms on the panic/somatic subscale, 22% (11 out of 50) reported clinically elevated symptoms on the generalized anxiety subscale, 38% (19 out of 50) reported clinically elevated symptoms on the social phobia subscale, and 36% (18 out of 50) reported clinically elevated symptoms on the school avoidance subscale. In addition, 48% of children (24 out of 50) reported elevated symptoms of separation in their mothers.

On the SCARED-Parent, 18% of mothers (9 out of 50) reported clinically elevated symptoms of anxiety in their child. For the SCARED-Parent subscales— 40% (20 out of 50) reported elevated scores on the separation subscale, 86% (43 out of 50) reported elevated scores

on the panic/somatic subscale, 20% (10 out of 50) reported elevated scores on the generalized anxiety subscale, 24% (12 out of 50) reported elevated scores on the social phobia subscale, and 64% (32 out of 50) reported elevated scores on the school avoidance subscale. Furthermore, clinically elevated total scores on the SCARED were reported by 14% of mother-child dyads (7 out of 50), whereas 36% of children (18) reported clinical elevations on the SCARED when the mother did not and 4% of mothers (2) reported clinical elevations on the SCARED when the child did not. See Table 2.

Table 2: Clinical description of the sample

	Total Anxiety	Separation Subscale	Panic/Somatic Subscale	Generalized Anxiety Subscale	Social Phobia Subscale	School Avoidance Subscale	Maternal Separation (reported by child)
SCARED	50%	72%	30%	22%	38%	36%	48%
-C	25/50	36/50	15/50	11/50	19/50	18/50	24/50
SCARED	18%	40%	86%	20%	24%	64%	N/A
-P	9/50	20/50	43/50	10/50	12/50	32/50	

In addition there were a range of scores across the scales for both measures. Child SCARED total scores ranged from 3 to 62 (82 is the highest possible score). Parent SCARED total scores ranged from 1 to 45 (a score of 25 or higher indicates clinically significant symptoms of anxiety). On the separation subscales (a score of 5 or higher indicates clinically significant symptoms), parent reported child separation scale scores ranged from 0 to 11 and child reported separation scale scores ranged from 1 to 15. Lastly, child reports of maternal separation anxiety symptoms ranged from 0 to 12.

### Demographic Analyses and Normality of the Variables

Bivariate correlations were conducted and examined to determine whether or not there were effects of age on each key variable, ANOVAs were conducted to determine whether or not there were differences by racial/ethnic group for key variables, and a *t*-test was conducted to

determine whether or not there were differences by gender (child only since mothers were used). Child age was significantly negatively correlated with mother's ratings of their child's separation anxiety on the SCARED separation anxiety subscale ( $r = -.394, p < .01$ ). Child age was therefore entered as a covariate in the two models that predicted maternal ratings of child separation anxiety to control for the significant relationship between these variables.

There were no other significant correlations between age and any other key variable.

There were no differences by gender or race for any key variable. For descriptive statistics see Tables 3 and 4.

Table 3: Descriptive statistics- demographics among key variables and age

	Maternal Report of Child Separation Anxiety	Child Self-reported Separation Anxiety	Child Rating of Maternal Separation	Maternal Anxiety Sensitivity	Maternal Somatic Symptoms	Maternal Trait Anxiety
Child Age	$r = -.394^{**}$ $p < .01$	$r = .010$ NS	$r = .045$ NS	$r = -.055$ NS	$r = -.140$ NS	$r = -.025$ NS
Maternal Age	$r = .045$ NS	$r = .071$ NS	$r = .148$ NS	$r = -.108$ NS	$r = -.140$ NS	$r = .156$ NS

Table 4: Descriptive statistics- demographics among key variables, race, and gender

	Gender		Child's Race			
	Male	Female	Caucasian	African American	Asian	Other
Child Self-reported Separation Anxiety	5.95 (2.55)	6.79 (3.00)	6.89 (2.99)	6.00 (1.87)	6.00 (2.82)	3.50 (1.29)
Child Reported Maternal Separation Anxiety	4.59 (2.99)	4.75 (3.68)	4.74 (3.25)	4.22 (3.35)	9.00 (4.24)	3.00 (3.46)
Maternal-rated Child Separation Anxiety	3.45 (2.82)	4.04 (3.44)	4.14 (3.34)	2.89 (1.76)	4.50 (2.12)	2.25 (4.50)
Maternal Anxiety Sensitivity	11.14 (9.54)	8.50 (9.19)	10.03 (9.28)	8.22 (10.96)	14.50 (10.61)	7.25 (7.85)
Maternal Somatic Symptoms	10.23 (9.28)	9.32 (11.07)	9.97 (9.59)	11.78 (14.26)	5.50 (6.36)	5.00 (7.44)
Maternal Trait Anxiety	59.23 (3.65)	59.18 (3.55)	58.77 (3.45)	59.78 (3.70)	58.00 (7.07)	62.25 (1.50)

\* No Significant differences found

To determine outliers, standardized values were calculated for each variable and outliers were identified by  $\pm 2.5$  standard deviations from the mean because of the smaller sample size of 50. An examination of the data showed that maternal anxiety sensitivity was skewed positively and had two outliers (z-scores = 2.71, 3.14), maternal somatic symptoms was skewed positively and had one outlier (z-score = 3.74), child ratings of their own separation anxiety were fairly normal with one outlier (z-score = 3.05), maternal ratings of their child's separation anxiety were slightly positively skewed, and child reported maternal separation was variable though not skewed. All skews were examined to determine whether the statistic was appropriate for the

sample size (Cochran, 1977 and Boos & Hughes-Oliver, 2000). Due to all skew statistics being within -2 and 2 as well as problems interpreting transformed variables (Levin, Liukkonen, & Levine, 1996), no transformation of the data was performed.

### Variable Relationships Analyses

Bivariate correlations were conducted between key variables to examine variable relationships. Anxiety sensitivity and somatic symptoms in the mother were significantly positively correlated ( $r = .511, p < .001$ ) and children's ratings of their own separation anxiety was significantly positively correlated with their rating of their mothers' separation anxiety ( $r = .587, p < .001$ ). No other significant key variable relationships were present. See Table 5 for correlation matrix.

Table 5: Bivariate correlations among key variables

	Maternal Trait Anxiety	Child Rating of Maternal SAD	Child SAD Rating	Maternal SAD Rating	Maternal Somatic Symptoms	Maternal Anxiety Sensitivity
Maternal Trait Anxiety	1	.207 NS	.067 NS	.057 NS	-.055 NS	-.224
Child Rating of Maternal SAD	-	1	.587** $p < .01$	.097 NS	.000 NS	-.143 NS
Child SAD Rating	-	-	1	.224 NS	.135 NS	.008 NS
Maternal SAD Rating	-	-	-	1	.062 NS	.002
Maternal Somatic Symptoms	-	-	-	-	1	.471** $p < .01$
Maternal Anxiety Sensitivity	-	-	-	-	-	1

## Regression Analyses

The first hypothesis of whether or not maternal trait anxiety, maternal somatization, and the child's ratings of maternal separation anxiety would each uniquely predict child ratings of their own separation anxiety was tested using linear regression. Maternal trait anxiety, maternal somatization, and child's rating of maternal anxiety were entered as independent predictors with child's rating of separation anxiety entered as the dependent variable. Preliminary analyses revealed no issues of multicollinearity (VIF between 1.00 and 1.05 for all independent variables) and no violations of independence or homoscedasticity. The overall regression model was significant [ $F(3, 46) = 8.80, p < .001$ ], accounting for 37% of the variance (adjusted  $R^2 = .32$ ). Within the model, only child reported maternal separation anxiety (unstandardized  $B = .50; \beta = .60, p < .001$ ; 95% Confidence Interval: .30-.70) uniquely contributed to the variance explained. See Table 6 for Model 1 results. Thus the effect of maternal separation anxiety (as reported by the child) on the child's separation anxiety (as reported by the child) was significant.

Table 6: Regression of maternal separation anxiety, trait anxiety, and somatic symptoms on child self-reported separation anxiety

Variable	$\beta$	$p$	$R$	$R$ square	Cohen's $f^2$
Model 1			.60	.37	.58
Child rated maternal separation	.60	$p < .001$			
Maternal trait anxiety	-.05	$p = .68$			
Maternal somatic symptoms	.13	$p = .27$			

\* Note- the Regression model was significant  $F(3,49) = 8.80, p < .001$

The second hypothesis of whether or not maternal trait anxiety, maternal somatization, and the child's ratings of parent separation anxiety will each uniquely predict maternal ratings of their child's separation anxiety was tested using linear regression. Child age was entered at step 1 to control for the significant relationship with the dependent variable. Maternal trait anxiety, maternal somatization and child's ratings of maternal separation anxiety were entered next as

independent predictors. Maternal rating of separation anxiety was entered as the dependent variable. Preliminary analyses revealed no issues of multicollinearity (VIF between 1.00 and 1.05 for all independent variables) and no violations of independence or homoscedasticity. After controlling for age, the overall regression model was not significant [ $F(4, 49) = 2.48, p = .057$ ; adjusted  $R^2 = .11$ ]. See Table 7 for Model 2 results.

Table 7: Regression of maternal separation anxiety, trait anxiety, and somatic symptoms on mother-rated child separation anxiety

Variable	$\beta$	$p$	$R$	$R$ square
Model 1			.39	.16
Child age	-.39	$p < .01$		
Model 2			.42	.18
Child rated maternal separation	.12	$p = .43$		
Maternal trait anxiety	.03	$p = .83$		
Maternal somatic symptoms	.12	$p = .43$		

The third hypothesis of whether or not maternal trait anxiety, maternal anxiety sensitivity, and the child's ratings of maternal separation anxiety will each uniquely predict the child's ratings of their own separation anxiety was tested using linear regression. Maternal trait anxiety, maternal anxiety sensitivity, and the child's rating of maternal separation anxiety were entered as independent predictors with child's rating of their separation anxiety entered as the dependent variable. Preliminary analyses revealed no issues of multicollinearity (VIF between 1.06 and 1.09 for all independent variables) and no violations of independence or homoscedasticity. The overall regression model was significant [ $F(3, 46) = 8.40, p < .001$ ], accounting for 35% of the variance ( $R^2 = .31$ ). Within the model, only child reported maternal separation anxiety (unstandardized  $B = .51$ ;  $\beta = .61, p < .001$ ; 95% Confidence Interval: .30-.71) uniquely contributed



to the variance explained. See Table 8 for Model 3 results. Thus the effect of maternal separation anxiety (as reported by the child) on the child's separation anxiety (as reported by the child) was significant.

Table 8: Regression of maternal separation anxiety, trait anxiety, and anxiety sensitivity on child self-reported separation anxiety

Variable	$\beta$	$p$	$R$	$R$ square	Cohen's $f^2$
Model 1			.60	.35	.55
Child rated maternal separation	.61	$p < .001$			
Maternal trait anxiety	-.04	$p = .75$			
Maternal anxiety sensitivity	.09	$p = .49$			

\* Note- the Regression model was significant  $F(3,49) = 8.40, p < .001$

The fourth hypothesis of whether or not maternal trait anxiety, maternal anxiety sensitivity and the child's ratings of maternal separation anxiety will each uniquely predict parent ratings of their child's separation anxiety was tested using linear regression. Child age was entered at step 1 to control for the significant relationship with the dependent variable. Maternal trait anxiety, maternal anxiety sensitivity, and child's rating of maternal separation anxiety were entered next as independent predictors. Maternal rating of separation anxiety was entered as the dependent variable. Preliminary analyses revealed no issues of multicollinearity (VIF between 1.00 and 1.09 for all independent variables) and no violations of independence or homoscedasticity. After controlling for age, the overall regression model was not significant [ $F(4, 49) = 2.29, p = .074$ ; adjusted  $R^2 = .095$ ]. See Table 9 for Model 4 results.

Table 9: Regression of maternal separation anxiety, trait anxiety, and anxiety sensitivity on mother-rated child separation anxiety

Variable	$\beta$	$p$	$R$	$R$ square
Model 1			.39	.16
Child age	-.39	$p < .01$		
Model 2			.41	.17
Child rated maternal separation	.11	$p = .44$		
Maternal trait anxiety	.02	$p = .87$		
Maternal anxiety sensitivity	.00	$p = .99$		

### Statistical Sensitivity Analyses

The four regressions were run again with outliers removed. For the first regression, the outlier in maternal somatic symptoms and the outlier in child's own reported separation anxiety were removed. In the second regression, the outlier in maternal somatic symptoms was removed. In the third regression, the outliers in maternal anxiety sensitivity and the outlier in child's own reported separation anxiety were removed. In the fourth regression, the outliers in maternal anxiety sensitivity were removed. The results of all analyses run did not change due to the removal of outliers. See Table 10 for results of these sensitivity analyses.

Table 10: Sensitivity Analyses

Variable	$\beta$	$p$	$R$	$R$ square	$F$	$p$
<b>Hypothesis 1</b>						
Model 1			.55	.30	6.24	$p = .001$
Child rated maternal separation	.55	$p < .001$				
Maternal trait anxiety	-.06	$p = .67$				
Maternal anxiety sensitivity	.06	$p = .66$				
<b>Hypothesis 2</b>						
Model 1			.40	.15	9.04	$p = .004$
Child Age	-.40	$p = .004$				
Model 2			.45	.21	2.84	$p = .04$
Child rated maternal separation	.07	$p = .60$				
Maternal trait anxiety	.05	$p = .73$				
Maternal somatic symptoms	.19	$p = .19$				
<b>Hypothesis 3</b>						
Model 1			.56	.31	6.39	$p = .001$
Child rated maternal separation	.56	$p < .001$				
Maternal trait anxiety	-.05	$p = .65$				
Maternal anxiety sensitivity	-.05	$p = .73$				
<b>Hypothesis 4</b>						
Model 1			.39	.15	8.06	$p = .01$
Child age	-.39	$p = .01$				
Model 2			.41	.17	2.21	$p = .08$
Child rated maternal separation	.10	$p = .50$				
Maternal trait anxiety	.04	$p = .79$				
Maternal anxiety sensitivity	-.08	$p = .58$				

## Discussion and Future Directions

This study sought to clarify the relationship between parent and child anxiety by examining specific maternal factors that might contribute to separation anxiety specifically. Results indicated that maternal trait anxiety, maternal anxiety sensitivity, and maternal somatization do not uniquely contribute to child separation anxiety. However, there was a unique relationship between maternal separation anxiety and child separation anxiety. This relationship was exhibited in child reports of maternal separation anxiety. Because ratings of maternal separation anxiety were reported by the child, these results indicate that children might not only be noticing their mother's anxiety related to separation, but it is then possibly having an influence on their own feelings of separation anxiety. These findings hold even after taking into account somatization, anxiety sensitivity, and trait anxiety exhibited by the mother. Thus these specific behaviors and the negative information that might be transmitted related to separation are possibly influencing the child's anxiety related to separation.

Trait anxiety, anxiety sensitivity, and somatic symptoms consist of broad feelings and behaviors in the parent that, while in combination might influence anxiety in a child, separately might not uniquely have a direct effect on a specific disorder (in this case separation anxiety). It is not surprising that children might attribute specific separation anxious statements and behaviors exhibited by their mothers with the separation event. With broader factors, this attribution is less likely. In addition, children with anxiety often have comorbid anxiety disorders, making it even less likely that nonspecific anxious such as exhibiting general somatic symptoms are directly influencing separation anxiety specifically. The sample also likely contained a high rate of comorbid anxiety as scores on the SCARED child and parent indicate. In the future other parental factors should be examined to determine which might have a

significant unique influence on the development and maintenance of anxiety in children. In addition, other disorders should be examined to determine whether broad underlying factors might influence anxiety disorders in general or whether specific factors exert specific influences on different disorders.

Interestingly children's perceptions about their mothers' behaviors impact ratings of their own separation. These findings fit well with the etiological model of the development of anxiety. Research has shown that modeling (Gerull & Rapee, 2002; Mineka, Davidson, Cook, & Keir, 1984) and negative information transmission (Field & Lawson, 2008; Muris, Bodden, Merckelbach, Ollendick, & King, 2003; Muris, van Zwol, Huijding, & Mayer, 2010) both contribute to the development of fears. Mothers may be modeling anxious behaviors for two reasons. First mothers may be anxious over separation events themselves and thus modeling anxious behaviors or portraying negative information related to the separation. This provides the child with information that separation events are something to fear and can lead to the development or maintenance of separation related anxiety. The second reason fits with the literature that parents change their behavior based on their perception of their child (Mills & Rubin, 1990, 1992, 1993; Rubin & Mills, 1990, 1992). Mothers who perceive their child as anxious about separation events may then start to treat their child differently. They may become anxious over how the child will react to the separation and model anxious behaviors in response to separation events because of this. They may talk about separation events in a negative light or use accommodation behaviors more because they are fearful their child will become upset in these situations. They may encourage their children to engage in separation less so as to avoid the child's anxious reaction. Because mothers may be anxious themselves over separation or might act anxious due to their perception of their child's anxiety, modeling of anxious behaviors

and transmission of negative information may contribute to the development and maintenance of separation anxiety in children. Thus parent factors are hugely important in this process. Because parents have the most control over children's environments, the behaviors mothers are exhibiting over separation events along with accommodation and negative reinforcement of escape behaviors leading to avoidance are imperative targets in the treatment of separation anxious children. In addition, younger children engage in social referencing for how they should behave in situations and return to parents as a secure base. If the parent is transmitting negative information about separation being a scary event or the world in general being a scary place, the child would likely return to the parent for safety and this behavior would be reinforced by a reduction in fear.

Because separation specific behaviors seem to be driving the effect, targeting anxious behaviors in the mother, specifically those related to separation events, might help in reducing separation fear in a child with separation anxiety. Exposure based therapies are the most efficacious treatments for anxiety in children. When treating children with separation anxiety, however, it is often difficult to do clinic-based exposures, as most of the anxiety around separation cannot be recreated in a clinic setting. This makes parent-led and home-based exposure very important for a clinically relevant reduction in separation anxiety. Thus, maternal anxiety, especially concerning separation, can interfere with treatment. Parent accommodation is a common problem in the treatment of anxiety in children and a mother anxious about separation is more likely to accommodate as well as model anxious separation behaviors, leading to the continuation of these fears. In addition younger children are often unable to understand most cognitive components of treatment due to developmental factors, making the majority of the child component of treatment behavioral in nature and homework based (Davis, May, &

Whiting, 2011). In future treatment studies, maternal anxiety (both specific and broad) should be measured and the effect of this anxiety on separation treatment specifically, as well as the treatment of other disorders, should be examined. A recent randomized controlled trial found that while a separation specific treatment with a heavy parent training component did not outperform a well-established child focused cognitive behavioral therapy program (the Coping Cat; Kendall, 1994), both programs were effective treatment programs for separation anxiety (Schneider et al., 2013). Interestingly, parental dysfunctional cognitions about their child and parenting were also significantly improved in both conditions. A previous study had indicated that parental dysfunctional beliefs about child anxiety and parenting self-efficacy were positively associated with child anxiety, even after controlling for parental anxiety and depression (Herren, In-Albon, Schneider, 2013). Thus, it is possible that a reduction in parental dysfunctional beliefs might aid in treatment response and this mechanism of change should be further examined.

Finally these results have important preventative implications. Some separation anxiety is part of normal development in young children. Therefore it is important to educate parents, particularly those prone to anxiety over separation, on how to regulate their own anxiety over separating from their child so as not to display this anxiety to the child. If a mother can be taught how to manage anxiety over separating from her child, the likelihood of that child developing separation anxiety in the future might be avoided. In addition, by screening for maternal separation anxiety, the identification of children with separation concerns might be easier and more cost effective. Future studies should determine whether screening for maternal separation anxiety provides an accurate, effective, and cost effective way to identify children at risk for separation anxiety.

## **Limitations**

It is important to note the limitations of this study and recommend caution when interpreting the results. First, self-report measures alone were used. This is especially important when examining the results of the significant regressions. The child might notice and be influenced by their mother's separation anxiety. However, this is a limitation due to the inability to determine whether the mother is truly exhibiting these separation anxious behaviors, or the already anxious child is interpreting their mother's behaviors as anxious when another child might interpret these same behaviors differently. Because objective measures of maternal separation were not used nor were there any other respondent's reports of maternal separation (i.e., maternal report of separation in self or paternal report of maternal separation), these results should be interpreted cautiously. In future studies, objective as well as other respondent measures of anxiety should be obtained to tease apart the nature of the relationship (i.e., whether there is an effect of child anxiety on ratings of maternal anxiety or if maternal anxiety is observed objectively and by others as well). However, the focus of the current study was the child's subjective perception of separation anxiety in the parent. It could be argued that whether the mother is actually exhibiting these behaviors is not important. What is critical is that the child perceives these behaviors in the mother.

Another limitation of the study was that a diagnostic interview was not administered and diagnostic status cannot be determined. The SCARED-P/C does have clinical cut-off scores; however, the use of a single self-report measure should not be used to determine diagnostic status (Silverman & Ollendick, 2005). However, for the purposes of the study the cut-off scores were useful to determine different levels of symptomatology and the measure provided a range of scores across a spectrum allowing for the examination of the effect of these factors on



different levels of separation anxiety. As indicated, there was a portion of the sample experiencing significant symptoms of anxiety across a variety of disorders, including separation anxiety. The cost and time needed to conduct clinical interviews for the current study was prohibitive and because the total spectrum of separation anxiety was desired, clinical interviews were not seen as imperative. In addition, the separation scale on the SCARED-C was did not show good internal consistency for the current study. Thus, caution is again indicated when generalizing the results to a clinical population.

A third limitation was the sample. The sample consisted of families with higher socioeconomic status and while the sample was pretty evenly split between the child genders, race was a majority Caucasian, which may limit the generalizability of these results. Future studies should examine whether these results are exhibited in more ethnically and economically diverse samples. Only mothers were examined, for reasons related to the likely differences parental gender has on the development and maintenance of anxiety in children; however, these results are therefore only applicable to the mother-child dyad. In future studies, factors related to the father, including paternal separation anxiety should be examined to determine whether there is a differential effect based on parent gender. In addition, it would be interesting to examine whether there is an effect of parental gender or whether the important factor is not gender but primary caregiver status. The primary caregiver, regardless of gender might influence the development and maintenance of anxiety in the child.

Lastly, an established measure was used in this study in a new way. This essentially new instrument has not undergone rigorous psychometric analysis and this may limit the generalizability of these findings. The child and the parent versions of the SCARED ask the same questions but change the wording from “I” to “my child.” The authors attempted to

maintain the integrity of the measure by only changing that part of the question to “my mother.” Thus we would hope that the new separation scale would have similar properties the separation scale of the established measure; however, this is not certain and further testing must be done to ascertain whether the new measure has sound psychometric properties.

## **Conclusions**

Anxiety over separation from a caregiver is a problem affecting many children and their parents and can cause long-term and widespread problems for both the child and the family. Therefore, it is important to determine what factors might be influencing the development and maintenance of separation anxiety so that clinicians can help prevent and treat these problems. The results of this study indicate that a child’s perception of maternal anxiety over separation uniquely influences child separation anxiety. Thus, it is important that maternal anxiety is targeted both in preventing the development of separation anxiety in children of anxious mothers and in the treatment of children and mothers already suffering from separation anxiety. Future studies should look at these and other factors that influence the development and maintenance of separation anxiety in diverse populations as well as paternal and primary caregiver factors that might have an effect on this disorder.

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