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SUFFOLK UNIVERSITY

DERIVED RELATIONAL RESPONDING, TRANSFORMATION OF PSYCHOLOGICAL
STIMULUS FUNCTIONS, AND AVOIDANCE IN MOTHERS OF CLINICALLY
REFERRED CHILDREN FOR ANXIETY AND RELATED DISORDERS

A DISSERTATION SUBMITTED TO
THE FACULTY OF THE COLLEGE OF ARTS AND SCIENCES
IN CANDIDACY FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

DEPARTMENT OF PSYCHOLOGY

BY
CARLOS ENRIQUE RIVERA VILLEGAS

BOSTON, MASSACHUSETTS

JANUARY 2020

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DEDICATION/
DEDICATORIA

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ABSTRACT

Accommodation is a parenting behavior that is highly prevalent, has a strong association with child anxiety, and that persists despite its deleterious effects (e.g., Benito et al., 2015; Lebowitz et al., 2013; Thompson-Hollands, Kerns, Pincus, & Comer, 2014). While little is known about the psychological processes that motivate parents to engage in accommodating behaviors, conceptual models suggest that parental behavior may be influenced by avoidance of parental distress and cognitions around child anxiety (e.g., Feinberg, Kerns, Pincus, & Comer, 2018; Jones, Lebowitz, Marin, & Stark, 2015). However, most of the research in this domain is correlational, precluding knowledge regarding the possible influence or *function* that parents' perceptions of their children's anxiety may have on their parenting behavior. Relational frame theory (RFT; Hayes, Barnes-Holmes, & Roche, 2001), a behavioral-analytic account of human language and cognition, allows for the experimental research of cognitive processes, as it conceptualizes cognitions as verbal behavior. The purpose of the present study was to explore derived relational responding in parents of anxious children and its potential role in avoidance-based parenting behavior. Specifically, five parents of anxious children provided words describing their children's anxiety (aversive stimuli), sources of joy (appetitive stimuli), descriptions of neutral objects (neutral stimuli) and positive parenting values (appetitive stimuli for a second experiment). This study used an alternating treatments single case experimental design across participants to explore latency and errors in derived relations across the three stimulus classes. I expected that mothers would: Hypothesis One: Form equivalence classes faster and with fewer errors between aversive child anxiety and novel stimuli relative to neutral-novel or appetitive-novel stimuli, Hypothesis Two: take more time and make more errors in forming classes with aversive child anxiety stimuli and parenting values stimuli, compared to

neutral-parenting values and appetitive-parenting values stimuli, Hypothesis Three: avoid visual stimuli previously associated with child anxiety stimuli, and Hypothesis Four: self-report elevated perception of child anxiety, parental avoidance, autonomy granting behavior and Hypothesis Five: self-report elevated cognitive fusion, experiential avoidance, and trait anxiety.

Hypotheses were partially supported. Most mothers formed functional equivalence classes among novel symbols and aversive child anxiety words faster and with less errors than when forming relations between novel symbols and either neutral or appetitive words. Mothers did not show a systematic tendency to form equivalence classes with stimuli of incongruent psychological functions more slowly or with more errors than when forming classes between other stimuli. While participants 1 through 4 selected symbols systematically, only 1 and 3 avoided the symbols that had acquired aversive psychological functions on all trials. Results support the possibility that parents of anxious children may be less sensitive to other stimuli when stimuli about their children's anxiety is present. Limitations of this study include not having a participant whose child did not struggle with anxiety, as well as some novel stimuli having psychological properties prior to the experimental tasks. Other implications are discussed.

CHAPTER I

INTRODUCTION

Prevalence and comorbidity of anxiety disorders

Anxiety is a debilitating mental health problem. During childhood, prevalence rates of anxiety disorders range from eight to twelve percent (Bernstein & Borchardt, 1991; Costello & Angold, 1995; Dadds, Spence, Holland, Barrett, & Laurens, 1997; Fisak & Grills-Taquechel, 2007), making them among the most prevalent childhood psychiatric conditions, and tending to persist into adulthood if untreated (Bernstein, Borchardt, & Perwien, 1996; Fisak & Grills-Taquechel, 2007). Recent accounts estimate a lifetime prevalence of anxiety disorders between 10.6% (Sommers, Goldner, Waraich, & Hsu, 2006) and 28.8% (Kessler, et al., 2005). Not only do they interfere with individuals' daily functioning, but they are also highly comorbid among themselves and with other psychological conditions. Up to 55% of people with a principal diagnosis of an anxiety disorder also had an additional anxiety disorder or a depressive disorder at the time of assessment (Barlow, Allen, & Choate, 2004). Another characteristic of anxiety disorders is a pervasive tendency for the person to engage in avoidance-based behaviors, even when there are non-avoidance behavioral options available to engage in (Barlow, Allen, & Choate, 2004; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996; Eifert & Forsyth, 2007). In children, anxiety is often manifested as extreme avoidance of the fear stimuli (e.g., sensory stimuli, being separated from caregivers or left alone, social interaction) and their associated distress (Beesdo, Knappe, & Pine, 2009; McCathie, & Spence, 1991).

Child anxiety within the family context

Research suggests anxiety and related disorders are transmitted intergenerationally (Bögels, & Brechman-Toussaint, 2006; Kendler, Neale, Kessler, Heath, & Eaves, 1992;

O'Connor, Heron, Glover, & Alspac Study Team, 2002; Stein, Jang, & Livesley, 1999; Stein, Jang, & Livesley, 2002), and are influenced by both genetic (e.g., Martin, Ressler, Binder, & Nemeroff, 2009) and environmental (see Wood, McLeod, Sigman, Hwang, & Chu, 2003 for a review) factors. Existing research points at the association between parental and child anxiety and related disorders (e.g., Beidel & Turner, 1997; McClure, Brennan, Hammen, & Le Brocq, 2001; Muris, Steerneman, Merckelbach, & Meesters, 1996; Van Gastel, Legerstee, & Ferdinand, 2009). For example, studies that have explored the relationship between specific parental and child anxiety disorders, suggest that social phobia in the parent is associated with the same disorder in the child (Biederman et al., 2006; Bögels, van Oosten, Muris, & Smulders, 2001), and that child obsessive compulsive disorder (OCD) tends to have variance accounted for by parental panic disorder (Biederman et al., 2006). Moreover, etiological models of child anxiety and related disorders (e.g. Chorpita & Barlow, 1998; Hudson & Rapee, 2004; Rapee, 1997) suggest the role of parenting in the development and maintenance of these disorders in children.

Extensive evidence supports the view that parenting styles (e.g., Bruch, Heimberg, Berger, & Collins, 1989; Chorpita, Albano, & Barlow 1996; Greco & Morris, 2002; Kohlmann, Schumacher, & Streit, 1988; Krohne, & Hock, 1991; Lieb et al. 2000; Moore, Whaley, & Sigman, 2004; Siqueland, Kendall, Steinberg, 1996; Spokas, & Heimberg, 2009; Van Gastel et al., 2009), cognitions (e.g., Chorpita et al., 1996; Creswell, Shildrick, & Field, 2011; Hudson & Rapee, 2004; Lester, Field, Oliver, & Cartwright-Hatton, 2009; Moore et al., 2004; Orchard, Cooper, Phil, & Creswell, 2015), and behaviors (e.g., Bögels & van Melick, 2004; Chorpita et al., 1996; Creswell, O'Conner, & Brewin, 2006; Ginsburg, Siqueland, Masia-Warner, & Hedtke, 2004; Lebowitz, Shic, Campbell, MacLeod, & Silverman, 2015; McLeod, Wood, & Weisz, 2007; Moore et al., 2004; Thompson-Hollands et al., 2014; Wood, 2006) are closely associated

with anxiety in children. Despite the existing evidence, one problem with “parenting styles” is that the various constructs may comprise multiple, varied cognitions and behaviors, thus making it difficult to interpret specific factors associated with the development of parent-child interactional patterns that maintain child anxiety. For example, over-involved parenting is characterized by parental accommodation and attempts to control the child’s environment (i.e., behaviors) due to parents’ beliefs (i.e., cognitions) that their children will not be able to cope with stressful situations (Creswell, O’Connor, & Brewin, 2008). Not surprisingly, the field has sought to further specify parent cognitions and behaviors that are implicated in child anxiety. Parental cognitions that have been associated with child anxiety include parental interpretative bias (i.e., parents’ tendency to perceive a higher probability of risk as well as a higher perceived cost for aversive outcomes in relationship to situations that their children face) such as catastrophizing (Moore et al., 2004) and negative expectations of the child’s coping abilities (e.g., Chorpita et al., 1996; Kortlander, Kendall, & Panichelli-Mindel, 1997; Lester, Field, & Cartwright-Hatton, 2012; Lester et al., 2009; Orchard et al., 2015). Some limitations with existing research on parental cognitions are the absence of experimental studies, perhaps due to difficulties of manipulating cognitive processes, and an overreliance on self-reported data. Thus, behavioral models of parent-child interaction in families raising anxious children appear to be a more fruitful line of inquiry, as these models allow for broader methods of research including behavioral observation and the experimental manipulation of variables of interest.

Parental behaviors that have been studied and linked to child anxiety and avoidance include parental modeling of fear and avoidance behavior (e.g., Burstein, & Ginsburg, 2010; Chorpita et al., 1996; Gerull, & Rapee 2002; Muris et al., 1996), as well as parental psychological control and low autonomy granting (e.g., McLeod et al., 2007; Hudson, Comer, &

Kendall, 2008; Hudson & Rapee 2001; Moore et al., 2004; Rapee 1997; Wood, 2006). Another parenting behavior that has been recently studied in the context of child anxiety, and appears to have an important association with child anxiety and related disorders is parental accommodation (e.g., Benito et al., 2015; Lebowitz et al., 2013; Thompson-Hollands et al., 2014).

Parental accommodation and child anxiety

Parental accommodation is defined as “parental behavior modifications that attempt to prevent or reduce child distress associated with participation in age-appropriate activities and/or exposure to feared or avoided stimuli.” (Thompson-Hollands et al., 2014, p. 766). Parental accommodation behaviors may take several forms including providing reassurance, removing anxiety-provoking stimuli or removing the child from anxiety-provoking contexts, allowing the child to avoid activities or situations that trigger their fear and anxiety (e.g., homework and school attendance, social interaction), modifying routines at home or in the community, and following rigid rules and/or rituals made by the child, all in the service of mitigating their anxiety. By definition, parents who accommodate a) model avoidance strategies to their children and b) engage in controlling behavior, as their attempts to reduce their children’s distress prevents their children to face challenging, yet possible developmentally formative experiences. Thus, both parental modeling of avoidance and parental overcontrol or lack of autonomy, which are the parenting behaviors that have been mostly associated with child anxiety, could be understood as different forms of parental accommodation. Additionally, while the parental behaviors that have been associated with child anxiety in the literature (i.e., parental modeling of fear and avoidance behavior, parental psychological control and lack of autonomy granting, and parental accommodation) may look different, they all seem to have the function of avoiding unpleasant experiences in the parents that are associated with their children’s anxiety. Thus,

these behaviors belong to the same functional class of avoidant behaviors. In other words, they are different forms of behavioral avoidance.

While parental accommodation has historically been explored within the context of pediatric OCD (e.g., Ferrão et al., 2006; Garcia et al., 2010; Merlo, Lehmkuhl, Geffken, & Storch, 2009), recent studies have established a strong association between parental accommodation and child anxiety (e.g., Benito et al., 2015; Johnco et al., 2015; La Buissonnière-Ariza et al., 2018; Lebowitz et al., 2013; Lebowitz et al., 2016; Lebowitz et al., 2017; Lebowitz, Scharfstein, & Jones, 2014; Lebowitz, Scharfstein, & Jones, 2015; Storch et al., 2015a; Storch et al., 2015b; Thompson-Hollands et al., 2014). The importance of researching parental accommodation within child anxiety includes its prevalence, its strong association to the maintenance of child anxiety, its persistence, and the lack of knowledge about what motivates parents to engage in accommodation and why it is so hard to stop it despite its deleterious effects.

Prevalence of parental accommodation in child anxiety

Evidence suggests that parental accommodation behavior is highly prevalent in families of children with anxiety disorders, as 95 to 100% of parents of these children report engaging in accommodating behaviors (Benito et al., 2015; La Buissonnière-Ariza et al., 2018; Lebowitz et al., 2013; Lebowitz, Scharfstein, & Jones, 2014; Lebowitz et al., 2015; Storch et al., 2015; Thompson-Hollands et al., 2014). Lebowitz and colleagues initially developed the Family Accommodation Scale - Anxiety (FASA; Lebowitz et al., 2013) by adapting the Family Accommodation Scale (FAS; Calvocoressi et al., 1999), a measure originally developed to measure family accommodation for children with OCD to study this construct. The FASA has nine items and two subscales, modification (e.g., Have you modified your family routine because

of your child's symptoms?) and participation (e.g., How often did you assist your child in avoiding things that might make him/her more anxious?). Participants included 75 parents of school age children struggling with anxiety disorders excluding OCD. The authors found that family accommodation was highly prevalent across pediatric anxiety disorders, especially separation anxiety. Ninety-three percent of parents reported engaging in accommodation (Lebowitz et al., 2013). In another study of 71 clinic-referred children with anxiety disorders and their parents, 97% of mothers and 88% of fathers reported they had engaged in at least one parental accommodation behavior within the previous two weeks, and averaging four accommodation behaviors (Thompson-Hollands et al., 2014). During a study of the development of another measure to assess parental accommodation, Benito and colleagues reported that 97.1% of parents reported engaging in accommodation, mostly in the form of providing reassurance and facilitating avoidance (2015). Besides its high prevalence, research has suggested strong associations between parental accommodation and constructs related to child anxiety.

Correlates of parental accommodation and child anxiety

High levels of parental accommodation have been associated with problematic variables in children, their parents, as well as deleterious treatment effects. On the other hand, lower levels of accommodation have been related to positive treatment outcomes. In children, parental accommodation has been associated with increased severity of child anxiety symptoms (La Buissonnière-Ariza et al., 2018; Lebowitz et al., 2013), child functional impairment (Benito et al., 2015; La Buissonnière-Ariza et al., 2018), internalizing, externalizing, and depressive symptoms (Jhonco et al., 2015; Storch et al., 2015), and even with sleep disturbances (Peterman et al., 2016). A study investigating the role of parental accommodation in child anxiety in 138 youth ages 8 to 17 receiving outpatient, partial, or inpatient services, found that accommodation

partially mediated the relationship between anxiety severity and functional impairment (La Buissonnière-Ariza et al., 2018). In parents, accommodation have been associated with parental depressive symptoms (Benito et al., 2015; La Buissonnière-Ariza et al., 2018), and parental distress (Benito et al., 2015; Lebowitz et al., 2013). Furthermore, reductions in parental accommodation have been associated with positive outcomes for children (La Buissonnière-Ariza et al., 2018; Lebowitz et al., 2014). Lebowitz and colleagues developed a parent training protocol that directly targeted parental accommodating behaviors in parents of children with anxiety. The protocol was piloted with parents of 10 children ages 9 to 13 with anxiety disorders and who refused to receive individual therapy. Results showed a significant decrease in family accommodation as well as child anxiety post intervention (Lebowitz et al., 2014). In the study by La Buissonnière-Ariza et al., reductions in parental accommodation post-treatment were associated with significant reductions in child- and parent-rated child anxiety severity, functional impairment, OCD, depression, and inattention, as well as with a significant increase in quality of life (2018). Given the association between parental accommodation with, not only child anxiety, but other problematic factors affecting children and parents, as well as the association between lower levels of accommodation and improvement in treatment outcomes, it seems important to further investigate parental accommodation in the context of child anxiety. For instance, despite these associations, less is known about what makes accommodation such a persistent behavior.

Why might parental accommodation behaviors persist?

While no studies to date have experimentally explored reasons for the persistence of parental accommodation, evidence from correlational studies and existing theories provide potential explanations. Accommodation seems to be maintained via negative reinforcement, that is, the behavior is strengthened by a temporary reduction in aversive experiences. For example,

imagine a child who starts crying and hyperventilating after her mother tells her she needs to get ready to go to school. The child's behavior may elicit distress in the mother. Perhaps she feels pain for her daughter's pain. She might also worry about herself being late for work once again, or feel frustrated at her daughter's response. In an attempt to reduce their suffering, the mother may opt to allow her daughter to call in sick and stay home. This decision quickly provides a sense of relief as daughter avoids the distress associated with going to school and mother avoids the distress associated with seeing her daughter suffer, being late for work, or feeling frustrated at her daughter. Because of its relatively fast and successful outcome in alleviating distress for both mother and child, the mother's accommodating behavior (i.e., complying with her daughter's request) becomes reinforced inadvertently, and thus the probability of it occurring in future increases. Once parents accommodate for their children's anxiety, this avoidant strategy provides an immediate yet short-term distress reduction for both parent and child (Feinberg et al., 2018). While the strategy may work in the short term, accommodation behaviors tend to inadvertently reinforce avoidance strategies which maintain anxiety in the long term (Ginsburg et al., 2004). Additionally, failure to accommodate may lead to exacerbation of symptoms and even child coercion (Lebowitz et al., 2013). In the initial study by Lebowitz and colleagues, despite 70.7% of parents reporting distress resulting from engaging in accommodation, 85.3% reported experiencing negative consequences (e.g., exacerbation of child anxiety and the child becoming angry and abusive) from not engaging in accommodation (2013). Relatedly, one model suggests that the rationale for which parents engage in accommodation is to mitigate the distress associated with the disorder (Shimshoni, Shrinivasa, Cherian, & Lebowitz, 2019). Despite the existence of theoretical models that seek to explain the persistence of parental accommodation behavior, less is known about the underlying processes in parents that motivate them to engage

in and persist in accommodation. Some studies, however, have pointed at the role of distressing parental private events in the maintenance of behaviors that may maintain child anxiety.

Parental perceptions of child anxiety, distress, and accommodation

Research suggests that parental behavior (e.g., accommodation) may be associated with parental distress and cognitions (e.g., Creswell et al., 2010; De Wilde & Rapee, 2008; Feinberg et al., 2018; Jones et al., 2015; Kerns et al., 2017; Thirlwall, & Creswell, 2010; Thompson-Hollands et al., 2014). For example, one study showed that parental accommodation was associated with maternal (though not paternal) distress (anxiety and stress, but not depression; Thompson-Hollands et al., 2014). While the direction of the relationship between maternal distress and parental accommodation behavior could not be established given this was a cross-sectional study, the findings indicate the importance to further explore mothers' distressing experiences within the framework of accommodation. Feinberg and colleagues' study showed that mothers who had more negative beliefs about their children's anxiety also tended to engage more in experiential avoidance and parental accommodation (Feinberg et al., 2018). Relatedly, Jones et al suggest that parental accommodation may mediate the association between maternal and child anxiety symptoms (2015). Although Feinberg et al. propose that the relationship between maternal experiential avoidance and accommodation is mediated by parental cognitions, their model was based on a cross-sectional study, and thus experimental methodologies are warranted to corroborate whether this is the direction in which processes impact one another. A model has been proposed by Creswell, Cooper, and Murray where parental cognitions (e.g., interpretive biases, expectations) may lead to behaviors (e.g., accommodation) that inadvertently maintain and increase children's anxious cognitions (2010) and child anxiety (De Wilde & Rapee, 2008; Thirlwall, & Creswell, 2010). A similar model was proposed by Kerns et al where

maternal anxiety predicted inefficient parental emotion regulation strategies, which predicted parental accommodation, which in turn predicted child anxiety (2017).

Given these findings, it is possible that aversive cognitions within the context of child anxiety may trigger distressing experiences in mothers, prompting them to engage in accommodating behaviors to avoid or escape their children's anxiety as well as their distress, a form of experiential avoidance which inadvertently maintains the children's anxiety. Simply put, there appears to be a functional relationship between parent perceptions of child anxiety/parent distress and parenting behavior such that parents accommodate. This is a negative reinforcement loop – parent feels distress so engage in behavior to ameliorate that distress (accommodation), and the removal of the aversive experience (parent distress) reinforces the avoidance behavior. While this is a reasonable short-term strategy for parents to reduce their distress, these accommodating behaviors may prevent children from facing situations and learning from them, reinforcing the belief that the world is a dangerous place and they are not able to cope with the challenges they encounter. Thus, in the long term, it may play a role in the maintenance and exacerbation of child anxiety. For example, a mother may believe that allowing her daughter to go to a sleepover at her friend's house could place her at risk of being targeted by her peers and imagine her child unable to cope, which may lead the mother to refuse the request. The repetition of this type of situations could eventually lead to the daughter internalizing messages about the world being a dangerous place and of her inability to face its dangers. The implication for this model highlights the importance of targeting parental cognitions to improve the treatment of child anxiety disorders.

Importance of exploring the function of parental cognitions

Given findings that parental accommodation may exacerbate child anxiety and that targeting parental behavior may effectively decrease child anxiety (Lebowitz, Omer, Hermes, & Scahill, 2014); that parents' behaviors may be mediated by parents' cognitions (Creswell et al., 2011; Orchard et al., 2015); and that parental cognitions and behaviors may be associated with the maintenance of anxiety and the attenuation of treatment response (e.g., Silverman, Kurtines, Jaccard, & Pina, 2009), it is important to study the role of cognition in parents of children struggling with anxiety or related disorders and within the contexts of their parenting and their children's anxiety.

While extensive research supports the association between parental cognitions and behaviors, less is known about the impact that cognitions may have on parental behavior, and how cognitions within the context of child anxiety may differ from cognitions in other contexts. Given this lack of knowledge, researchers have highlighted the need to conduct experimental studies to further explore parental cognitions and its potential influence on behaviors such as parental accommodation or other avoidant based behaviors (e.g., Lester et al., 2009; Orchard et al., 2015). Thus, the importance for a more fine-grained study at the relationship between mothers' cognitions and parenting behaviors in a sample of mothers raising children struggling with anxiety and related disorders is warranted.

One barrier in conducting experimental research on cognitions however, is the impracticability of having direct impact on cognitions, thus preventing their experimental manipulation. Nevertheless, one way in which cognitive processes have been experimentally explored is through the study of derived relational responding. Through this approach, cognition is understood as verbal behavior. Understanding cognitions as a verbal behavioral process makes

it possible to measure and manipulate those behaviors, which in turn allows to conduct experimental investigation on them. A better understanding of parental cognitions or verbal behaviors may allow researchers and clinicians to develop effective strategies to help parents employ alternative and adaptive coping responses to their distressing emotions and thoughts (or verbal behaviors) that may occur within the context of their children's anxiety. These alternative responses may in turn have an impact on reducing processes that maintain anxiety in their children in the long term.

Cognition as verbal behavior: Derived relational responding

Human beings have the ability to derive relations between stimuli, that is, we establish relations between things that have not been previously related directly. In addition, these relations between things have an influence in the way we respond to them. This process is called derived relational responding (Hayes et al., 2001; Sidman, 1994). The basis for relational conditioning is stimulus equivalence training, shown in Sidman's (1971) seminal experiment in which a participant with a learning disability was trained to match spoken words to pictures that represented them and the same spoken words with their printed words (e.g., match the word "cat" with a picture of a cat, and match the word "cat" with the printed letters "CAT"). Without additional training, the participant showed the ability to match printed words to pictures and pictures to printed words. In other words, the person indirectly learned to associate the picture of a cat with the printed letters "CAT" as well as the printed letters "CAT" with the picture of a cat. This process is called "combinatorial mutual entailment" and represents one aspect of derived relational responding. The stimuli formed an equivalence class, that is, they became equivalent to each other (Sidman, 1971). It is important to note that relations among stimuli are not formed exclusively based on equivalence. Other possible relations include opposition (e.g., down is the

opposite of up, night of day, etc.), difference (e.g., green is different from red), comparison (i.e., more than/less than), cause (e.g., if/then), as well as temporal (e.g., now/then), hierarchical (e.g., first, second, third; Boston is a part of Massachusetts; dogs belong to the family Canidae), and deictic (i.e., I/you, here/there, now/then). However, research suggests that equivalence relations are the first kind of relations to emerge as children learn to relate objects for the words that represent them (Luciano, Becerra, & Valverde, 2007). Later on, the other kind of relations emerge.

Basic research on derived relational responding eventually led to the development of Relational Frame Theory (RFT; Hayes et al., 2001). RFT is a contextual behavioral theory of language and cognition that proposes that the core process of language and cognition is relational. That is, cognition is understood as verbal behavior, and that behavior is based on relating different stimuli. The theory proposes that verbally competent human beings have the unique ability to relate stimuli a) indirectly, and b) arbitrarily, that is, to relate stimuli based on criteria established upon social convention as opposed to natural properties (e.g., size, color, quantity). For example, it is an arbitrary social convention that US dimes are smaller than nickels, and so people who know this will choose the smaller coin, even when it is smaller. From an RFT standpoint, derived relational responding is viewed as a basic unit of behavior and as an operant behavior that is developed through multiple exemplar training, that is, something we learn to do as a consequence of continuous exposure to it (Hayes et al., 2001). While an in-depth review of RFT is beyond the scope of the present work (for an in-depth review see Hayes, Barnes-Holmes, & Roche, 2001 and Torneke, 2010), commenting on some of RFTs basic processes will help better understand the analysis of cognition as verbal behavior.

Conditional discrimination

Conditional discrimination, a basic behavioral term, proposes that the occurrence of a discriminated operant depends on additional situational cues. That is, when we think and relate different things to one another and to other things, we do so based on contextual cues of that particular circumstance, cues that act as parameters (or conditions) and highlight the features we are relating based on. Moreover, conditional discrimination involves relations among stimuli, placing the emphasis on the relation, not on the stimuli. For example, if instructed to choose the larger of two objects – a pen and a hammer, the individual would choose a hammer. However, if asked to choose the larger object between a pen, a hammer, and a baseball bat, the person would choose the baseball bat over the other two objects, and the hammer over the pen. The available choices depend on the instructions given, specifically, “choose the larger of these objects,” and not on other properties such as weight, the materials they are made of, their color, etc. Additionally, the criterion for reinforcement needs to highlight the relation between the objects not the objects themselves. That is, reinforcement should follow choosing the largest of the three objects which may vary, so that when new objects are introduced, the person knows to choose the largest available object, instead, for example, of continuing to choose the baseball bat after a broom or a bicycle have been added to the list of objects.

RFT extends from a person’s history of conditional discrimination training, that is, his or her previous experience discriminating events based on formal properties and abstracting relations given certain situational cues. Additionally, RFT adds four features that encompass the function of human verbal behavior (i.e., language and cognition): arbitrary applicability, mutual entailment, combinatorial entailment, and transformation of stimulus functions (Drossel, Waltz, & Hayes, 2007).

Arbitrary applicability

As described above, relations can be based on abstract properties, arbitrary rules, or social conventions, instead of natural or physical attributes. Once these relations are trained, they can be applied to any stimuli. For example, after training the relation “larger than” a child will be able to select a dime over a nickel, which is physically smaller, but arbitrarily larger. Relations can be formed based on abstract characteristics or functions, over concrete ones. From an RFT account, we can say that “the relational nature of discriminations comes under control of contextual cues other than the formal properties of the related events” (Drossel, Waltz, & Hayes, 2007, p. 36).

Mutual entailment and combinatorial mutual entailment

Mutual entailment shows that relations among stimuli are reversible. Combinatorial mutual entailment occurs when relations among stimuli emerge due to an existing indirect relationship between them (Blackledge, 2003; Dymond & Roche, 2009; Hayes et al., 2001). For example, after directly training to choose stimulus B1 in the presence of stimulus A1 (i.e., A1-B1), and to choose stimulus C1 in the presence of stimulus A1 (i.e., A1-C1), humans most likely derive relations between A1, B1, and C1 that had not been directly trained before. They would derive the untrained relations B1-A1 and C1-A1 (*mutual entailment*), as well as B1-C1 and C1-B1 (*combinatorial mutual entailment*: see Figure 1).

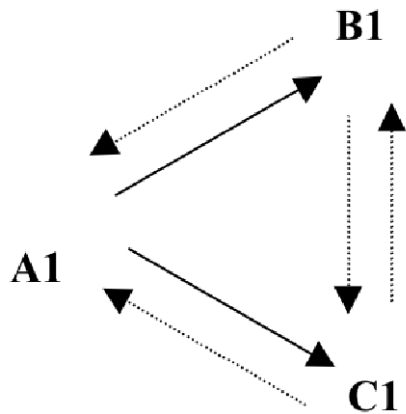


Figure 1. Three-member equivalence class. Solid lines represent directly reinforced relations. Dotted lines represent derived relations (mutual and combinatorial mutual entailment).

Transformation of psychological stimulus functions

Transformation of psychological stimulus function occurs when a particular function or property of a stimulus influences the properties of another stimulus that participate in the same class, without direct training (Dougher, Augustson, Markham, Greenway, & Wulfert, 1994). For example, when rewarding people after choosing the stimulus “Apple” and not rewarding them for choosing the stimulus “Lamp,” then subsequently giving them the task to choose between the stimuli “Shoe” or “Lemon,” they would most probably choose “Lemon.” The appetitive function was transferred from Apple to Lemon, as they are both members of the same functional class (i.e., fruits). This process has been documented reliably in the scientific field. For example, Dougher et al (1994) trained participants to form equivalence functional classes A1-B1-C1-D1 and A2-B2-C2-D2. Participants then were conditioned to receive a shock (CS+) in the presence of stimulus B1 and not receive a shock (CS-) in the presence of stimulus B2. After the conditioned response was established, as measured by skin conductance response, participants were presented with stimuli that have not been conditioned. They derived a fear response to

stimuli C1 and relief response to stimuli C2 equivalent to those evoked during the presentation of B1 and B2. As stated earlier, transformation of function occurs not only in terms of equivalence, but also in terms of other type of relations such as, opposition, difference, comparison, cause, temporal, hierarchical, and deictic.

Transformation of function may occur with any stimuli. For example, we can teach people that the Spanish word *maluco* means the opposite of yummy. Asking them “Do you want me to give you something *maluco*?” most probably evoke avoidance responses. In this example, the relation of opposition between the stimuli *maluco* and yummy has been established by direct training. People have also been previously taught that yummy and yucky participate in a relation of opposition, that is, yummy is the opposite of yucky. As a result, a derived relation of equivalence between the stimuli *maluco* and yucky is established (i.e., *maluco* is equivalent to yucky). Moreover, a derived relational response of avoidance is established, since the stimulus *maluco* has acquired new functions through the process of transformation of function. We can say that the function of *maluco* was transformed. Derived relational responding can be studied with matching-to-sample tasks (Sidman, 1971).

Matching-to-sample paradigm

Matching-to-sample (MTS) is a paradigm used to assess derived relational responding and transformation of psychological stimulus functions. The procedure entails training and testing phases. Usually, a sample visual stimulus is presented at the top half of a computer screen, and two or more comparison stimuli at the bottom half (see Figure 2).

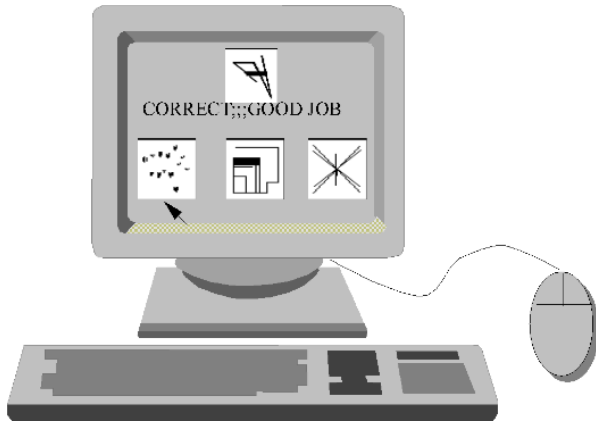


Figure 2. Example of a matching-to-sample trial

For each trial of the training phase, participants are asked to match one sample stimulus (either A1, A2, or A3) with one of the comparison stimuli (B1, B2, or B3, presented simultaneously). Only one of the three comparison stimuli is considered a correct answer. Participants are reinforced for selecting the correct answer by showing a “Correct” sign in the screen and punished for selecting the incorrect answer by showing an “Incorrect” sign. Through direct conditioning, participants are taught that when presented with the sample stimulus A1 and the comparison stimuli B1, B2, and B3, the correct answer is B1, and the incorrect answers are B2 and B3; when presented with sample stimulus A2 and the comparison stimuli B1, B2, and B3, the correct answer is B2, and the incorrect answers are B1, and B3; when presented with sample stimulus A3 and the comparison stimuli B1, B2, and B3, the correct answer is B3, and the incorrect answers are B1, and B2. On a subsequent phase, a third group of stimuli C is presented (e.g., C1, C2, C3) instead of the B stimuli. In this phase, participants are taught to associate A and C stimuli (e.g., when presented with A1 as sample stimulus and C1, C2, and C3 as comparison stimuli, select C1; if A2, select C2; if A3, select C3). Once A-to-B and A-to-C relations have been directly taught during training phases, verbal competent participants are able to derive relations in the opposite order (i.e., mutual entailment; B1 to A1, C1 to A1, B2 to A2,

C2 to A2, B3 to A3, and C3 to A3) as well as between stimuli that have not been directly related previously (i.e., combinatorial mutual entailment; B1-C1, C1-B1, B2-C2, C2-B2, B3-C3, and C3-B3) during testing phases. In summary, after directly learning two relations, verbally competent humans will derive (i.e., indirectly learn) four more relations (Figure 1). Existing research suggests direct and derived relational responding and multiple exemplar training mediate equivalence class formation (Luciano et al., 2007). Furthermore, derived relational responding occurs only in verbally competent humans and is impaired in intellectually disabled humans who are not verbally competent (Devany, Hayes, & Nelson, 1986; Hayes et al., 2001).

The ability to derive relations between stimuli and respond based on those relations has important implications for the understanding of human experiences. For instance, it provides an explanation for the generativity of language and the capacity for people to engage in complex behaviors that are governed by verbal rules, two processes deeply associated with human learning and emotion. Derived relational responding, for instance, has been used to study processes of emotion and learning such as fear conditioning (Augustson & Dougher, 1997; Dougher et al., 1994; Eifert & Forsyth, 2007; Friman, Hayes, & Wilson, 1998; Hayes & Hayes, 1989; Hayes, Kohlenberg, & Hayes, 1991). Research on RFT suggest that fear and anxiety may impact individuals' derived relational responding and avoidance-based responses.

Existing Relational Frame Theory research on derived relational responding, anxiety, and avoidance

Besides basic experimental studies (e.g., Dougher et al., 1994; Dougher, Hamilton, Fink, & Harrington, 2007; Dougher, & Markham, 1994; Wilson & Hayes, 1996) where individuals engage in avoidance after novel stimuli (i.e., non-words letters, novel visual symbols) have acquired aversive psychological functions, other studies have been done with stimuli that is more

relevant to individuals, such as emotionally relevant words. A series of studies by Plaud and colleagues suggest that people have more problems forming functional classes (i.e., relating stimuli based on their function) with emotionally relevant stimuli than with neutral stimuli (Plaud, 1995; Plaud, Gaither, Franklin, Weller, & Barth, 1998; Plaud et al., 1998). Wilson (1998) studied relational acquisition of stimulus function between individuals with substance abuse dependency and healthy controls. After comparing drug versus nondrug related equivalence classes, he found that individuals with alcoholism made more errors in class acquisition than non-alcoholics. Interestingly, he also found that individuals with alcoholism acquired classes with drug-related stimuli faster than with non-drug-related stimuli. Wilson proposed that while people may be faster at acquiring new members to classes with emotionally relevant stimuli, they might have more problems parsing pre-existing emotionally relevant stimuli. Pre-existing classes with emotionally relevant stimuli may be more rigid, hindering the formation of new functional classes with those particular stimuli (Wilson, 1998). In other words, people may associate emotionally relevant stimuli faster because they are hypervigilant to it, but they may have a harder time when the associations to be made contradict prior learned relations. Leslie and colleagues (1993) explored class formation with emotionally relevant stimuli, specifically, anxiety-related words and pleasant adjectives. They found that participants who were clinically anxious struggled to form equivalence classes between anxious words and pleasant words as compared to participants without clinical anxiety. Specifically, one out of eight participants in the anxious group and six out of eight participants in the non-anxious groups were able to form new equivalence classes. These results support the premise that equivalence class formation may be systematically disrupted or hindered by prior learning, when it contradicts the new learning. Additionally, the anxious group was able to maintain the trained relationships better than the

non-anxious group (1993), providing support to Wilson's hypothesis that people may be faster at acquiring new members to classes with emotionally relevant stimuli (1998). In general, these findings provide empirical support for the study of cognitive processes such as indirect learning through RFT-related processes (e.g., derived relational responding, transformation of functions, contextual cues).

Derived relational responding in parents

Murrell explored the effects of parenting stress on mothers' derived relational responding. Consistent with the findings of Wilson (1998), she found trending evidence that distressed mothers had the tendency to acquire stimulus equivalence classes containing emotionally relevant stimuli (i.e., negative child behavior words) and neutral stimuli faster than non-distressed mothers and non-mothers. Moreover, distressed mothers showed more difficulty in forming new equivalence classes with emotionally relevant stimuli (i.e., negative child behavior words) and positive parenting words, as compared to non-distressed mothers and non-mothers. According to Murrell, most of her hypotheses were at least partially confirmed, but methodological limitations may have masked or weakened the likelihood of reaching statistically significant effects (Murrell 2005; Murrell et al., 2008).

Limitations with previous research

Murrell cited a few methodological limitations of her study. First, the stimuli were not rated by participants as expected in several domains. Murrell states, "It is likely that the stimuli were not emotionally salient or personally relevant enough." (2005, p. 74). Murrell proposes making stimuli more salient by tailoring to individual participants (e.g., asking mothers which behaviors from their children upset them the most and what positive parenting behaviors are most difficult for them). In her study, there was some unintended variability that might have

impacted the results. Some participants completed the experiment in one sitting, while others required two sessions, with usually one week in between sessions and the time between sessions varying for participants. While some participants completed self-reports on the same sitting as the rest of the study, others completed them a month prior to the experimental tasks. Some participants completed the experiment alone, while others completed it with other participants present, and some using laptops while others using desktop computers. The author noted not using self-reports of general measures that could help explore the link between derived relational responding and parent behavior in more general contexts. Murrell suggests, for example, administering self-reports of experiential avoidance (2005). Another way to potentially improve the study would be to focus on avoidance rather than stress, given avoidance has been linked to a wide variety of problems, and it can also be assessed behaviorally.

Importance of targeting maternal derived relational responding, transformation of psychological stimulus functions, and avoidance in the study of child anxiety

While the scientific literature suggests an association between parental accommodation and child anxiety, and evidence points at the potential role of parental cognition (i.e., verbal behavior) as an influential factor on parental accommodation, less is known about the processes in which parents experience cognitions. Exploring patterns of derived relational responding may provide knowledge about how mothers relate to their children's anxiety. Thus, derived relational responding in parents within the context of their children's anxiety and related disorders may be an important target of exploration.

Based on RFT accounts on the development of fear, avoidance, and anxiety, it is possible that the impact of anxiety across generations is associated with mothers' difficulties in flexibly deriving relations with stimuli that has acquired aversive psychological functions. Further

exploration and understanding of these processes may be instrumental in the refinement and development of effective treatment interventions aimed at reducing clinical anxiety and increasing psychological flexibility. Exploring derived relational responding, transformation of psychological stimulus functions, and their impact on behavior may allow for a more precise analysis for several reasons. First, since cognition is understood as verbal behavior, it allows for the analysis of cognitive processes from a behavioral perspective that can be experimentally manipulated. Second, the MTS paradigm is an implicit measure of behavior. Existing research suggests that implicit measures may diverge from evaluative responses under certain circumstances (see Perugini, Richetin, & Zogmaister, 2010 for a review), thus the importance of assessing implicit (e.g., MTS tasks) in addition to evaluative responses (e.g., self-reports). RFT-processes may help us learn more about how mothers perceive, make meaning and behave in the face of their children's anxiety. This in turn, may help illuminate how child anxiety might be inadvertently maintained.

The Present Study

Aims of the present study

This study focused on mothers' private experiences related to their children's anxiety. While research demonstrate that anxiety is transmitted intergenerationally, and maternal anxiety is highly associated with child anxiety, less is known about how this interaction unfolds. The present study explored mother's verbal behavioral processes that are presumed to be involved in parental accommodation. Those processes include derived relational responding, transformation of psychological stimulus functions, and avoidance, in mothers of children who struggle with anxiety and related disorders, and within the context of their parenting values and their children's

anxiety. Specifically, I aimed to explore how mothers derive relationships between stimuli related to their children's anxiety (presumed aversive) and their parenting values (presumed appetitive). I also aimed to explore the degree to which previously random novel stimuli without specified psychological functions acquire psychological functions, and how this transformation of psychological functions may impact mothers' behavioral flexibility within the context of their parenting values and their children's anxiety. Finally, I wanted to explore relationships between mother's derived relational responding and self-reported levels of constructs that have been related to child anxiety (parental perception of child anxiety, parental autonomy-granting behavior, and parental avoidance) and general mental health (trait anxiety, cognitive fusion, and experiential avoidance).

This study included three experimental tasks on derived relational responding, as well as self-report assessments of mothers' perception of their children's anxiety, parental avoidance, autonomy-granting behavior, trait anxiety, cognitive fusion, and experiential avoidance. In an attempt to address limitations found in previous studies (e.g., Murrell 2005; Wilson, 1998), the present study used stimuli that are emotionally relevant and unique to each participant's personal history. Additionally, this study employed a single case experimental design, allowing for a more fine-grained analyses of derived relational responding, transformation of stimulus functions, and avoidance. To date, this is the first study that used stimuli uniquely relevant to each participant, which fits with the idiographic stance of RFT and recent efforts to conduct individual process-based research (Hayes et al., 2019). Making procedures more fitting to participant's personal experiences should increase the precision of current methods used in this line of research.

The clinical implications of this study may include advancement in the experimental and behavior-analytic understanding on how mothers' verbal behavior is associated with avoidance

behavior in the context of their children's anxiety. Knowing more about the interaction between derived relational responding, psychological stimulus function, and avoidance, could help strengthen the bridge between RFT and clinical interventions. My goal was to learn more about these processes, so we can better understand why avoidant parenting behavior, such as accommodation, persists. I hope that this study will improve current methodology used in the field, yield some answers that contribute to the existing empirical body of research on child anxiety, and inform clinical intervention strategies with their parents.

Hypotheses

The study's overarching goal is to explore whether mothers of anxious children derive relations and experience and transformation of psychological stimulus functions with greater difficulty in the context of their children's anxiety and parenting behavior. Thus, this study explored differences within a mother's ability to derive relations and form functional equivalence classes between neutral novel stimuli and stimuli with varying degrees of psychological functions (e.g., aversive, neutral, appetitive). This study also explored whether mothers would engage in behavioral avoidance within the context of child anxiety and parenting values stimuli. Study hypotheses are detailed below. Finally, the study explored potential relationships between a mother's patterns of derived relational responding with child anxiety words and their perception on different aspects of their parenting experience and their anxiety.

1. A mother of a clinically anxious referred child will form equivalence classes faster and with less errors between aversive child anxiety stimuli and novel stimuli, related to neutral-novel or appetitive-novel stimuli.
2. A mother of a clinically anxious referred child will take more time and make more errors in forming classes with aversive child anxiety stimuli and parenting values

- stimuli, compared to the neutral-parenting values or appetitive-parenting values stimuli, given aversive child anxiety stimuli is presumed to be less equivalent (i.e., most incongruent) with parenting values based on participants' histories.
3. A mother of a clinically anxious referred child will systematically avoid the visual stimuli that presumably acquired the aversive function of aversive child anxiety stimuli during a previous experimental task, when these stimuli and stimuli that had acquired neutral and appetitive functions are presented and the mother is instructed to match those stimuli with a parenting value target stimulus. This experiment is designed to assess a) whether transformation of psychological functions occurs during Experiment 1, and b) whether transformation of psychological functions leads to behavioral avoidance, in this case, choosing to avoid stimuli in a matching-to-sample task, within the context of parenting values and child anxiety, through a relation of opposition (i.e., child anxiety stimuli does not go with parenting value stimuli).
 4. A mother that shows rigid derived relational responding with child anxiety stimuli (operationalized as her tendency to form relations with child anxiety words insensitively, that is, faster on experiment 1 and slower on experiment 2 than forming relations with neutral or appetitive words) will report elevated levels of her child's anxiety and her parental anxiety, and low levels of parental autonomy granting behavior.
 5. A mother that shows rigid derived relational responding with child anxiety stimuli will report elevated levels of her trait anxiety, cognitive fusion, and experiential avoidance.

CHAPTER II

METHOD

Given the idiographic characteristic of the study and of RFT, as well as being the only known study which uses stimuli identified by each participant, this study incorporated a single case alternating treatments experimental design (Barlow & Hayes, 1979) for the first three hypotheses, and visual analysis for the fourth and fifth hypotheses. This consideration was also made following Murrell's results, limitations, and recommendations for future research (2005), as well as consultation with RFT and research experts.

Participants

Participants were recruited via flyers posted in mental health outpatient clinics and community centers around a city in the Northeastern region of the United States or by word of mouth (See Appendices A through D for recruitment material and Figure 5 for the study flowchart). Interested potential participants contacted investigator via emails and they were sent a description of the study and a link to the study screener.

Participants were eligible if, by self-report, they were the mother of at least one 6 to 18-year-old child who struggled with anxiety or an anxiety related disorder (such as OCD, eating disorders, skin picking, etc.) who had been diagnosed and/or referred for mental health services due to his/her anxiety or anxiety related disorder.

The study sample consisted of five mothers of children between the age of 7 and 12. All mothers who initially contacted the experimenter were eligible, consented, and participated in the study. Mother's age ranged from 35 to 48 ($M = 39.80$, $SD = 4.97$). Two mothers reported being separated and three married. Four reported having attended grad school, while one (Participant 2) completed high school or GED diploma. This same participant's salary was reported to be less

than \$15,000 annually, while two mothers reported incomes between \$50,000 and \$75,000, and the other two above \$75,000. While four mothers reported having anxiety and having received treatment, Participant 1 reported not having it nor receiving treatment. Participant 2 reported becoming a mother for the first time while between the ages of 15 to 18. Two other mothers reported being mothers for their first time between the ages 21 to 30, and the other two when they were 30 years old or older. Participant 2 reported having four children, Participants 1 and 5 reported having two children, and Participants 3 and 4 having 1 child each. The ages, gender, and anxiety disorder each child struggle with varied (see Table 1).

Table 1

Participant's demographic information and study information

| | P1 | P2 | P3 | P4 | P5 | <i>M</i> | <i>SD</i> |
|----------------|-------------|--------------------|-------------|-------------|-------------|----------|-----------|
| Gender | Female | Female | Female | Female | Female | | |
| Age | 37 | 35 | 48 | 40 | 39 | 39.80 | 4.97 |
| Marital status | Separated | Separated | Married | Married | Married | | |
| Education | Grad School | High School/GED | Grad School | Grad School | Grad School | | |

| | | | | | |
|---------------------------|--------------|--------------------------|----------|--------|-----------|
| Income | \$50-75K | <\$15K | \$50-75K | >\$75K | >\$75K |
| Age of 1st motherhood | 21-30 | 15-18 | 30+ | 21-30 | 30+ |
| Number of children | 2 | 4 | 1 | 1 | 2 |
| Children ages & gender | 9 F, 9 F | All F, 12, 13, 15, 17 | 9 F | 12 M | 4 M, 7 NB |
| Age of anxious child | Younger twin | 12yo | 9 | 12 | 7 yo |

| | | | | | |
|--------------------------------------|-----|--|-----|-----|---|
| Child's diagnoses | Anx | Severe anx, depression, Social anx | GAD | Anx | No dx but shows anx, exc. func., sensory processing |
| Does mother have anxiety? | No | Yes | Yes | Yes | Yes |
| Has mother received treatment? | No | Yes | Yes | Yes | Yes |
| Number of social supports | 5 | 100 | 7+ | 10 | Many |

| | | | | | | | |
|--|------------|------------------------------|------------|--------------------|--------------------|-------|-------|
| How did mother hear of study? | Colleague | Team management for MH | Colleague | Son's therapist | Mom's therapist | | |
| Place of Study | P's Office | P's Home | P's Office | Suffolk U | Suffolk U | | |
| Order of Experiments | 1, 2, 3 | 2, 1, 3 | 1, 3, 2 | 1, 2, 3 | 1, 3, 2 | | |
| Duration of In Person Study (min.) | 71 | 105 | 69 | 44 | 56 | 69.00 | 22.88 |

Note. F = Female, M = Male, NB = Nonbinary, Dx = diagnosis, Anx = anxiety, Exc. func. = struggles with executive function, GAD = Generalized Anxiety Disorder.

Materials and Procedure

Online Pre-Experimental Assessment

After providing informed consent, participants were directed to complete a *Writing Contextualization Task* and *Word Identification Survey* (see Appendix E for online survey script). When necessary, 72 hours after they had initiated the online tasks, participants received an automated email reminding them to complete the online procedures (see Appendix F).

Writing Contextualization Task

This task asked participants to think and write for five to seven minutes about a difficult situation they experienced related to their child's anxiety. This procedure was implemented to establish awareness and sensitivity to their experience of their children's anxiety and their parenting values, and to gather relevant words or phrases related to their personal experience. Extant literature (Pennebaker & Beall, 1986; Pennebaker & Chung, 2011) suggests writing procedures such as this one have been used successfully in the past to help participants establish awareness and sensitivity to their experience with relevant circumstances associated with variables of scientific interest, in this case, their experience regarding their children's anxiety and their parenting values.

Word Identification Survey

Participants were asked to provide words or short phrases related to the following topics: (1) child's anxiety (e.g., their biggest fear about their child's anxiety, what their child's anxiety meant for the mother), (2) parenting values (e.g., "How would you like for your child to remember you or the role you played in his/her childhood?"), (3) a neutral topic (i.e., "... random household objects that have no particular emotional value to you."), (4) a happy topic (i.e., "... things that are associated with happiness for you."). These words were used to create personal

emotionally relevant stimuli for the four types of words to be used in the MTS task (aversive, values, neutral, and appetitive).

Once participants completed these online procedures, they were contacted to schedule an appointment to complete the in-person experimental session (see Appendix G). All participants completed the in-person portion of the study within one week after completing the online procedures.

In-Person Experimental Session

Participants were given the option to complete the experimental session at the research site or in the workplace or home. Two participants completed the study at the research site, two at their work offices, and one at her residence. All participants used the same computer, and all the rooms were well lit, and without loud sounds that could have impacted participant's focus on the study. The experimenter was present while each participant completed the in-person procedure. To ensure participants' privacy during this study, all interviews were conducted in a private room with only the co-investigator present. The duration of the experimental session ranged from 44 (Participant 4) to 105 minutes (Participant 2; $M = 69.00$, $SD = 22.88$). Although participants were given the opportunity to take short breaks in between different sections, they preferred to continue without breaks. All participants signed a paper copy of the informed consent and kept a second copy for their records (see Appendix H).

Imaginal Contextualization Task

At the start of the experimental session, to establish sensitivity to their experience of their children's anxiety, participants were asked to imagine for two minutes a challenging situation related to their child's anxiety (see Appendix I).

Pre-Experiment Rating of Stimuli

Next, they were presented with the words chosen from the *Word Identification Survey* they previously completed online and asked to rate the emotional valence and desire to avoid that each word elicited for them using a 5-point Likert type scales. For valence ratings, participants were asked, “How pleasant or unpleasant do you find each word, phrase, or symbol?” Participants responded, 1 = very pleasant, 2 = pleasant, 3 = neither pleasant nor unpleasant, 4 = unpleasant, 5 = very unpleasant. For avoidance function ratings, participants were asked, “When you think about each symbol, word, or phrase, how strongly do you need to avoid it (or the feelings that go with it)?” Participants responded, 1 = no need to avoid, 3 = moderate need to avoid, 5 = great need to avoid¹ (see Appendix J).

Matching-to-Sample Tasks

Participants completed three matching-to-sample (MTS) experimental tasks designed to assess derived relational responding. The software for the MTS tasks was designed by Michael Bordieri, Ph.D. and presented to participants via a Hewlett Packard TouchSmart 300 PC desktop computer. To prevent order effects the order in which MTS experiments were given was semi-randomized. Experiment 1 always preceded experiment 3 given responses in the third task were contingent upon exposure to symbols in the first one. After completing the MTS tasks, participants rated the words and symbols presented during the tasks.

Across experiments, sample visual stimulus was presented at the top half of a computer screen and three comparison stimuli at the bottom half (see Figure 2 on page 17). Participants were instructed: “In the next activity, one image will appear at the top of the screen, and three additional images will appear below it. Your task is to choose an image from the bottom that best

¹ Random novel visual symbols were selected from a pool of symbols that have been previously used in RFT research (Murell, 2005; Wilson & Hayes, 1996) and varied randomly among participants (see Figure 3).

goes with the image at the top. To do this, simply click on one of the three images at the bottom of the screen. Sometimes you will be given feedback about your selection, other times you will not. However, there is always only one correct answer. The more accurate and fast you are, the less time the experiment will take. Please ask the experimenter if you have any questions. When you are ready, click continue.”

The stimuli for the MTS tasks consisted of symbols and words/phrases. The four groups of words (aversive (child anxiety words), neutral (household items), appetitive (words related to things that made participants happy), and parenting values) were derived from the *Word Identification Survey*. In choosing words to assign to trials, I attempted to match word length across categories and tried to avoid grouping words that looked very similar (e.g., words that began with the same letter). See Figure 4 for example of stimuli.

Experiment 1

There were five phases to Experiment 1 which was designed to test whether participants would more readily derive relations and form equivalence classes with novel neutral stimuli when the stimuli to be related with it are aversive (i.e., child anxiety words) relative to when they are neutral (i.e., household items) or appetitive (i.e., pleasant words). The first three phases were direct reinforcement trials and the last two were testing trials. During Phase 1 participants were taught through direct reinforcement (the message “correct” or “incorrect”) to relate *novel symbols* (A) and *words presumed to have three different psychological functions* (B). Specifically, they were taught to associate one symbol (A1) with aversive words related to child anxiety (B1), another symbol (A2) with neutral words related to household objects (B2), and a third symbol (A3) with appetitive words related to things that brought happiness to the mother (B3). Each training module consisted of six trials per stimulus for a total of 18 trials). Training

modules were repeated until participants reached 90% accuracy (i.e., responding to 16 correct trials).

Phase 2 was also aimed at teaching participants relations through direct reinforcement and the number of trials, randomization, accuracy criteria, and feedback were the same as those used in Phase 1. However, in this phase, participants were taught through direct reinforcement (the message “correct” or “incorrect”) to associate a *new set of novel symbols* (C) with the *symbols* (A) assumed to have acquired psychological functions in Phase 1 (i.e., participants were reinforced for matching C1 with A1 (assumed to have an aversive function), C2 with A2 (assumed to have a neutral function), and C3 with A3 (assumed to have an appetitive function)).

Phase 3 was a direct reinforcement *mixed* training in which participants were randomly presented with all of the same stimulus pairings from both Phases 1 and 2 with the same patterns of reinforcement, but in a random mixed order. In other words, participants were presented with trials where they were reinforced for matching the symbols and words from Phase 2 (A1-B1, A2-B2, A3-B3) and trials where they were reinforced for matching the symbols from Phase 2 (A1-C1, A2-C2, A3-C3). Training modules consisted of 36 trial blocks (18 with A-B and 18 with A-C) and they were repeated until participants reached 90% accuracy.

Phases 4 and 5 were testing phases. Each phase consisted of 18 random trials regardless of the accuracy of the responses, and no feedback was given. Performance on the tests were measured via response time and accuracy. In Phase 4, in order to test for mutual entailment (i.e., whether reinforcing participants for matching symbols A1, A2, A3 to words B1, B2, B3 in Phases 1 and 3 and to other symbols C1, C2, C3 in phase 2 would lead them to match words B1, B2, and B3 or symbols C1, C2, C3 to symbols A1, A2, A3), participants were presented with the aversive (B1), neutral (B2), and appetitive (B3) words or the symbols C1, C2, and C3, to see if

they would match them with the appropriate symbols A1, A2, and A3. In Phase 5, in order to test for combinatorial mutual entailment (whether participants would form relations between novel symbols (C) and words (B) after being reinforced for matching those novel symbols (C) and words (B) with an intermediary stimulus (A) in Phases 1, 2, and 3), participants were presented the psychologically valenced words and expected to match them with the novel symbols (C1-B1, C2-B2, C3-B3) and vice versa, that is, they were presented the novel symbols and expected to match them with the psychologically valenced words (B1-C1, B2-C2, B3-C3).

Experiment 2

The structure of Experiment 2 was identical to that of Experiment 1 in terms of the number of direct training and test phases, randomization, accuracy criteria, and feedback. The only difference was the *type of stimuli* participants were presented and reinforced for matching in Phases 2 and 3. During Phase 1, participants were again taught through direct reinforcement to pair novel symbols (J) with a second set of *words presumed to have three different psychological functions* (K). Specifically, they were taught to associate one symbol (J1) with aversive words related to child anxiety (K1), another symbol (J2) with neutral words related to household objects (K2), and a third symbol (J3) with appetitive words related to things that bring happiness to the mother (K3). In Phase 2, participants taught through direct reinforcement to pair the symbols from Phase 1 (J), with *words presumed to reflect parenting values* (L). Phase 3 was a direct reinforcement *mixed* training in which participants were randomly presented with all of the same stimulus pairings from both Phases 1 and 2 with the same patterns of reinforcement, but in a random mixed order. As in Experiment 1, Phases 4 and 5 of Experiment 2 were testing phases designed to test for mutual entailment and combinatorial mutual entailment.

Experiment 3

Experiment 3 did not include any direct reinforcement or learning trials. This experiment was designed to test whether the symbols presented in Experiments 1 and 2 took on the psychological stimulus function of the words they were directly or indirectly related with, and whether the symbols expected to acquire aversive functions were avoided. The experiment consisted of one testing phase (i.e., no feedback was provided) made up of 36 trials. There were four conditions, nine trials per condition. On all trials, participants were presented with a phrase that reflected their parenting value (e.g., “being a loving mother”) and asked to match that phrase with one of three symbols. Condition one included the symbols expected to acquire psychological functions through direct learning in Experiment 1 (i.e., aversive A1, neutral A2, appetitive A3. Condition 2 presented the symbols expected to acquire psychological functions through derived relational responding in Experiment 1 (i.e., aversive C1, neutral C2, appetitive C3. Given the importance of exploring whether derived relational responding had an impact on avoidant behavior, condition 3 used the same derived aversive stimulus (in this conditioned labeled C1/S1 to differentiate from C1 in condition 2) and compared to novel visual stimuli (S2 and S3; condition 3), and derived aversive stimulus (C1/T1) compared by size (i.e., large C1/T1, medium T2, small T3; condition 4). I expected that mothers would systematically avoid those stimuli they had previously related with child anxiety words during the first MTS task, given that such stimuli were expected to have acquired aversive functions and thus were inconsistent with parenting values. This method was developed based on existing RFT research (Hooper, Stewart, Duffy, Freegard, & McHugh, 2012) and with the consultation of RFT expert researchers.

Table 2

List of stimuli with description, expected acquired psychological function, and process through which function is acquired.

| Exp | Label | Description | Expected acquired function | Process |
|-----|-------|---------------------|----------------------------|-------------------------------|
| 1 | A1 | Novel symbol | Aversive | Direct training |
| | A2 | Novel symbol | Neutral | Direct training |
| | A3 | Novel symbol | Appetitive | Direct training |
| | B1 | Child anxiety words | N/A | Personal experience |
| | B2 | Neutral words | N/A | Personal experience |
| | B3 | Appetitive words | N/A | Personal experience |
| | C1 | Novel symbol | Derived aversive | Derived Relational Responding |
| | C2 | Novel symbol | Derived neutral | Derived Relational Responding |
| | C3 | Novel symbol | Derived appetitive | Derived Relational Responding |
| 2 | J1 | Novel symbol | Trained aversive | Direct training |
| | J2 | Novel symbol | Trained neutral | Direct training |
| | J3 | Novel symbol | Trained appetitive | Direct training |
| | K1 | Child anxiety words | N/A | Personal experience |
| | K2 | Neutral words | N/A | Personal experience |

| | | | | |
|---|------------|-----------------------|--------------------------|-------------------------------|
| | K3 | Appetitive words | N/A | Personal experience |
| | L1 | Parenting value words | N/A | Personal experience |
| | L2 | Parenting value words | N/A | Personal experience |
| | L3 | Parenting value words | N/A | Personal experience |
| 3 | R1, R2, R3 | Parenting value word | N/A | Personal experience |
| | S1 | C1 | Derived aversive | Derived Relational Responding |
| | S2 | Novel symbol | None | None |
| | S3 | Novel symbol | None | None |
| | T1 | C1 large | Highest derived aversive | Derived Relational Responding |
| | T2 | C1 medium | Medium derived aversive | Derived Relational Responding |
| | T3 | C1 small | Lowest derived aversive | Derived Relational Responding |

Note: N/A = Not applicable; words are not expected to acquire psychological functions given they are expected to already have them.

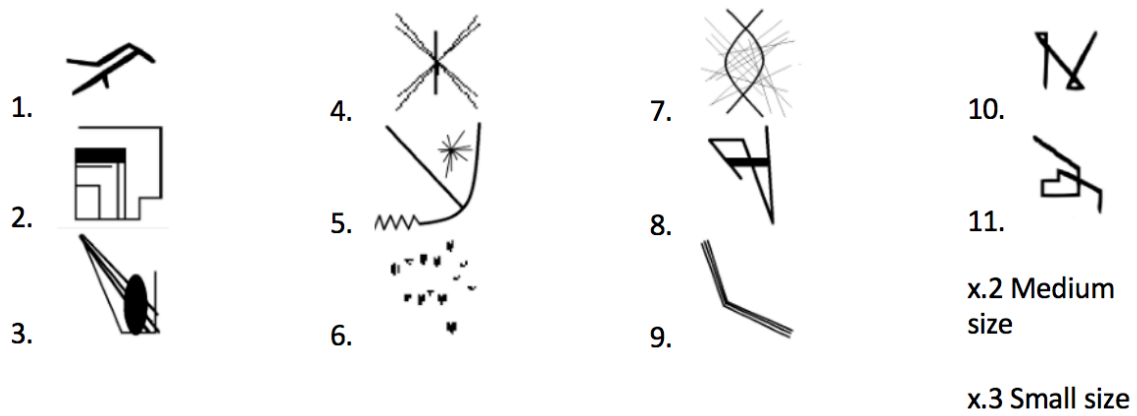


Figure 3. Visual novel symbols. The last two symbols, medium and small, depended on the symbol being selected for each particular participant as stimuli T2 and T3.

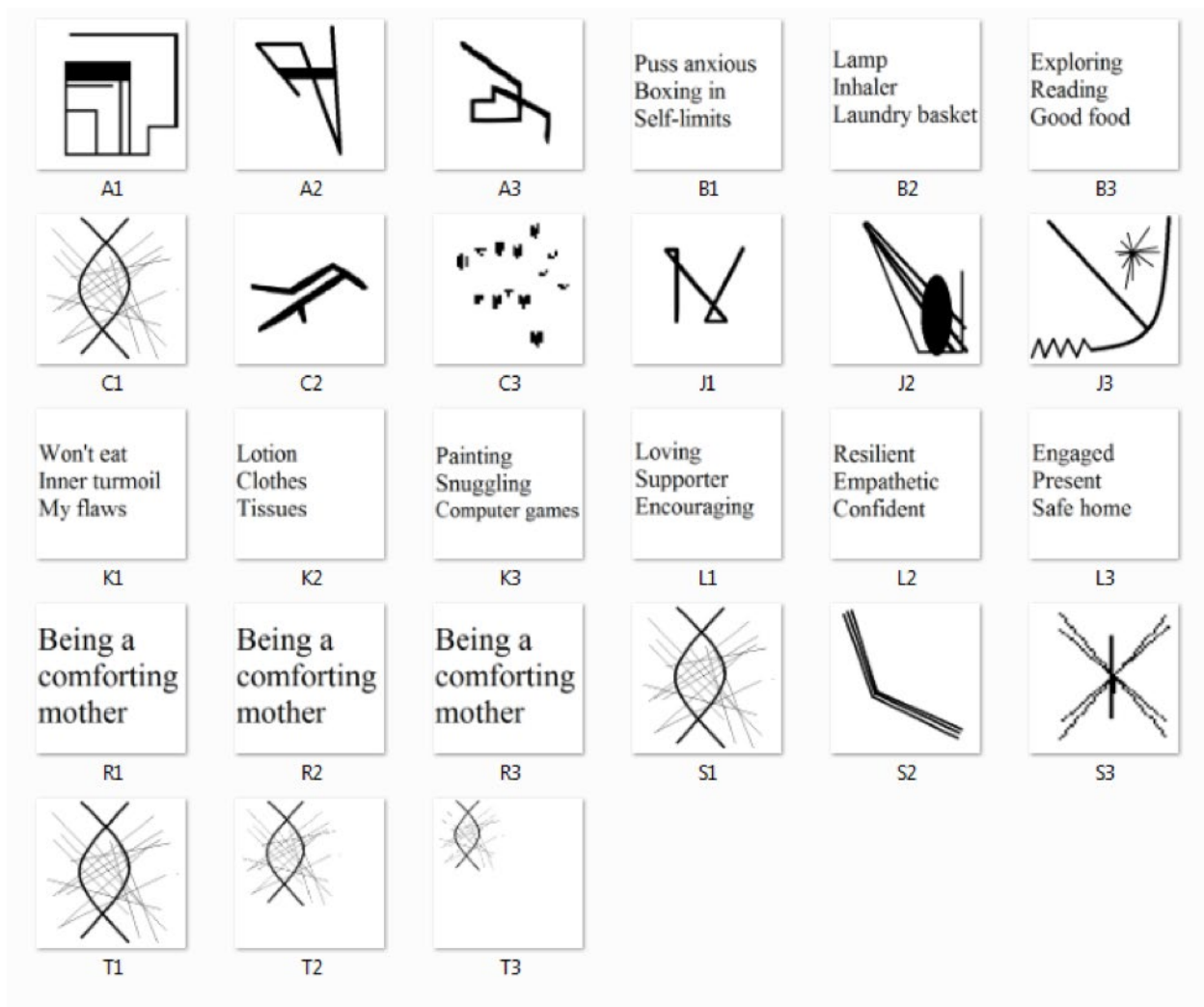


Figure 4. Example of stimuli for participant's experimental task (participant's 5 stimuli). Stimuli A, B, and C are for experiment 1; J, K, and L for experiment 2; and A, C, R, S, and T for experiment 3. R1, R2, and R3, are identical given the same target stimulus was presented in each trial to assess for avoidance responses. For all participant's stimuli see Appendix K.

Post-Experiment Rating of Stimuli

After participants completed the experiment, they were once again presented with the words chosen from the *Word Identification Survey* to serve as stimuli in the study, as well as the symbols used in the experiments, and asked to rate the emotional valence and desire to avoid that each word elicited for them using a 5-point Likert type scales. For valence ratings, participants

were asked, “How pleasant or unpleasant do you find each word, phrase, or symbol?”

Participants responded, 1 = very pleasant, 2 = pleasant, 3 = neither pleasant nor unpleasant, 4 = unpleasant, 5 = very unpleasant. For avoidance function ratings, participants were asked, “When you think about each symbol, word, or phrase, how strongly do you need to avoid it (or the feelings that go with it)?” Participants responded, 1 = no need to avoid, 3 = moderate need to avoid, 5 = great need to avoid.

Questionnaires

Next, participants were administered a packet of questionnaires. Following the demographic questionnaire, the order in which the measures was given was randomized by category (i.e., parenting-related measures, individual-related measures). All measures were completed independently, however the experimenter was present while participants completed the self-reports.

Demographic Questionnaire

The demographic questionnaire assessed participants’ gender, marital status, highest level of education, current income range, age at which they first became a mother, current age, number of children, ages and genders of children, children with anxiety or a related disorder, and type of disorder, whether they struggle with anxiety or a related disorder, if they have ever been diagnosed with an anxiety or related disorder, the number of people they can count on for social support, and how they heard about our study. According to existing research, these are relevant variables that could impact the variance in the process of derived relational responding (Murrell, 2005; see Appendix L).

Parenting-Related Measures

Parental Perception of Child Anxiety

The Spence Child Anxiety Scale for Parents (SCAS-P; Spence, 1999) is a 38-item report that assesses parents' perceptions of their children's anxiety. Each item is answered on a scale from 0 (never) to 3 (always). The SCAS-P yields a total score as well as scores from six subscales related to different anxiety disorders (separation anxiety, physical injury fears, obsessive compulsive disorder, panic/agoraphobia, social phobia, and a generalized anxiety higher order factor). The total score was used in the present study. The SCAS-P has good psychometric properties and seems useful for both research and clinical purposes (Nauta et al., 2004). The measure has satisfactory to excellent reliability with reliability coefficients ranging from 0.81 to 0.90 in non-clinical populations and 0.83 to 0.92 in clinical populations, providing evidence for internal consistency of its subscales. The SCAS-P has good convergent validity as it correlated well with other measures (Child Behavior Check List; CBCL - internalizing subscale, and the SCAS self-report), as well as good divergent validity, as the scale correlated lower with externalizing symptoms scales (CBCL). During the development study of the SCAS-P, the scale was able to successfully classify 80.5% of the children as having or not having a clinical diagnosis of anxiety. In the same study, mean (and standard deviation) scores for boys and girls with anxiety ranged from 30.10 ($SD = 14.90$) to 33.00 ($SD = 13.5$), while scores for boys and girls without anxiety ranged from 11.80 ($SD = 8.30$) to 16.00 ($SD = 11.60$; Nauta et al., 2004).

Parental Autonomy-Granting Behavior

The Parent-Child Relationship Inventory (PCRI; Gerard, 1994) is a 78-item maternal self-report measure that assesses seven different aspects of the relationship between parent and child. It is rated on a four-point Likert-scale. For the present study, only the Autonomy scale (ten

items which measures the promotion of child's independence) were used. The PCRI has shown adequate psychometric properties (Coffman, Guerin, & Gottfried, 2006) in different samples including women of low socioeconomic status (SES) and with histories of drug abuse (Luthar & Sexton, 2007). Lower scores represent less parental autonomy-granting behavior. Raw scores are converted to *T* scores, with normalized scores having a mean of 50 and a standard deviation of 10. A *T*-score less than 40 (one standard deviation below the mean) represents problematic autonomy-granting behavior and values less than 30 represent the possibility of serious problems in this area (Gerard, 1994).

Parental Avoidance and Anxiety

The Parental Acceptance and Action Questionnaire (PAAQ; Cheron, Ehrenreich, & Pincus, 2009) is a 15-item self-report of experiential avoidance within the context of parenting. Each item is rated on a 7-point Likert type scale (from 1 = never true, to 7 = always true), and has two factors, inaction and unwillingness. Higher scores represent more parental avoidance. The PAAQ has fair internal consistency, ranging from .64 - .65. Its temporal stability has been found to be moderate, $r = .68 - .74$ (see Appendix O). In the development and validation study, 148 mothers of anxious children scored an average of 53.80 ($SD = 9.00$) on the PAAQ (Cheron, Ehrenreich, & Pincus, 2009).

Individual-Related Measures

Experiential Avoidance

The Brief Experiential Avoidance Questionnaire (BEAQ; Gámez, et al., 2014) is a 15-item self-report measure of experiential avoidance. It was developed as a short version of the Multidimensional Experiential Avoidance Questionnaire (MEAQ; Gámez, Chmielewski, Kotov, Ruggero, & Watson, 2011). The BEAQ has good psychometric properties with internal

consistency ranging from .80 to .89 and assesses multiple facets of experiential avoidance (see Appendix M). In their development and validation study, authors found a mean score of 48.55 ($SD = 11.24$) from a non-clinical student and community sample ($N = 578$; Gámez et al., 2014). This measure is being used given that performance in the ability to derive relations is thought to be correlated with experiential avoidance.

Cognitive Fusion

The Cognitive Fusion Questionnaire (CFQ; Gillanders et al., 2014) is a 7-item self-report that measures the extent to which a person is fused with his or her cognition. In other words, the CFQ measures how much a person believes his or her thoughts are accurate depiction of reality, or the extent to which a person is “hooked” by his or her thoughts. Items are answered in a 7-point Likert-type scale ranging from 1 (never true) to 7 (always true). The CFQ has excellent internal consistency ranging from .88 to .93, and good test-retest reliability ($r = .81$). It also has a coherent, simple, and consistent factor structure that is stable across diverse samples. The CFQ possesses good convergent validity as it correlates highly with measures of psychological inflexibility, mindfulness, rumination, distress, burnout and frequency of automatic thoughts, as well as adequate divergent validity, as it is not associated with socially desirable responding. The CFQ can be used in clinical and research settings (Gillanders et al., 2014; see Appendix N). In the development and validation study of the CFQ, student and community samples ($n = 1040$) scored a mean of 22.28 ($SD = 8.30$), and a mixed mental health sample ($n = 215$) scored a mean of 34.31 ($SD = 8.06$; Gillanders et al., 2014).

Trait Anxiety

The State-Trait Anxiety Inventory – Revised (STAI-Y; Spielberger, 1983) is a widely-used measure of state and trait anxiety. The measure yields two total scores, state anxiety and

trait anxiety. Each subscale consists of 20 items rated on a 4-point Likert type scale (from 1 = almost never, to 4 = almost always). The STAI has demonstrated good internal consistency, test-retest reliability, and convergent and discriminant validity. Additionally, the STAI State (.95) and the STAI Trait (.93) have demonstrated excellent internal consistency in previous studies. Participants only completed the trait form. This measure requires approximately 5 minutes to complete for adults. In one study, the mean and standard deviation of the STAI-Y was 53.54 ($SD = 12.25$; $N = 1124$) in a clinical sample, compared to 41.43 (11.06 ; $N = 877$) in a nonclinical sample (Balsamo et al., 2013).

Debriefing Session

At the end of the study, participants were debriefed by the researcher. Specifically, they were asked about their experience with the study in general and by sections, as well as follow up questions to gain understanding on some of their performance (e.g., their thoughts on why they rated certain symbols as they did). Participants also had a chance to ask questions about the study. Finally, they were compensated with \$50 in cash or Amazon gift card at the completion of the in-person portion of the study (see Appendices P and Q).

A summary of the procedure is displayed in the flowchart in Figure 5.

CHAPTER III

RESULTS

Data cleaning

Incorrect responses, outliers, and missing data

Incorrect responses and outliers were removed from the analyses on participant's response time. Outliers were responses that fell at least three standard deviation from the mean. Less than 2% of correct responses (i.e., 24 of 1,385 data points) were considered outliers and removed from the analysis. Given each participant's response was automatically gathered by the software, there were no missing data on the experimental tasks. Additionally, there was no missing data on self-reports.

Preliminary analysis

Word ratings

Experiment 1

As expected, all participants rated aversive words as more unpleasant and with a higher need to be avoided than neutral and appetitive words. The difference of avoidance functions between neutral and appetitive words were less pronounced (see Figures 6 and 7).

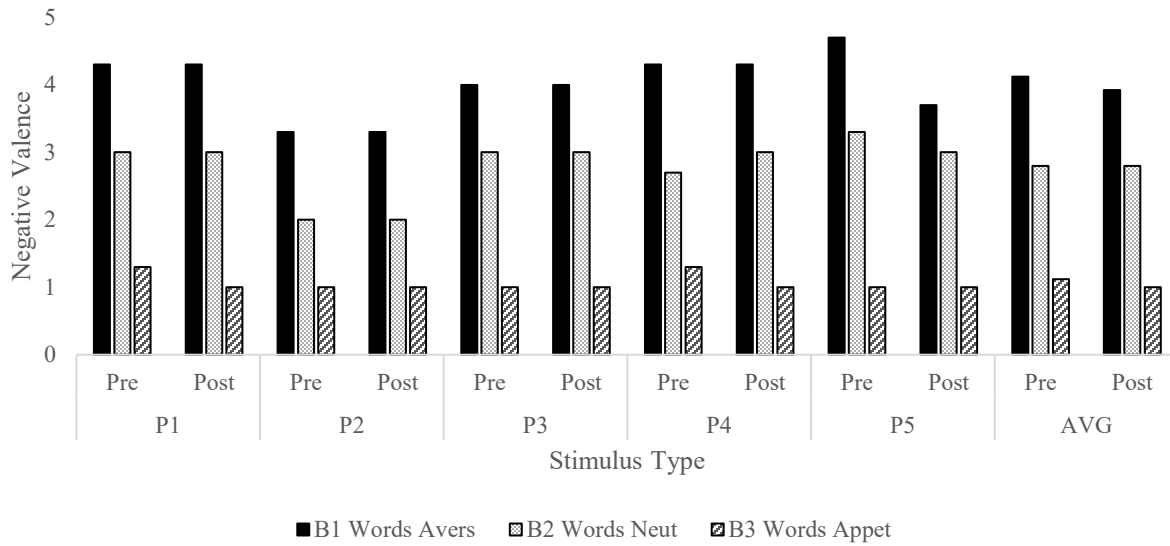


Figure 6. Word Ratings for Valence, Pre and Post Experiment 1

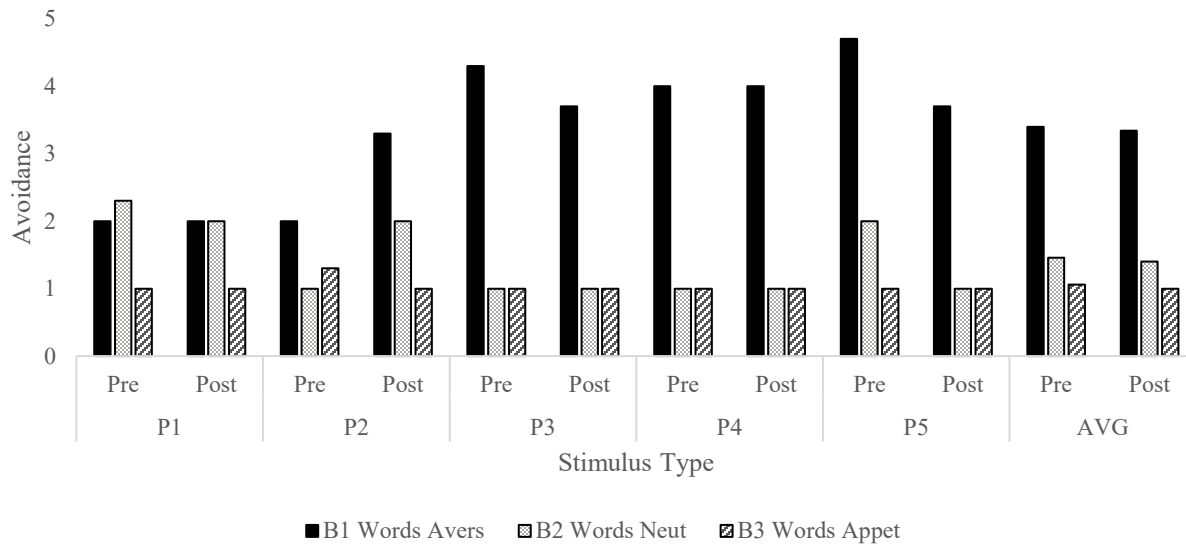


Figure 7. Word Ratings for Avoidance, Pre and Post Experiment 1

Experiment 2

As expected, all participants rated aversive words as more unpleasant and with a higher need to be avoided than neutral and appetitive words. The difference of avoidance functions between neutral and appetitive words were less pronounced (see Figures 8 and 9).

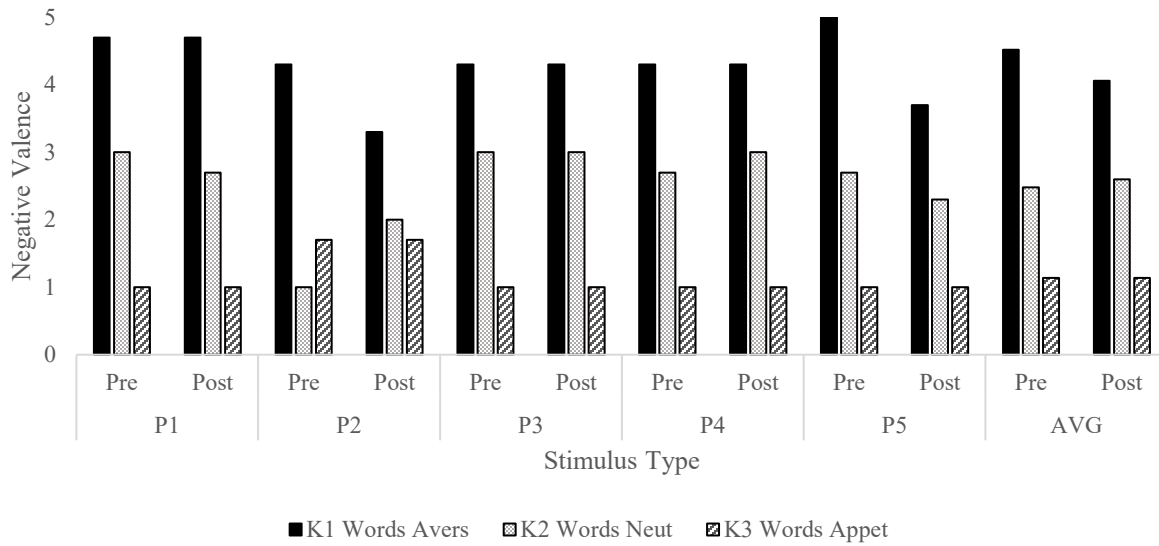


Figure 8. Word Ratings for Valence, Pre and Post Experiment 2

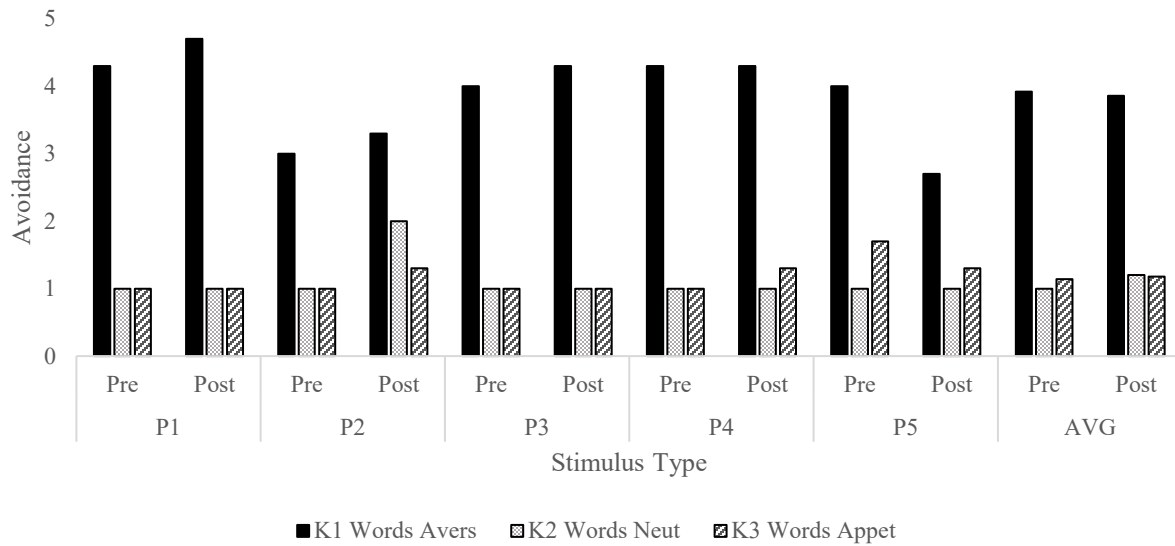


Figure 9. Word Ratings for Avoidance, Pre and Post Experiment 2

As expected, participants rated the parenting values words as pleasant and with a low need to be avoided (see Figures 10 and 11).

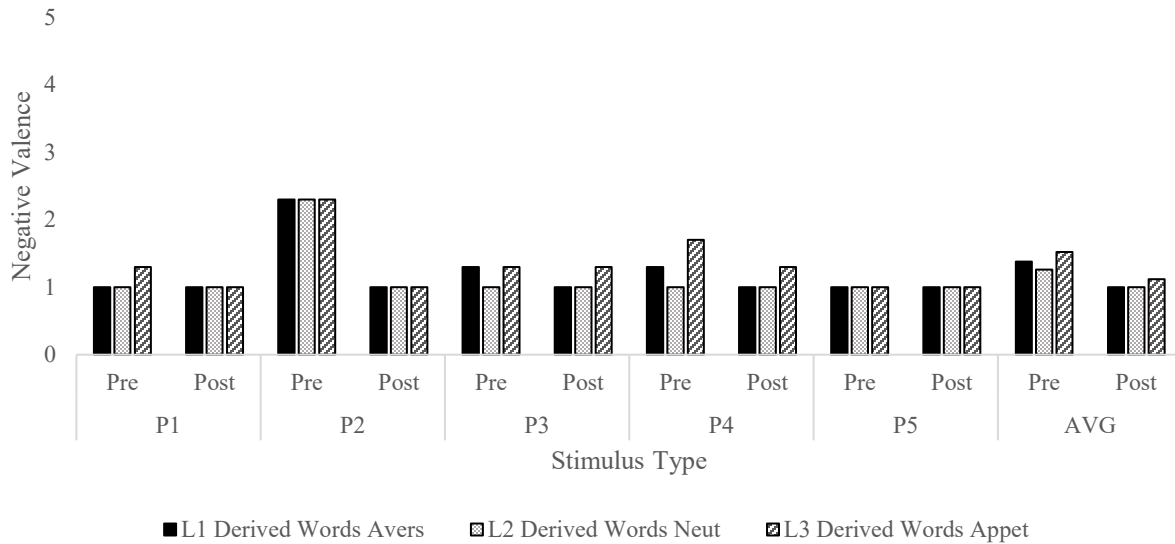


Figure 10. Parenting Values Word Ratings for Valence, Pre and Post Experiment 2

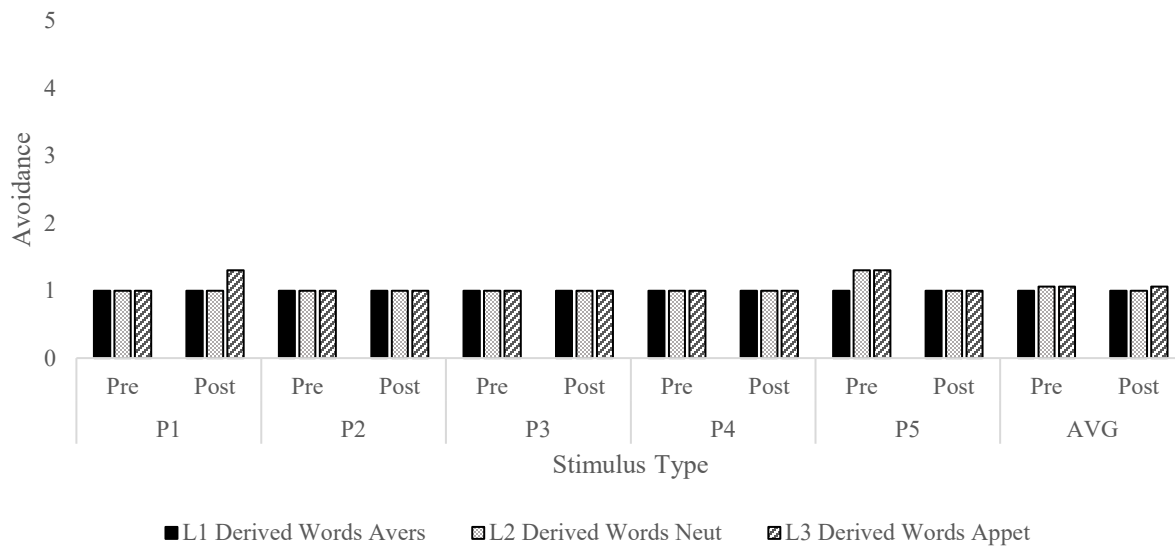


Figure 11. Parenting Values Word Ratings for Avoidance, Pre and Post Experiment 2

Stimuli ratings

Even for the novel visual symbols that were rated as having non-neutral valence and avoidance functions prior to the computer tasks, existing changes between pre- and post-experimental rating were in the expected direction for all symbols for Participant 1 (3 symbols for valence and 4 for avoidance ratings). Interestingly, for Participant 2, only 2 out of 8 changes

were in the expected direction for valence, and 3 out of 6 for avoidance. Given participants 1 and 2 rated some of the novel symbols as not neutral, the ratings for visual stimuli prior to experimental tasks was eliminated. Thus Participants 3 through 5 only rated them after completing the computer tasks.

Primary analysis

Hypothesis 1

In order to test the hypothesis that a mother of a child struggling with anxiety would form equivalence classes faster and with less errors between aversive child anxiety stimuli and novel stimuli, related to neutral-novel or appetitive-novels stimuli, I examined the impact of condition (aversive, neutral, or appetitive stimuli) on accuracy and reaction time in Experiment 1.

Accuracy was measured by the number of correct responses was measured and reaction time was the time that it took for a participant to select a match stimulus once the target and match options were displayed on the screen. Consistent with existing studies using implicit assessment tools (e.g., Implicit Association Test; Greenwald, Nosek, & Banaji, 2003; Affect Misattribution Procedure; Imhoff, Schmidt, Bernhardt, Dierksmeier, & Banse, 2011), these data only include correct responses.

Number of errors

As expected, there were fewer errors for aversive stimulus trials in Experiment 1 as compared to neutral and appetitive trials. These results occurred in most trials and for most participants, with a few exceptions (see Table 3).

Table 3

Number of Errors by Phase and Stimulus Type, Experiment 1

| | | <u>Stimulus Type</u> | | | |
|---------|-------------|----------------------|---------|------------|-------|
| | Participant | Aversive | Neutral | Appetitive | Total |
| Block 1 | P1 | 2 | 0 | 1 | 3 |
| | P2 | 0 | 0 | 0 | 0 |
| | P3 | 0 | 1 | 3 | 4 |
| | P4 | 0 | 4 | 4 | 8 |
| | P5 | 1 | 0 | 1 | 2 |
| Total | | 3 | 5 | 9 | 17 |
| Block 2 | P1 | 0 | 1 | 0 | 1 |
| | P2 | 6 | 6 | 2 | 14 |
| | P3 | 1 | 4 | 8 | 13 |
| | P4 | 0 | 0 | 2 | 2 |
| | P5 | 0 | 0 | 2 | 2 |
| Total | | 7 | 11 | 14 | 32 |
| Block 3 | P1 | 0 | 0 | 0 | 0 |
| | P2 | 0 | 0 | 0 | 0 |
| | P3 | 0 | 1 | 0 | 1 |
| | P4 | 0 | 1 | 0 | 1 |
| | P5 | 0 | 1 | 0 | 1 |
| Total | | 0 | 3 | 0 | 3 |
| Block 4 | P1 | 0 | 0 | 0 | 0 |

| | | | | | |
|---------|-------|----|----|----|----|
| | P2 | 0 | 0 | 0 | 0 |
| | P3 | 0 | 1 | 0 | 1 |
| | P4 | 4 | 0 | 0 | 4 |
| | P5 | 0 | 0 | 0 | 0 |
| | Total | 4 | 1 | 0 | 5 |
| Block 5 | P1 | 0 | 0 | 0 | 0 |
| | P2 | 0 | 0 | 0 | 0 |
| | P3 | 0 | 0 | 0 | 0 |
| | P4 | 1 | 0 | 0 | 1 |
| | P5 | 0 | 0 | 0 | 0 |
| | Total | 1 | 0 | 0 | 1 |
| Total | | 15 | 20 | 23 | 58 |

Response time

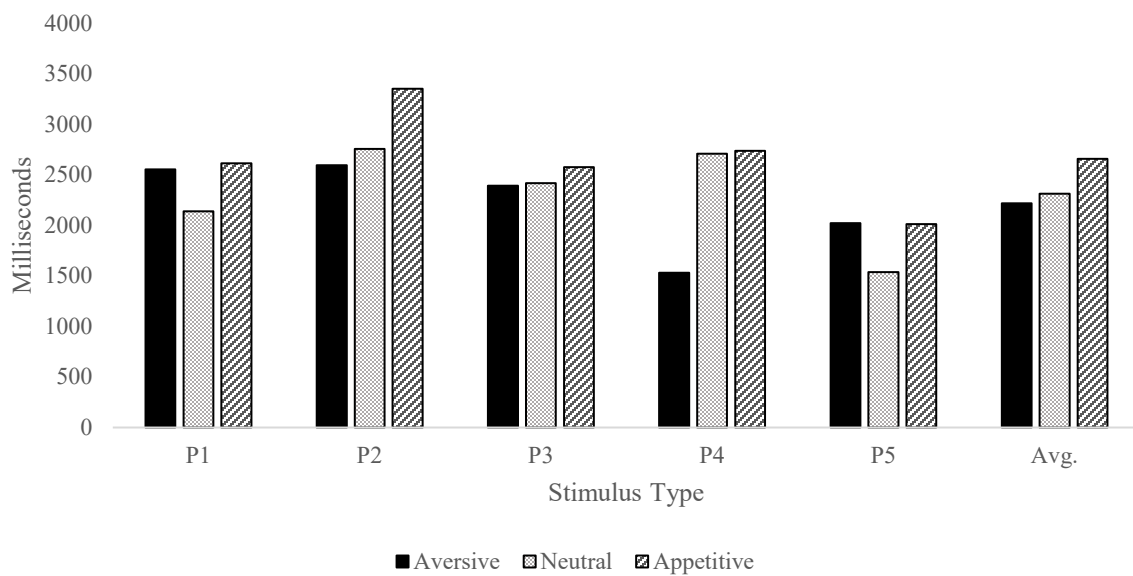
Tables 4 to 8 and Figures 12 to 16 show response time means for each participant as well as their averaged response times on each of the phases of Experiment 1.

In the first block, all participants except Participants 1 and 5 responded faster to aversive trials. Three participants responded the second fastest to appetitive, and the slowest to neutral stimulus trials. Grouped together, participant's latencies were shorter for aversive stimulus trials ($M = 2219.05$ ms), followed by neutral ($M = 2312.17$ ms), then appetitive stimulus trials ($M = 2657.70$ ms).

Table 4

Response Time by Stimulus Type, Phase 1 Experiment 1

| Participant | <u>Stimulus Type</u> | | | Avg. |
|-------------|----------------------|---------|------------|---------|
| | Aversive | Neutral | Appetitive | |
| P1 | 2553.70 | 2138.50 | 2612.45 | 2434.88 |
| P2 | 2595.17 | 2756.17 | 3351.40 | 2900.91 |
| P3 | 2392.67 | 2417.91 | 2574.22 | 2461.60 |
| P4 | 1531.73 | 2710.25 | 2738.25 | 2326.74 |
| P5 | 2022.00 | 1538.00 | 2012.20 | 1857.40 |
| Avg. | 2219.05 | 2312.17 | 2657.70 | |

*Figure 12. Response Time by Stimulus Type, Phase 1 Experiment 1*

In the second phase, Participants 2, 3, 4, and 5 responded faster to aversive stimuli, while participants 1 responded the slowest to it. As a whole, participants' latency was faster in

aversive trials ($M = 2045.27$ ms), followed by appetitive ($M = 2312.44$ ms) and neutral trials ($M = 2684.20$ ms).

Table 5

Response Time by Stimulus Type, Phase 2 Experiment 1

| Participant | <u>Stimulus Type</u> | | | |
|-------------|----------------------|---------|------------|---------|
| | Aversive | Neutral | Appetitive | Avg. |
| P1 | 3120.00 | 1753.40 | 2961.67 | 2611.69 |
| P2 | 2129.50 | 5272.83 | 3090.30 | 3497.54 |
| P3 | 2153.71 | 3493.43 | 2250.00 | 2632.38 |
| P4 | 1559.80 | 1583.33 | 1684.50 | 1609.21 |
| P5 | 1263.33 | 1318.00 | 1575.75 | 1385.69 |
| Avg. | 2045.27 | 2684.20 | 2312.44 | |

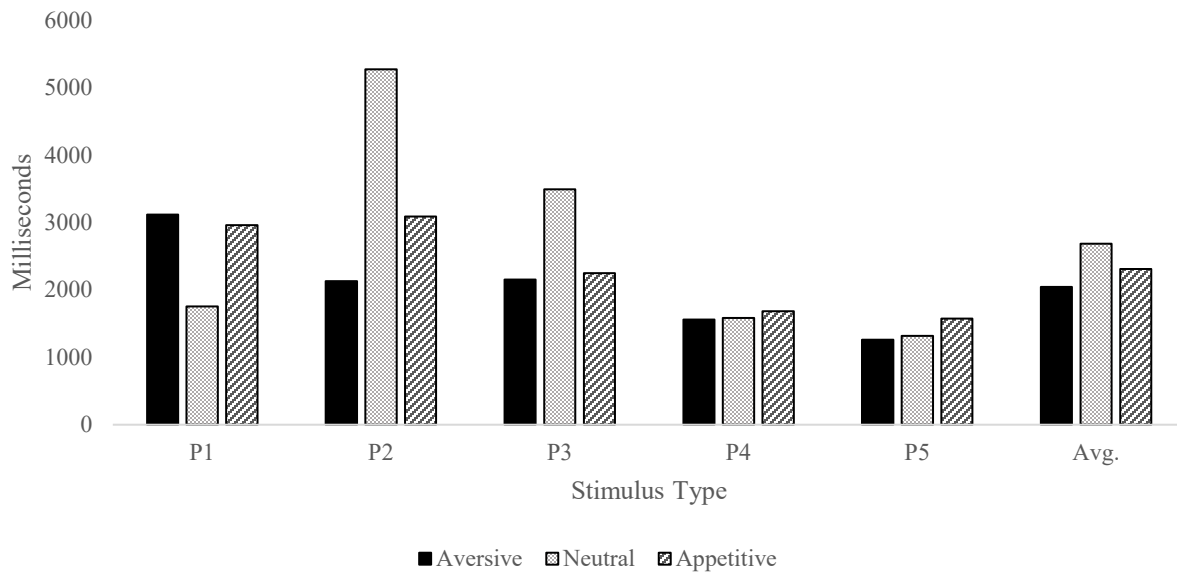


Figure 13. Response Time by Stimulus Type, Phase 2 Experiment 1

In the mixed training phase, all participants except for Participant 1 responded faster to aversive stimulus trials. Overall, participants' response time was also lower in aversive trials ($M = 1751.78$ ms), but this time followed by neutral ($M = 2243.22$ ms), then appetitive stimulus trials ($M = 2622.87$ ms). Notably, the difference between aversive and appetitive stimulus trials as a whole was almost one second, (871.09 ms).

Table 6

Response Time by Stimulus Type, Phase 3 Experiment 1

| Participant | <u>Stimulus Type</u> | | | |
|-------------|----------------------|---------|------------|---------|
| | Aversive | Neutral | Appetitive | Avg. |
| P1 | 2277.82 | 2107.33 | 2308.75 | 2231.30 |
| P2 | 2076.17 | 3473.50 | 3412.42 | 2987.36 |
| P3 | 1625.17 | 2303.64 | 3566.64 | 2498.48 |
| P4 | 1427.75 | 1943.18 | 2161.27 | 1844.07 |
| P5 | 1352.00 | 1388.45 | 1665.25 | 1468.57 |
| Avg. | 1751.78 | 2243.22 | 2622.87 | |

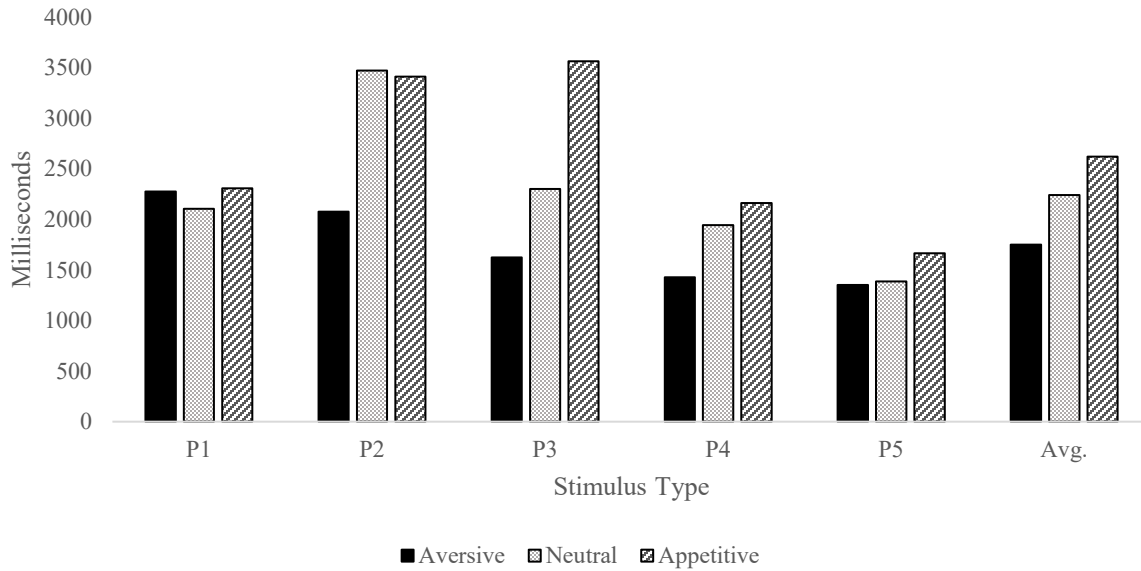


Figure 14. Response Time by Stimulus Type, Phase 3 Experiment 1

Phase four, the mutual entailment testing phase, yielded similar results, with all participants except Participant 1 reacting faster to aversive stimuli. Of these four participants, three reacted the second fastest to appetitive and the slowest to neutral stimulus trials. Grouped together, participants' response to aversive trials was the fastest ($M = 1784.07$ ms), followed by appetitive ($M = 1912.23$ ms), then neutral stimulus trials ($M = 1981.58$ ms).

Table 7

Response Time by Stimulus Type, Phase 4 Experiment 1

| Participant | <u>Stimulus Type</u> | | | |
|-------------|----------------------|---------|------------|---------|
| | Aversive | Neutral | Appetitive | Avg. |
| P1 | 2594.50 | 2321.83 | 1859.00 | 2258.44 |
| P2 | 2059.33 | 2602.58 | 2787.33 | 2483.08 |
| P3 | 1310.67 | 1525.50 | 1474.33 | 1436.83 |
| P4 | 1762.50 | 2069.50 | 2186.83 | 2055.03 |

| | | | | |
|------|---------|---------|---------|---------|
| P5 | 1193.33 | 1388.50 | 1253.67 | 1278.50 |
| Avg. | 1784.07 | 1981.58 | 1912.23 | |

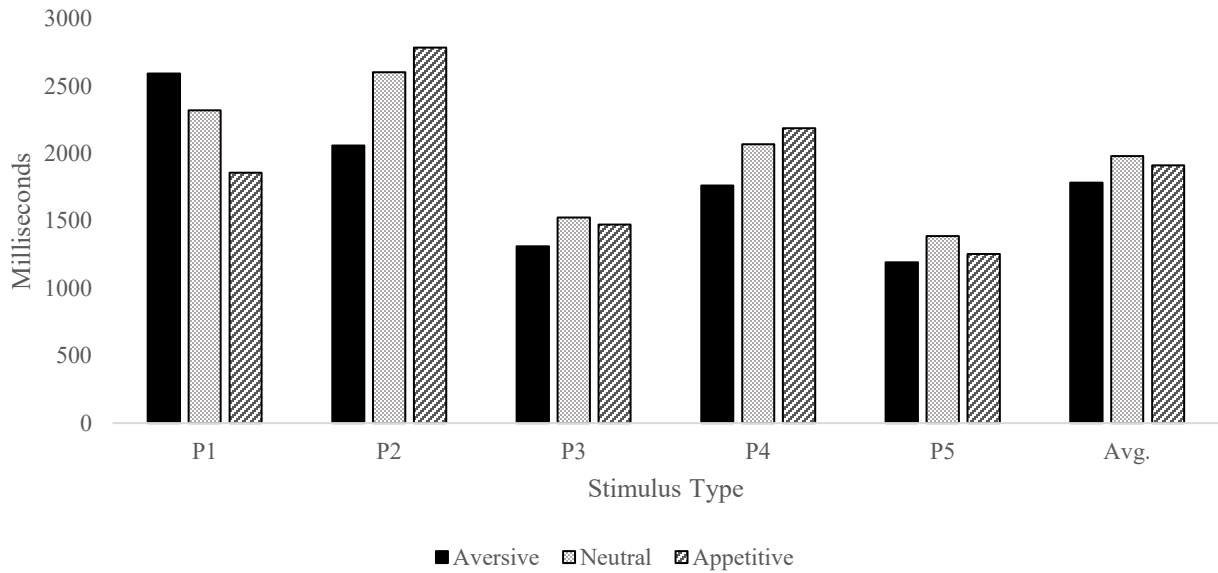


Figure 15. Response Time by Stimulus Type, Phase 4 Experiment 1

Finally, during the combinatorial mutual entailment phase, all participants except Participant 2 responded faster to aversive stimulus trials. Three out of the other four participants responded the second fastest to appetitive and the slowest to neutral stimulus trials. As a group, participants' responded the fastest to aversive ($M = 1917.23$ ms), followed by neutral ($M = 2307.48$ ms), then appetitive stimulus trials ($M = 2846.56$ ms).

Table 8

Response Time by Stimulus Type, Phase 5 Experiment 1

| <u>Stimulus Type</u> | | | | |
|----------------------|----------|---------|------------|---------|
| Participant | Aversive | Neutral | Appetitive | Avg. |
| P1 | 1861.67 | 2542.50 | 1944.83 | 2116.33 |

| | | | | |
|------|---------|---------|---------|---------|
| P2 | 2431.00 | 2093.00 | 3141.00 | 2555.00 |
| P3 | 2236.00 | 3069.58 | 4342.33 | 3215.97 |
| P4 | 1588.50 | 1643.33 | 2677.83 | 1969.89 |
| P5 | 1469.00 | 2189.00 | 2126.83 | 1928.28 |
| Avg. | 1917.23 | 2307.48 | 2846.56 | |

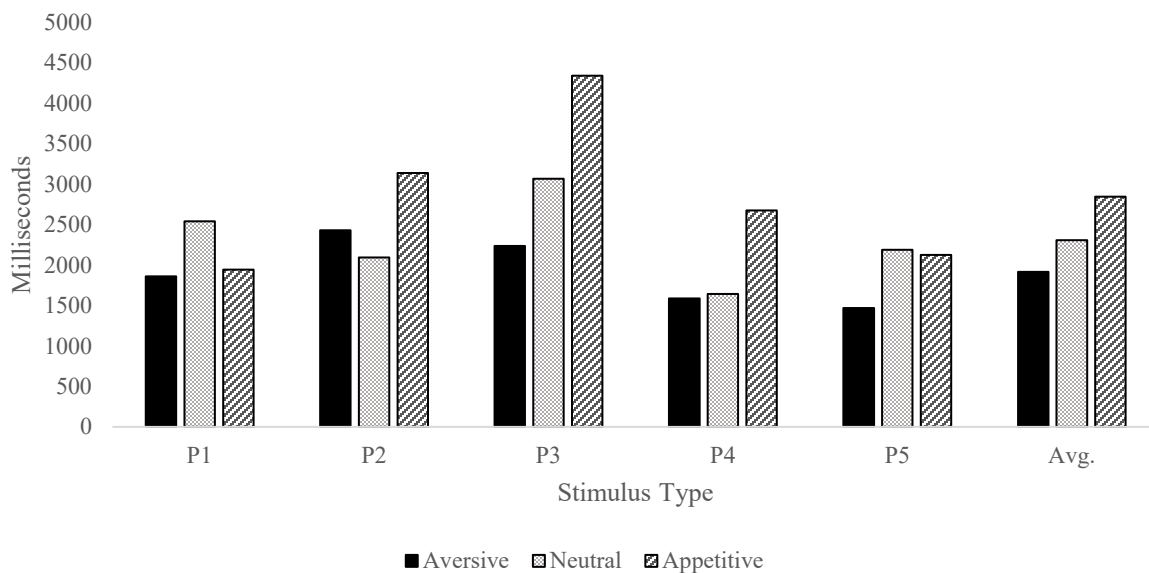


Figure 16. Response Time by Stimulus Type, Phase 5 Experiment 1

Regardless of differences due to the potential presence of order effects during initial trials, there was a consistent tendency to respond faster to aversive stimulus trials in all of the five phases of experiment one, with the exception of Participant 1 who responded faster to neutral or appetitive stimulus trials in different phases. Differences in response time between neutral and appetitive stimulus trials were less consistent across trials and participants.

Hypothesis 2

In order to test the hypothesis that mothers of a child struggling with anxiety would take more time and make more errors in forming classes with aversive child anxiety stimuli and

parenting values stimuli, compared to the neutral-parenting values or appetitive-parenting values stimuli, given aversive child anxiety stimuli is presumed to be most incongruent with parenting values based on participants' histories, I examined the impact of condition (aversive, neutral, or appetitive stimuli) on accuracy and reaction time in Experiment 2. As in Experiment 1, accuracy was measured by the number of correct responses and reaction time was the time that it took for a participant to select a match stimulus once the target and match options were displayed on the screen.

Number of errors

Results did not support the hypothesis that there would be more errors for aversive stimulus trials in Experiment 2 as compared to neutral and appetitive trials (see Table 9). Participant 2's number of errors were very elevated in the first phase, relative to the other participants, however, even when removing Participant's 2 results from the analyses, the total number of errors is still lowest for aversive stimulus trials (34) followed by appetitive (45) and neutral (49) stimulus trials. Thus, Participant 2's responses were kept in the analysis given they followed a systematic trend.

Table 9

Number of Errors by Phase and Stimulus Type, Experiment 2

| | | <u>Stimulus Type</u> | | | |
|---------|-------------|----------------------|---------|------------|-------|
| | Participant | Aversive | Neutral | Appetitive | Total |
| Phase 1 | P1 | 1 | 7 | 5 | 13 |
| | P2 | 31 | 63 | 63 | 157 |
| | P3 | 0 | 2 | 6 | 8 |
| | P4 | 0 | 1 | 1 | 2 |

| | | | | | |
|---------|-------|----|----|----|-----|
| | P5 | 1 | 2 | 0 | 3 |
| | Total | 33 | 75 | 75 | 183 |
| Phase 2 | P1 | 9 | 7 | 2 | 18 |
| | P2 | 6 | 17 | 16 | 39 |
| | P3 | 0 | 3 | 1 | 4 |
| | P4 | 3 | 3 | 2 | 8 |
| | P5 | 3 | 1 | 4 | 8 |
| | Total | 21 | 31 | 25 | 77 |
| Phase 3 | P1 | 6 | 1 | 0 | 7 |
| | P2 | 0 | 0 | 1 | 1 |
| | P3 | 0 | 1 | 0 | 1 |
| | P4 | 0 | 0 | 1 | 1 |
| | P5 | 0 | 0 | 0 | 0 |
| | Total | 6 | 2 | 2 | 10 |
| Phase 4 | P1 | 0 | 0 | 0 | 0 |
| | P2 | 1 | 0 | 2 | 3 |
| | P3 | 0 | 0 | 0 | 0 |
| | P4 | 0 | 0 | 0 | 0 |
| | P5 | 0 | 0 | 0 | 0 |
| | Total | 1 | 0 | 2 | 3 |
| Phase 5 | P1 | 0 | 0 | 0 | 0 |
| | P2 | 4 | 4 | 4 | 12 |

| | | | | |
|-------|----|-----|-----|-----|
| P3 | 0 | 0 | 0 | 0 |
| P4 | 0 | 0 | 0 | 0 |
| P5 | 0 | 0 | 0 | 0 |
| Total | 4 | 4 | 4 | 12 |
| Total | 65 | 112 | 108 | 285 |

Response time

Tables 10 to 14 and Figures 17 to 21 show response time means for each participant on each of the five phases of Experiment 2, as well as average response times. In Phase 1, four participants responded slower to appetitive trials and one to neutral trials. Three participants responded faster to neutral trials, one to aversive, and one to appetitive. For one participant, appetitive trials were her fastest response, and for the other four, they were their middle response. As a group, response times for aversive trials were the fastest ($M = 1971.85$ ms), followed by neutral ($M = 2122.32$ ms) and appetitive stimulus trials ($M = 2449.10$ ms). These results are contrary to expectations.

Table 10

Response Time by Stimulus Type, Phase 1 Experiment 2

| Participant | <u>Stimulus Type</u> | | | |
|-------------|----------------------|---------|------------|---------|
| | Aversive | Neutral | Appetitive | Avg. |
| P1 | 2267.64 | 2240.00 | 2857.14 | 2454.93 |
| P2 | 2676.97 | 2475.90 | 3530.76 | 2894.54 |
| P3 | 1911.17 | 2490.10 | 2720.00 | 2373.76 |
| P4 | 1492.83 | 1950.00 | 1476.00 | 1639.61 |

| | | | | |
|------|---------|---------|---------|---------|
| P5 | 1510.64 | 1455.60 | 1661.58 | 1542.61 |
| Avg. | 1971.85 | 2122.32 | 2449.10 | |

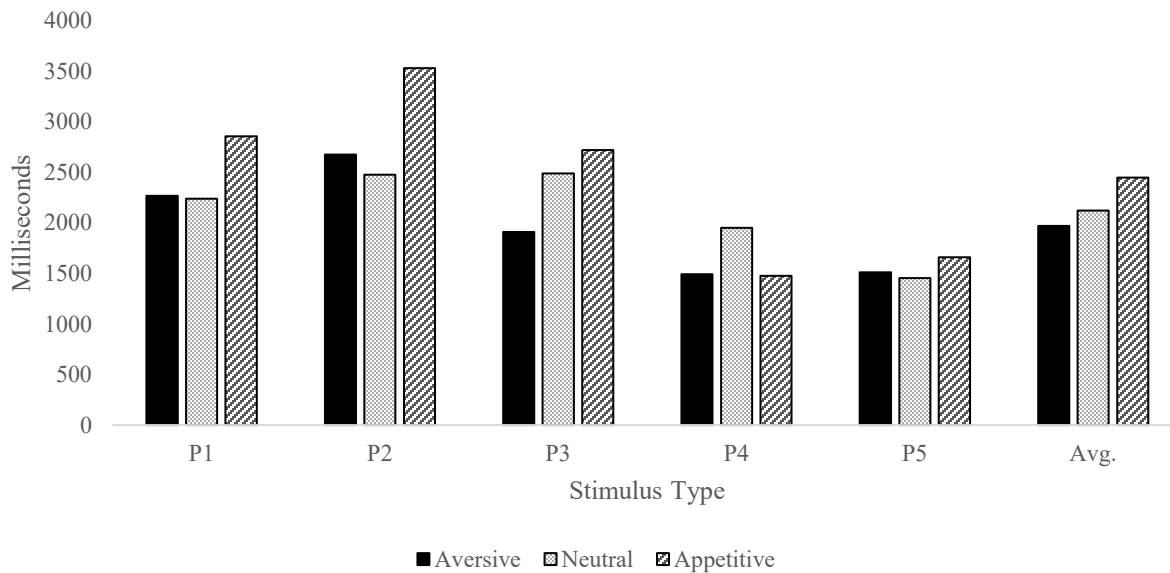


Figure 17. Response Time by Stimulus Type, Phase 1 Experiment 2

In Phase 2, two participants responded slower to aversive stimulus trials, and three to appetitive trials. As a whole, participants' latencies were the slowest in aversive trials ($M = 2536.07$ ms), followed by appetitive ($M = 2518.17$ ms) and neutral trials ($M = 2379.46$ ms). Although average scores support my hypothesis, the individual results for each participant are mixed.

Table 11

Response Time by Stimulus Type, Phase 2 Experiment 2

| Stimulus Type | | | | |
|---------------|----------|---------|------------|---------|
| Participant | Aversive | Neutral | Appetitive | Avg. |
| P1 | 3097.07 | 2674.18 | 2006.14 | 2592.46 |

| | | | | |
|------|---------|---------|---------|---------|
| P2 | 2982.88 | 3066.15 | 3226.92 | 3091.98 |
| P3 | 2550.83 | 2192.56 | 2859.73 | 2534.37 |
| P4 | 2184.11 | 2019.33 | 1914.20 | 2039.21 |
| P5 | 1865.44 | 1945.10 | 2583.88 | 2131.47 |
| Avg. | 2536.07 | 2379.46 | 2518.17 | |

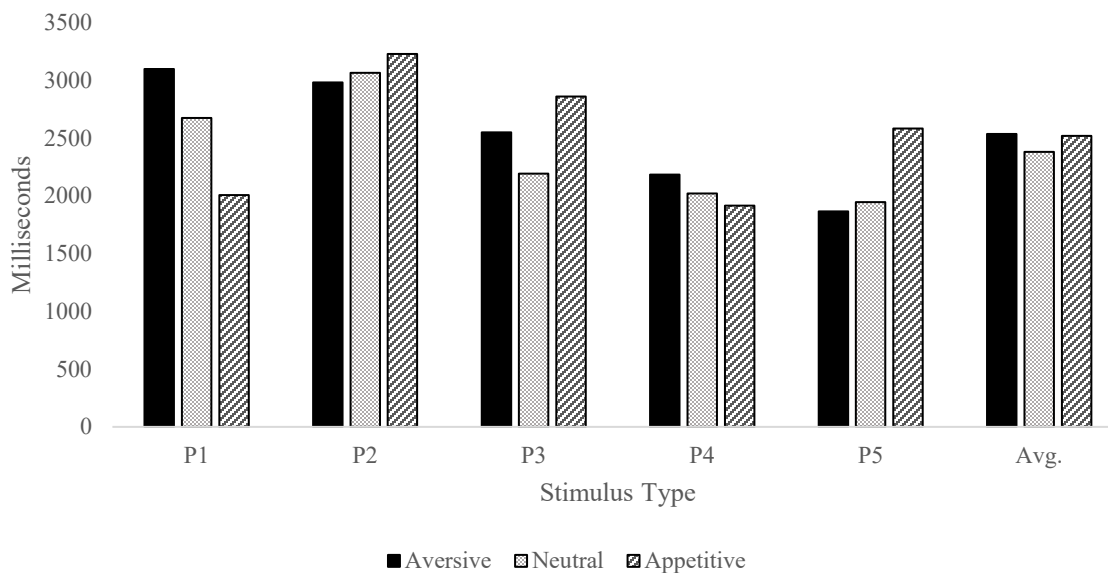


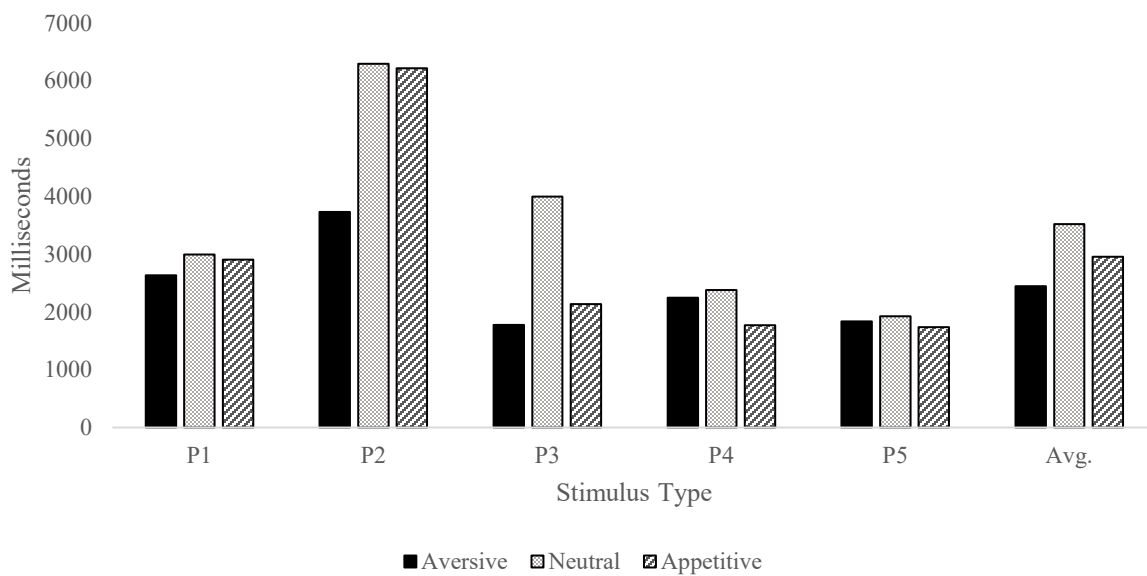
Figure 18. Response Time by Stimulus Type, Phase 2 Experiment 2

In the mixed training phase, all participants responded the slowest to neutral stimulus trials. Three participants had their fastest response during the aversive trials whereas for the other two participants, response time to the aversive trials fell between those for the neutral and appetitive trials. On average, participants' response times were the slowest for neutral stimuli ($M = 3520.03$ ms), followed by appetitive ($M = 2954.07$ ms), then aversive stimulus trials ($M = 2445.57$ ms). Notably, the difference between aversive and appetitive stimulus trials as a whole was over one second, (1074.46 ms). Again, these results do not support the expectation that participants would respond the slowest to aversive stimulus trials.

Table 12

Response Time by Stimulus Type, Phase 3 Experiment 2

| Participant | <u>Stimulus Type</u> | | | Avg. |
|-------------|----------------------|---------|------------|---------|
| | Aversive | Neutral | Appetitive | |
| P1 | 2636.44 | 2993.13 | 2904.91 | 2844.83 |
| P2 | 3732.33 | 6296.92 | 6218.73 | 5415.99 |
| P3 | 1775.83 | 3999.36 | 2135.92 | 2637.04 |
| P4 | 2245.00 | 2382.75 | 1772.64 | 2133.46 |
| P5 | 1838.25 | 1928.00 | 1738.17 | 1834.81 |
| Avg. | 2445.57 | 3520.03 | 2954.07 | |

*Figure 19. Response Time by Stimulus Type, Phase 3 Experiment 2*

Similar response times were found during Phase four, the mutual entailment testing phase. Three participants responded the slowest to appetitive stimulus trials, and two responded slowest to the neutral trials. Three participants responded fastest on aversive stimulus trials, and

for the other two, aversive trials fell in between neutral and appetitive trials. Grouped together, participants' responses during appetitive trials were the slowest ($M = 2479.72$ ms), followed by neutral ($M = 2351.87$ ms), then aversive stimulus trials ($M = 2134.47$ ms).

Table 13

Response Time by Stimulus Type, Phase 4 Experiment 2

| Participant | <u>Stimulus Type</u> | | | |
|-------------|----------------------|---------|------------|---------|
| | Aversive | Neutral | Appetitive | Avg. |
| P1 | 2017.67 | 2860.00 | 2402.50 | 2426.72 |
| P2 | 3857.17 | 3489.00 | 4436.00 | 3825.67 |
| P3 | 1812.33 | 2053.83 | 2184.17 | 2016.78 |
| P4 | 1609.67 | 1879.83 | 2022.83 | 1837.44 |
| P5 | 1375.50 | 1476.67 | 1353.08 | 1401.75 |
| Avg. | 2134.47 | 2351.87 | 2479.72 | |

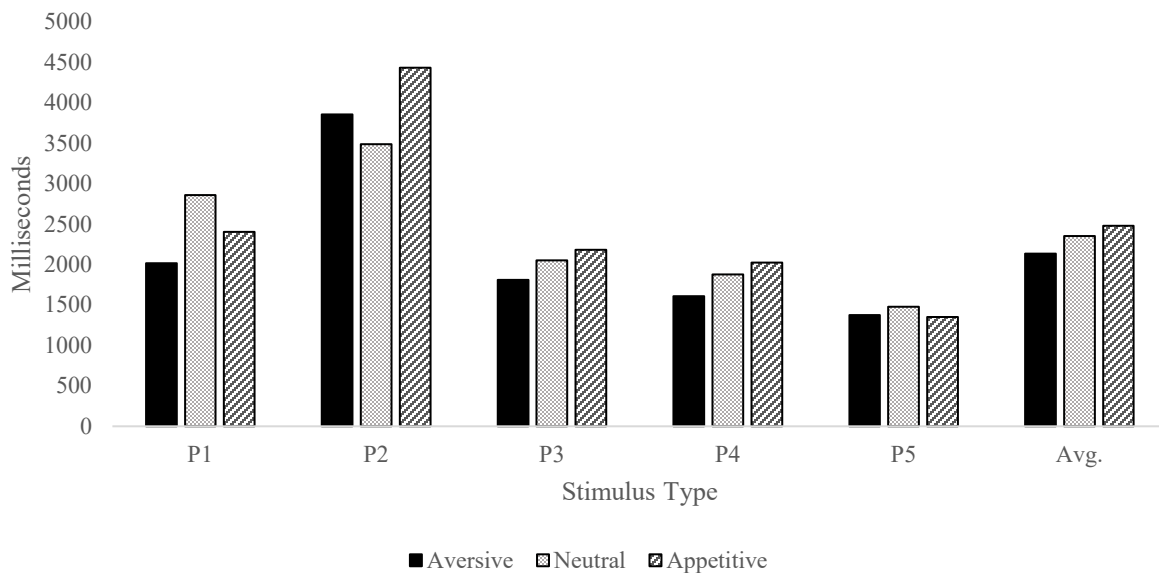


Figure 20. Response Time by Stimulus Type, Phase 4 Experiment 2

Finally, during Phase 5, the combinatorial mutual entailment phase, two participants responded the slowest to appetitive, two to neutral, and one to aversive stimulus trials. Aversive trials were the slowest for Participant 2, and the fastest for Participant 5. As a group, participants' responded the slowest to appetitive ($M = 3283.95$ ms), followed by aversive ($M = 3193.53$ ms), then neutral stimulus trials ($M = 3035.34$ ms). Again, these results do not support the hypothesis.

Table 14

Response Time by Stimulus Type, Phase 5 Experiment 2

| Participant | <u>Stimulus Type</u> | | | |
|-------------|----------------------|---------|------------|---------|
| | Aversive | Neutral | Appetitive | Avg. |
| P1 | 4807.67 | 3920.67 | 5096.17 | 4608.17 |
| P2 | 4906.50 | 4781.50 | 4212.00 | 4633.33 |
| P3 | 2376.83 | 2233.17 | 3299.67 | 2636.56 |
| P4 | 2316.67 | 2330.17 | 1939.83 | 2195.56 |
| P5 | 1560.00 | 1911.17 | 1872.08 | 1781.08 |
| Avg. | 3193.53 | 3035.34 | 3283.95 | |

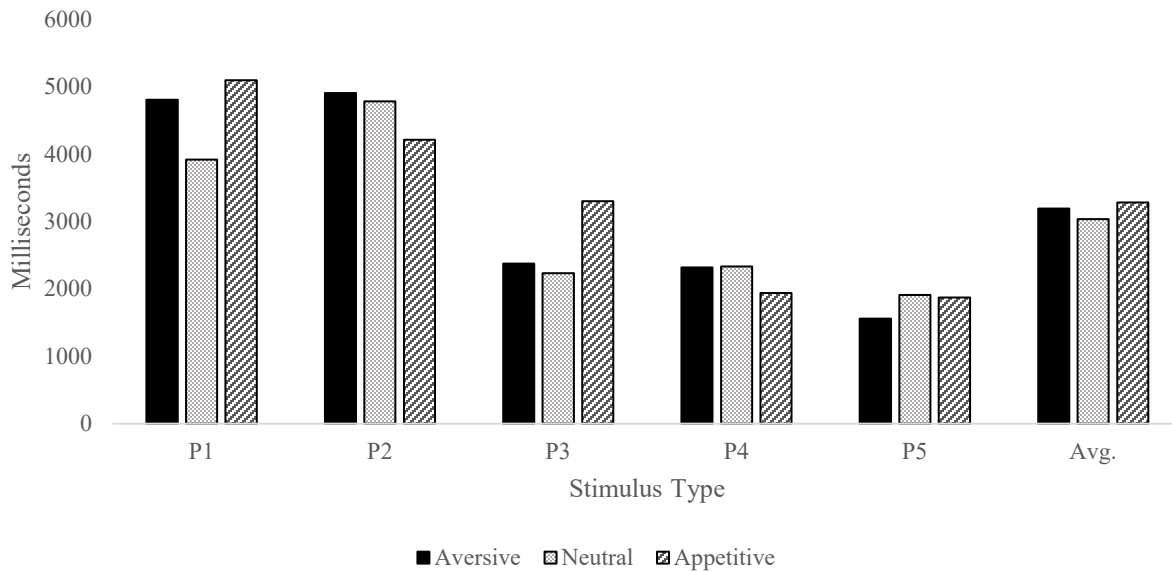


Figure 21. Response Time by Stimulus Type, Phase 5 Experiment 2

In summary, the results in Experiment 2 did not support the hypothesis that participants would respond the slowest to aversive stimuli (i.e., stimuli that opposed parenting values). While there was somewhat of a tendency for participants to respond faster to aversive stimulus trials, as in Experiment 1, the results were mostly mixed. Compared to Experiment 1, the differences in response time by stimulus type (aversive, neutral, or appetitive) were also less pronounced.

Hypothesis 3

Hypothesis 3 expected that a mother of an anxious child would systematically avoid the visual stimuli that presumable acquired the function of aversive child anxiety stimuli in Experiment 1, when these stimuli and stimuli that had acquired neutral and appetitive functions were presented and the mother was instructed to match those stimuli with a parenting value target stimulus. Before testing if participants avoided the aversive stimuli, first, they were asked to rate the stimuli to assess whether they acquired the expected psychological functions (i.e., appetitive, neutral, or aversive for valence and avoidance).

Symbol ratings

Symbols presented during Experiment 1 were expected to have acquired functions through direct training (Figure 22), and through derived relational responding (Figure 23). All participants except Participant 2 tended to rate the aversive stimuli as more unpleasant and as eliciting a desire to be avoided, than those associated with the neutral words, which were also rated as more unpleasant and eliciting a stronger desire to be avoided than the stimulus that was related to the appetitive words.

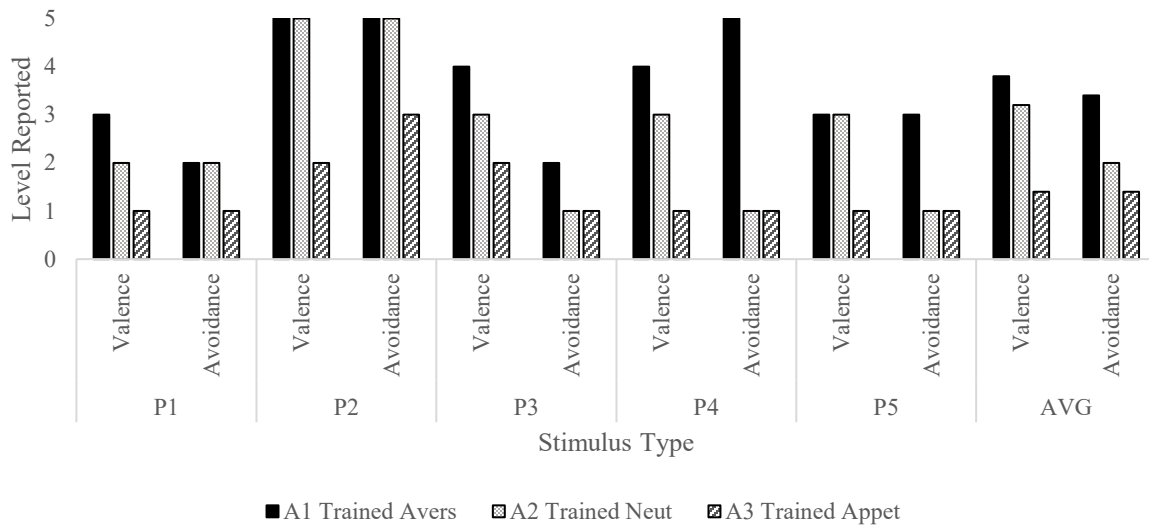


Figure 22. Mutual Entailment Negative Valence and Avoidance Symbol Ratings, Experiment 1

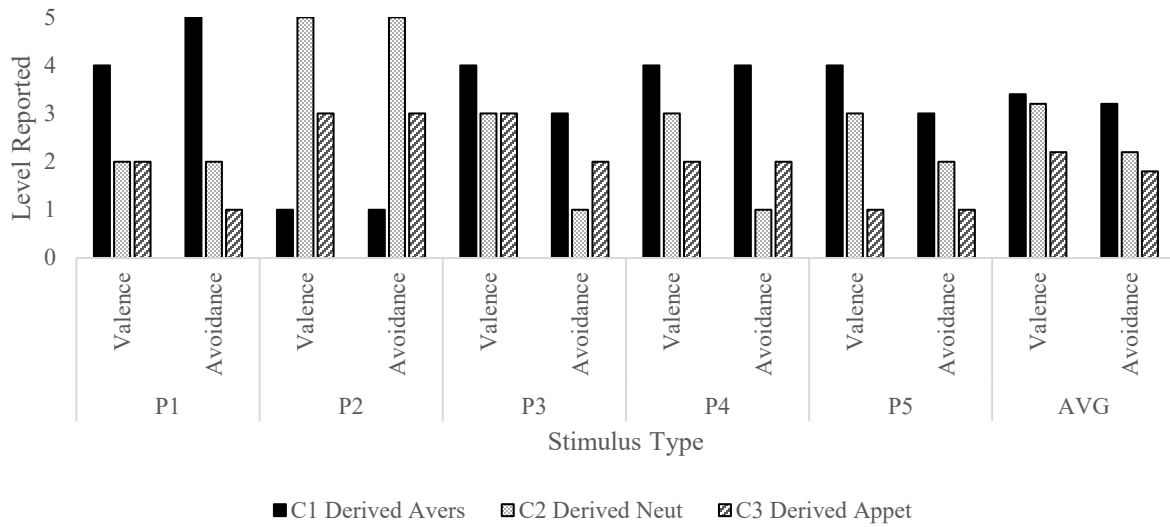


Figure 23. Combinatorial Mutual Entailment Negative Valence & Avoidance Symbol Ratings, Experiment 1

Participants' ratings of the trained stimuli under Experiment 2 also supported the hypothesis that symbols would acquire psychological functions based on the psychological functions of the words with which they were related. (see Figure 24). The difference between neutral and appetitive symbol ratings for valence was less pronounced.

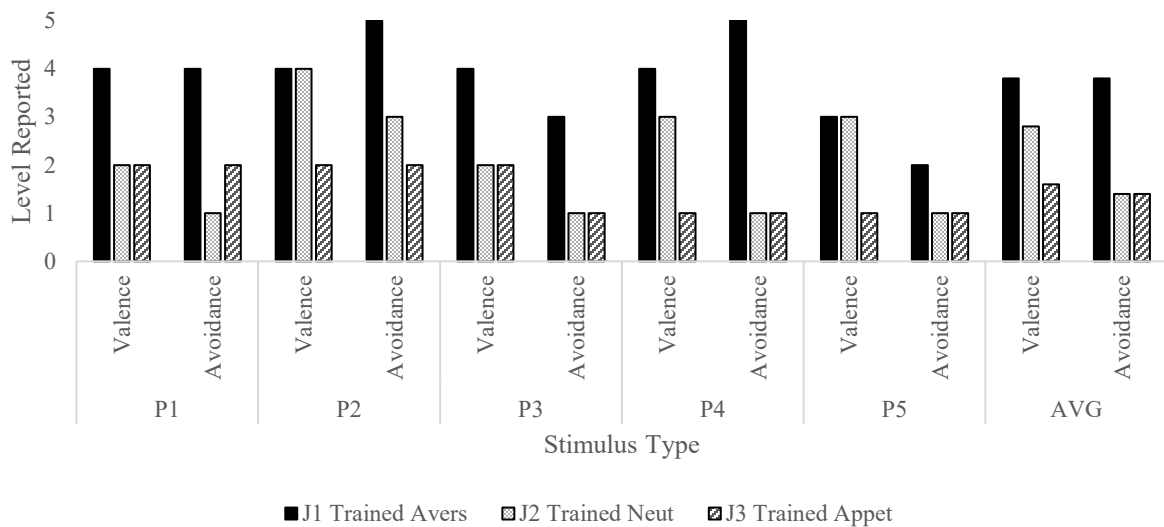


Figure 24. Mutual Entailment Negative Valence & Avoidance Symbol Ratings, Experiment 2

Hypothesis 3 was further tested by examining the valence and avoidance ratings provided in Experiment 3. With exception of Participant 2's responses, most of the other participants' ratings corroborated the expectation that the stimuli indirectly related with the child anxiety words would be rated as more aversive (i.e., more unpleasant and needed to be avoided) than novel symbols (see Figure 25), and that the same stimulus would be rated as more aversive when larger in size (see Figure 26).

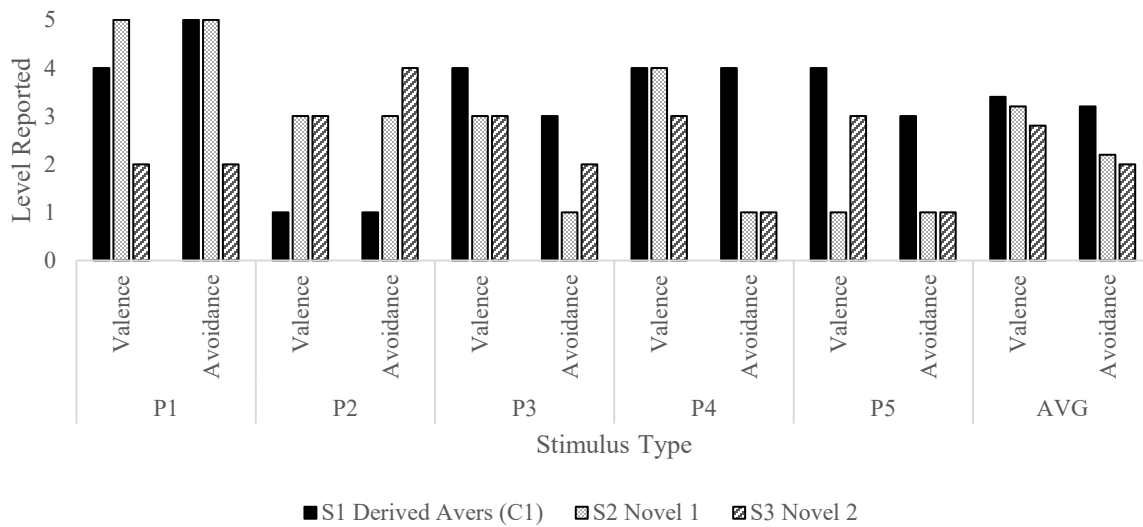


Figure 25. Derived Aversive vs. Novel Symbol Ratings, Experiment 3

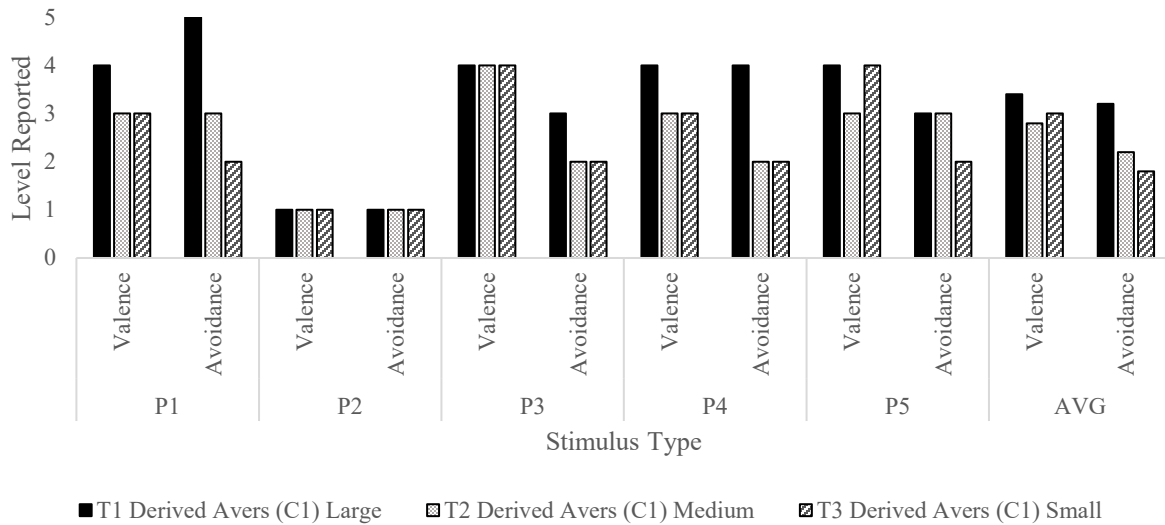


Figure 26. Derived Aversive by Size Symbol Ratings, Experiment 3

Behavioral avoidance

During Experiment 3, participants engaged in a computer task where I expected they would avoid the stimuli that had acquired aversive functions either directly or indirectly (i.e., derived) during Experiment 1. Participants 1 and 3 avoided the target stimuli on all of the 36 trials. Participants 2 and 4's proportion of avoidance of the target stimuli was 25% for both, however, their selection varied within condition. Participant 5 avoided the target stimuli at a rate of 58% (see Figure 27).

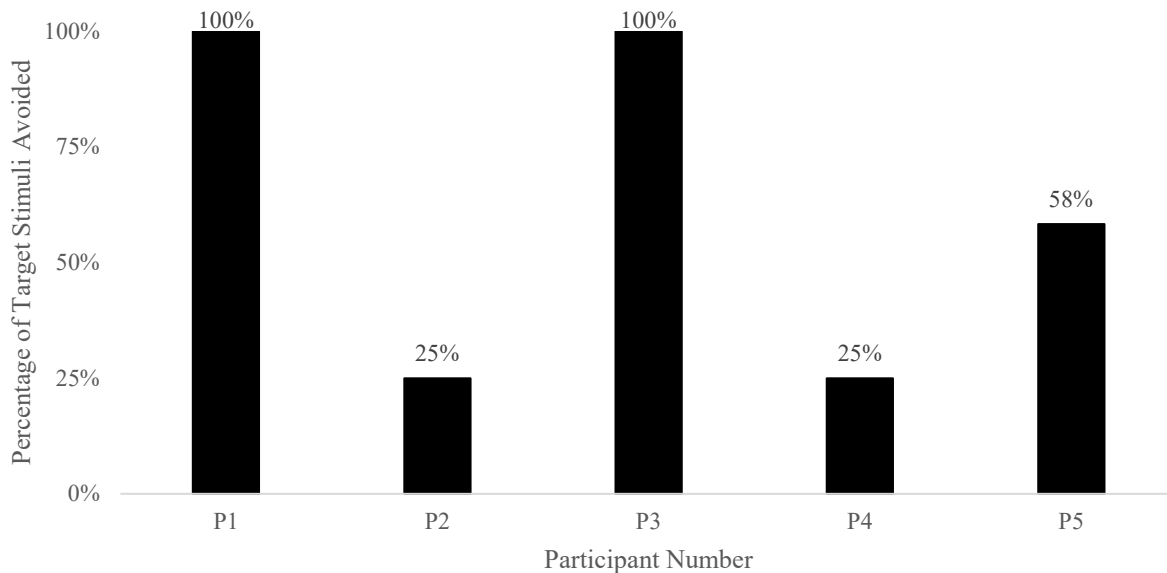


Figure 27. Percentage of Target Stimuli Avoided

Given not all participants responded as expected (i.e., 100% avoidance of target stimuli), their responses in each of the four conditions were further analyzed (see Table 15). While both participants 2 and 4 avoided 25% of the target stimuli, the target stimuli successfully avoided by Participant 2 was the trained aversive stimulus (condition 1). She chose the derived aversive stimulus all the times it was presented (conditions 2, 3, and 4). Participant 4, on the other hand, avoided the derived aversive stimulus when it was presented with two novel symbols (condition 3), but not under the other 2 conditions. She also chose the trained aversive stimulus every time it was presented (condition 1).

What is more striking is that regardless of whether participants avoided the stimuli expected to be avoided, most of them selected their response consistently within conditions, throughout the 36 trials of the experiment. The only exception was by Participant 5, who varied her responses within conditions. Her responses supported expectations for four out of the five conditions. The only condition in which she responded contrary to expectations was in the first condition, with stimuli supposed to having acquired functions directly, as opposed to derived or

indirectly. During the debriefing session, when the experimenter noted her response varied, she responded sometimes it was nice to vary things and try out new things, something she had learned in her own therapy.

Table 15

Frequency of Selection by Stimuli

| | | P1 | P2 | P3 | P4 | P5 |
|---------------|-------------------------|----|----|----|----|----|
| Condition 1: | Trained Aversive | 0 | 0 | 0 | 9 | 8 |
| Trained | Trained Neutral | 0 | 0 | 0 | 0 | 0 |
| Stimuli | Trained Appetitive | 9 | 9 | 9 | 0 | 1 |
| Condition 2: | Derived Aversive | 0 | 9 | 0 | 9 | 3 |
| Derived | Derived Neutral | 9 | 0 | 0 | 0 | 0 |
| Stimuli | Derived Appetitive | 0 | 0 | 9 | 0 | 6 |
| Condition 3: | Derived Aversive | 0 | 9 | 0 | 0 | 2 |
| Derived vs | Novel Symbol 1 | 0 | 0 | 9 | 9 | 6 |
| Novel Stimuli | Novel Symbol 2 | 9 | 0 | 0 | 0 | 1 |
| Condition 4: | Large Derived Aversive | 0 | 9 | 0 | 9 | 2 |
| Derived | Medium Derived Aversive | 0 | 0 | 0 | 0 | 6 |
| Stimuli by | | | | | | |
| Size | Small Derived Aversive | 9 | 0 | 9 | 0 | 1 |

Hypotheses 4 and 5

Hypothesis 4 and 5 explored relationships between participants' derived relational responding in the three experiments and their scores on self-report measures (see Table 16 and Figure 28).

Parental Perception of Child Anxiety (SCAS-P)

Compared to standardized norms, this group's average score ($M = 41.80$, $SD = 4.44$) was higher than clinical ($M = 30.10$, $SD = 14.90$) and non-clinical ($M = 16.00$, $SD = 11.60$; 11.60) samples from a previous study (Nauta et al., 2004). All mothers appear to perceive their children as being highly anxious, especially, Participants 1, 3, and 4. Participants 2 and 5's scores were lower than this group's mean, yet still higher than clinical cutoffs and consistent with clinical samples.

Parental Autonomy Granting Behavior (PCRI-A)

The group's average *T-score* for the parental autonomy granting scale fell within the normal range ($M = 50.80$, $SD = 10.08$) as compared to standardized norms ($M = 50.00$, $SD = 10.00$; Gerard, 1994). Participant 2's score was about 1.5 standard deviations from the mean, suggesting problems in this area for this mother. On the other hand, Participant 4's score was over 1 standard deviation above the mean.

Parental Avoidance and Anxiety (PAAQ)

Compared to average scores of mothers of anxious children in a previous study ($M = 53.80$ $SD = 9.00$; Cheron, Ehrenreich, & Pincus, 2009), the group's average score on parental avoidance and anxiety was slightly higher ($M = 54.20$ $SD = 11.78$). Participant 2 scored almost two standard deviations above the mean, suggesting high levels of parental avoidance. Participant 4 scored the lowest among the five mothers.

Experiential Avoidance (BEAQ)

Compared to the mean score from a non-clinical sample used in the measure development study ($M = 48.55$, $SD = 11.24$; $N = 578$; Gámez et al., 2014), the mean score from the current sample is slightly lower, suggesting normal levels of experiential avoidance. However, Participant 2's scores suggest elevated levels of experiential avoidance, while Participant 4's scores suggest low levels.

Cognitive Fusion (CFQ)

The group's average score ($M = 24.60$, $SD = 6.58$) was slightly higher than the mean score from a student and community sample used during the development and validation study of the CFQ ($n = 1040$) scored a mean of 22.28 ($SD = 8.30$), and over a standard deviation lower than a mixed mental health sample ($n = 215$) scored a mean of 34.31 ($SD = 8.06$) used in the same study (Gillanders et al., 2014). Participant 2's score resembled that of the clinical sample, suggesting she may struggle with cognitive fusion. Participant 3's score was over one standard deviation lower than the group's mean.

Trait Anxiety (STAI)

The group average ($M = 41.60$, $SD = 9.79$) was similar to the mean of a non-clinical sample 41.43 (11.06; $N = 877$) in one study (Balsamo et al., 2013). Participants 3 and 4 scored below the mean of the non-clinical sample, suggesting low levels of trait anxiety. Participants 2 and 5 reported elevated scores consistent with a clinical sample in the same study ($M = 53.54$, $SD = 12.25$; $N = 1124$; Balsamo et al., 2013).

Table 16

Participants' Total Score on Self-reports

| | P1 | P2 | P3 | P4 | P5 | <i>M</i> | <i>SD</i> |
|--------|----|----|----|----|----|----------|-----------|
| SCAS-P | 46 | 37 | 45 | 44 | 37 | 41.80 | 4.44 |
| PCRI-A | 56 | 35 | 49 | 62 | 52 | 50.80 | 10.08 |
| PAAQ | 50 | 75 | 49 | 46 | 51 | 54.20 | 11.78 |
| BEAQ | 42 | 59 | 45 | 34 | 41 | 44.20 | 9.20 |
| CFQ | 20 | 34 | 17 | 25 | 27 | 24.60 | 6.58 |
| STAI | 43 | 51 | 31 | 32 | 51 | 41.60 | 9.79 |

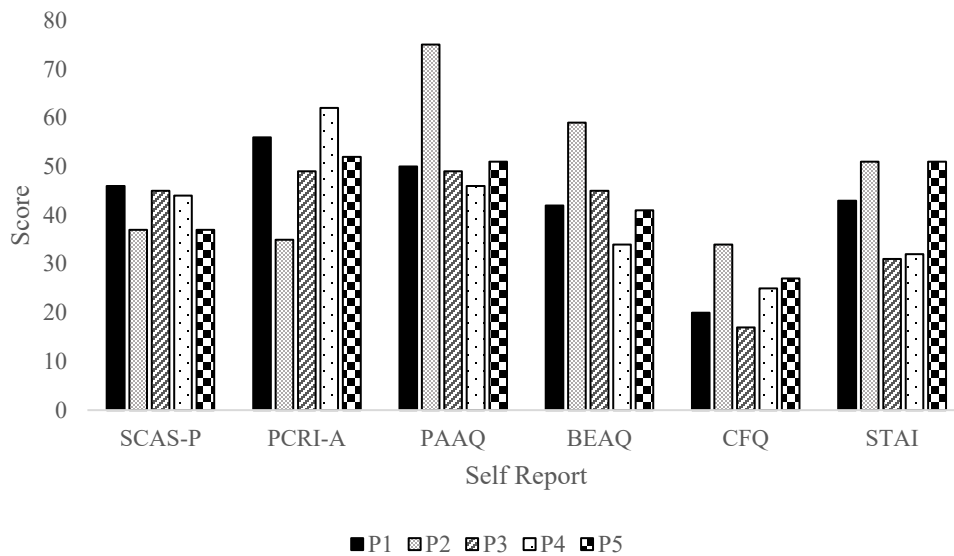


Figure 28. Scores on Self-reports. Scores for PCRI-A are inverted, and lower scores are more problematic.

Hypothesis 4

In order to test the hypothesis that a mother that shows rigid derived relational responding with child anxiety stimuli (operationalized as her tendency to form relations with child anxiety

words insensitively, that is, faster on experiment 1 and slower on experiment 2 than forming relations with neutral or appetitive words) will report elevated levels of her child's anxiety and her parental anxiety, and low levels of parental autonomy granting behavior, I visually inspected these relationships.

Based on Experiment 1, Participant 1 was the mother who most deviated from the other participants. Regarding parental experiential avoidance, her score on the PAAQ (50, $M = 54.20$, $SD = 11.78$) was lower than average and suggests she struggles less with experiential avoidance within the context of her parenting. Regarding her score on the PCRI-A was the second highest (56, $M = 50.80$, $SD = 10.08$), and it suggests she promotes her child's independence. Interestingly, she scored the highest on the SCAS-P (46, $M = 41.80$, $SD = 4.44$), which suggests she perceived her child's anxiety as more elevated than most of the other mothers.

Of all participants, Participant 2 struggled the most with the computer tasks, taking almost twice as long to complete them in relation to the other four participants (105 minutes, $M = 69.00$, $SD = 22.88$). On Experiment 2, she repeated the first phase 16 times, while others did not repeat any phase more than 4 times. Her word and symbol ratings were less coherent than those of the other participants. Regarding her self-reports, her scores were among the most elevated. Her score on the PAAQ were almost 2 standard deviations higher than the mean (75, $M = 54.20$, $SD = 11.78$), suggesting she struggles with parental experiential avoidance. Her scores on the autonomy scale was the lowest and fell below the clinical cutoff of 38 (35, $M = 50.80$, $SD = 10.08$). This suggests she struggles promoting autonomy for her child. Interestingly she shared the lowest score on the SCAS-P (37, $M = 41.80$, $SD = 4.44$), suggesting that, as compared to other mothers, she perceives her child as having lower levels of anxiety (see Table 17).

Table 17

Relationships between participants' experimental performance and parenting measures

| | Derived Relational Responding Experiment 1 | Derived Relational Responding Experiment 2 | Avoidant Response Rate Experiment 3 | Autonomy- Granting Behavior | Parental Avoidance | Perception of Child Anxiety |
|----|---|--|--|--------------------------------|--------------------|--------------------------------|
| P1 | Faster in neutral than aversive categories in 4 of 5 phases | More errors in aversive than other categories | 100% | 56; normal | 50; normal | 46; above mean |
| P2 | Less errors in appetitive than other categories; faster in aversive than neutral in first 4 phases | Repeated the most phases; more errors in appetitive than other categories; slower in appetitive categories in 3 phases | 25% | 35; below mean | 75; above mean | 37; below mean |

| | | | | | | |
|----|--|---|------|----------------|------------|----------------|
| P3 | Less errors in aversive than other categories; faster in aversive than other categories in 5 phases | More errors in appetitive than other categories; slower in appetitive categories in 4 phases | 100% | 49; normal | 49; normal | 45; normal |
| P4 | Faster in aversive than other categories 5 phases | Slower in neutral categories in 3 phases | 25% | 62; above mean | 46; normal | 44; normal |
| P5 | Faster in aversive than other categories in 4 phases | Slower in neutral categories in 3 phases | 58% | 52; normal | 51; normal | 37; below mean |

Hypothesis 5

To test the hypothesis that a mother that shows rigid derived relational responding with child anxiety stimuli will report elevated levels of her trait anxiety, cognitive fusion, and experiential avoidance, I visually inspected these relationships.

Similar to constructs from Hypothesis 4, Participant 2 scored the highest in experiential avoidance (BEAQ; 59, $M = 44.20$, $SD = 9.20$), cognitive fusion (CFQ; 34, $M = 24.60$, $SD = 6.58$), and trait anxiety (STAI; 51, $M = 41.60$, $SD = 9.79$). Participant 1 scored the second lowest on experiential avoidance (BEAQ; 42, $M = 44.20$, $SD = 9.20$), second lowest on the cognitive fusion questionnaire (CFQ; 20, $M = 24.60$, $SD = 6.58$), and slightly above average on trait anxiety (STAI; 43, $M = 41.60$, $SD = 9.79$). Participant 4's score on experiential avoidance was the lowest and over 1 standard deviation below the mean (BEAQ; 34, $M = 44.20$, $SD = 9.20$). Her score on trait anxiety was almost one standard deviation below the mean (STAI; 32, $M = 41.60$, $SD = 9.79$). Her cognitive fusion score was average (CFQ; 25, $M = 24.60$, $SD = 6.58$). She also completed the experimental tasks in the shortest time (44 min; $M = 69$ min, $SD = 22.88$) and over one standard deviation below the mean. Her responses on Experiment 3 corroborated the hypothesis, as she avoided the target stimuli in every single trial. On experiment one, she made fewer errors on the trained aversive stimulus trials (phases 1-3), and her response time was lowest for aversive trials followed by neutral and then appetitive trials on all phases of the experiment. On Experiment 2, her response time was actually higher (i.e., she took longer to respond) for aversive stimulus trials compared to appetitive trials, as hypothesized, on four of the five phases. However, her response time on neutral trials was higher than that of aversive trials on four of the phases (see Table 18). These results may suggest a connection between derived relational responding abilities and anxiety related constructs.

Table 18

Relationships between participants' experimental performance and individual measures

| | Derived Relational Responding Experiment 1 | Derived Relational Responding Experiment 2 | Avoidant Response Rate Experiment 3 | Experiential Avoidance | Cognitive Fusion | Trait Anxiety |
|----|---|--|--|---------------------------|------------------|----------------|
| P1 | Faster in neutral than aversive categories in 4 of 5 phases | More errors in aversive than other categories | 100% | 42; normal | 20; normal | 43; normal |
| P2 | Less errors in appetitive than other categories; faster in aversive than neutral in first 4 phases | Repeated the most phases; more errors in appetitive than other categories; slower in appetitive categories in 3 phases | 25% | 59; above mean | 34; above mean | 51; above mean |

| | | | | | | |
|----|--|---|------|----------------|----------------|----------------|
| P3 | Less errors in aversive than other categories; faster in aversive than other categories in 5 phases | More errors in appetitive than other categories; slower in appetitive categories in 4 phases | 100% | 45; normal | 17; below mean | 31; below mean |
| P4 | Faster in aversive than other categories 5 phases | Slower in neutral categories in 3 phases | 25% | 34; below mean | 25; normal | 32; below mean |
| P5 | Faster in aversive than other categories in 4 phases | Slower in neutral categories in 3 phases | 58% | 41; normal | 27; normal | 51; above mean |

CHAPTER IV

DISCUSSION

This study explored mothers' abilities to derive relations and form equivalence classes with aversive child anxiety stimuli, compared to neutral and appetitive stimuli, and within the context of parenting values. Additionally, this study explored mothers' use of avoidance responses within the context of child anxiety and parenting values. Finally, the study explored potential associations between mothers' abilities to form classes and self-reported levels of constructs associated with child and maternal anxiety. The study included five mothers having at least one child clinically referred for an anxiety disorder.

Hypothesis 1

For the first hypothesis, I expected mothers to derive equivalence relations between novel stimuli and aversive child anxiety stimuli faster and with fewer errors than when deriving relations between novel stimuli and either appetitive or neutral stimuli. Results supported the hypothesis as mothers of anxious children tended to learn, derive relations, and form functional equivalence classes faster and with less errors between aversive child anxiety stimuli and novel stimuli, related to neutral-novel or appetitive-novel stimuli. Findings are consistent with previous studies that emotional relevance impacts class formation (Murrell, 2005; Plaud, 1995; Wilson, 1998).

Interestingly, only Participant 1 responded in a way that was inconsistent with Hypothesis 1 in that she responded faster to neutral or appetitive stimuli compared to aversive stimuli trials in some of the phases. When exploring how else she differed from the other participants, she was the only one who reported not struggling with anxiety and not getting services for it. This may support the idea that maternal anxiety and distress may be related to

maternal verbal behavior within the context of child anxiety. If a mother struggles less with anxiety herself, maybe she is less hypervigilant or distressed by the child anxiety aversive stimuli and thus less predisposed to inflexibly acquiring novel stimuli to anxiety related functional classes.

Hypothesis 2

The second hypothesis predicted that when deriving relations between parenting values stimuli and aversive child anxiety stimuli, mothers would take longer and make more errors than when deriving relations between parenting values stimuli and either neutral or appetitive stimuli. This prediction was based on the notion that it would be more challenging for mothers to relate more incongruous stimuli (parenting values vs. child anxiety) than to relate more similar stimuli. The results of the study did not support this hypothesis. Responding was inconsistent across participants and experimental phases. Some participants responded faster to when aversive stimuli were paired with parenting values while others responded slower. Taken together, the differences in response time by stimulus type tended to be less than 300 milliseconds. Regarding number of errors, participants also tended to make fewer errors with pairing values with aversive stimuli, contrary to expectations.

Similar to the findings from Experiment 1, it is possible that for the parents in the current sample, the aversive function of the child anxiety aversive stimuli led them to be hypervigilant to this kind of stimuli, which may have led to less errors, and in some cases more rapid class formation, regardless of the incongruence between aversive child anxiety and parenting values stimuli. It is also possible that the aversive stimuli were in fact more closely related to parenting values stimuli compared to the other pairings even if the relation of opposition. In this way, that relation may be stronger than any relations that parenting value stimuli might share with the

neutral or appetitive stimuli. Perhaps, parenting values stimuli are more salient in the frame of child anxiety stimuli, than in the frame of neutral stimuli or stimuli that are pleasant yet less related to parenting (e.g., if presenting ‘night,’ as target stimulus and ‘shoe,’ ‘day,’ and ‘key,’ people may select ‘day’ because the relationship is strongest, even though is not one of equivalence. So maybe parents were not relating based on equivalence. If this could be the case, it is important design methods that allow to study relational responding in regard to intensity of relations (weak to strong) in addition to the type of relation (equivalence, opposition, temporal, etc.). Moreover, this experiment may be more precise if the neutral and appetitive stimuli presented also relate to parenting values, so that the intensity of relations between those pairings is comparable to the intensity of the relations between child anxiety stimuli and parenting values.

Hypothesis 3

This study also explored whether mothers would engage in behavioral avoidance within the context of child anxiety and parenting values stimuli. Hypothesis 3 expected that mothers would systematically avoid the visual stimuli that presumable acquired the function of aversive child anxiety stimuli in Experiment 1, when these stimuli and stimuli that had acquired neutral and appetitive functions were presented and mothers were instructed to match those stimuli with a parenting value target stimulus. This experiment was designed to assess a) whether transformation of psychological functions had occurred during Experiment 1, and b) whether transformation of psychological functions would lead to behavioral avoidance, in this case, choosing to avoid stimuli in a matching-to-sample task, within the context of parenting values and child anxiety, through a relation of opposition (i.e., child anxiety stimuli does not go with parenting value stimuli).

Results partially support these expectations, as two mothers avoided the aversive stimuli on all trials. Two other mothers avoided the aversive stimuli only on 25% of the trials, although their responses were consistent across the four conditions. It is not clear why participants choose the aversive stimuli, especially given participants rated the stimuli as aversive and needed to be avoided during the self-reports, which occurred after they completed all the matching-to-sample tasks. It is possible that during the experimental task, the psychological functions and relations selected for stimuli were different from those expected and later reported through ratings. For example, after being asked the reason for her choosing the aversive stimuli, one mother stated during the debriefing session, “Being a loving mother does not always feel good, sometimes is very hard, especially when your child is acting difficult.” In this particular instance, “being a loving mother” had aversive functions, and thus it would not be expected that she would avoid child anxiety aversive stimuli. Moreover, it makes sense she would match the stimuli together, based on a relation of equivalence, as both of them are aversive in that particular context. It is also possible that participants made their choices based on a relation of equivalence selecting other functions other than the one expected to be selected (i.e., valence). For example, when asked why a participant chose a particular aversive stimulus, she stated, “I chose it because it’s intense, not necessarily good, but intense. I like intensity sometimes.” In this case, the intensity function might have been selected over the valence function (i.e., pleasant-unpleasant). In this case, it is possible that when selecting the function of intensity, the aversive stimulus become equivalent to a parenting value stimulus which also shares a high-intense function, and thus it makes sense for a participant to match both stimuli. It is also possible participants chose the child stimuli given that parenting values and child anxiety may be more closely related than parenting values-household objects, or than parenting values-pleasant activities, given that parenting

occurs within the context of the child. Interestingly, Participant 5 stated, “If I can come to associate the things I fear with the things I look to give, I will feel better about the things I fear as an opportunity to give the love and support and encouragement.” This statement reflects one of the main goals of therapy, that of helping the individual transform or broaden the psychological functions of aversive stimuli, so that they are not just aversive and may come to elicit functions related to the individual’s values (Hayes et al., 2001; Villatte, Villatte, & Hayes, 2015). It seems like for this mother, stimuli related to her child anxiety was, in part, a reminder of the kind of mother she wanted to be for her child.

Controlling for the particular relations and functions to be selected is a real-world problem that is difficult to assess experimentally, since stimuli, especially psychologically relevant stimuli, tend to have multiple psychological functions. For example, what we care about can be a source of joy, pain, worry, love, etc., in different circumstances. However, contextualization scripts or exercises can help highlight specific functions and relations between stimuli. Just as mothers were contextualized to connect affectively with their child’s anxiety at the beginning of the online procedures and experimental tasks, a contextualization imaginal exercise could have been administered prior to experiment three to highlight appetitive functions of their parenting values and aversive functions of their child anxiety. Additionally, the script for Experiment 3 instructed participants to “Click on the lower image you prefer each time.” The instructions may have not specified the particular function expected for parents to select. Future studies could make instructions more explicit, for example, by instructing participants to “select the image at the bottom that *best goes with* the image at the top,” and maybe even specifying that “there is only one correct answer.” Additionally,, future studies could strengthen the relation between comparison and target stimuli, perhaps by adding symbols such as doubly pointed

arrows from each comparison stimulus to the target parting value stimulus. This could help highlight a relation of equivalence. Hooper et al., for example, used doors between comparison and target stimuli to highlight the relation between them (2012). The functions and relational frames selected when relating two or more stimuli may vary or be multiple. To decrease the potential for participants to select more elaborate functions and relations, the task could ask them to “select the correct stimuli *carefully but as fast as possible*.” In this way, the time constraint could yield more implicit or brief and immediate relational responses (BIRRs) and prevent explicit or extended and elaborated relational responses (EERRs; Hughes & Barnes-Holmes, 2013).

It is interesting that mothers chose stimuli systematically, especially for mothers who chose the aversive stimuli. This suggests that mothers’ choices were not random, at least after the initial trials for each of the four conditions, given that once they chose a stimulus within a condition, they continued to choose the same particular stimulus within that condition. This occurred even when participants were instructed that their choices did not have an impact on the number of trials presented. It seems mothers created rules and stuck to them. These results may corroborate the idea that people form functional classes arbitrarily and tend to stick to them, even in the absence of rewarding contingencies. This pattern of consistent responding could be related to a human predisposition for coherence, prediction and influence over environmental factors, but it may also highlight behavioral inflexibility led by rule-governed behavior (Hayes, Strosahl, & Wilson, 1999). Related to behavioral inflexibility is the participant’s five responses. She was the only participant who varied her choices within conditions. When inquired about her varied response, she reported noticing her tendency to overthink, which helped her not do it, “Overthinking is a specialty of mine... So, I didn’t overthink it... I chose whatever, probably

choosing different ones.” She also said it was nice to vary and try new things, something she had learned in her own therapy. Not surprisingly, she was the same participant who stated that her the child anxiety stimuli reminded her of her parenting values.

Additionally, the study also sought to explore potential relationship between derived relational responding and self-reported levels of general maternal mental health (e.g., anxiety, experiential avoidance, cognitive fusion) and child-parent constructs.

Hypothesis 4

Hypothesis four stated that mothers with difficulty with derived relational responding would score high in self-reports measures about their child anxiety their parental anxiety and they would grant less autonomy to their children. Participant 1 differed the most in her responses during Experiment 1. Based on her responses, it did not appear as her ability to form functional classes was impaired by the aversive function of the child anxiety stimuli. Not surprisingly, her parental experiential avoidance was lower than the average, and her autonomy granting behavior was the second highest, suggesting she promotes her child’s independence. On the other hand, participant 2, who struggled the most with computer tasks, reported the highest parental experiential avoidance and the lowest autonomy granting behavior.

Interestingly, Participant 1 perceived her child as having the most elevated level of anxiety, while Participant 2 perceived her child’s anxiety as the being lowest. Could it be that as a mother’s ability to form classes within the context of child anxiety is less hindered, she is also more able to sensitively acknowledge her child’s anxiety? This makes sense from a theoretical perspective. It is not difficult to imagine that a mother who struggles with distressing thoughts about her child’s anxiety, is also less willing to accept and lean into the experience of her child’s anxiety, potentially leading to its minimization. However, this study only included mothers’ self-

report data and there were only five participants. In general, these findings support the general idea that cognitions may have an impact on parental distress and parental over controlling behavior, and thus, they highlight the importance of targeting processes of maternal cognition as a way to treat child anxiety.

Hypothesis 5

The fifth hypothesis explored relationships between patterns in mothers' abilities to form classes and their perception of general measures related to their anxiety and avoidance including their trait anxiety, cognitive fusion, and experiential avoidance. Similar to Hypothesis 4, Participant 2 reported the highest levels of experiential avoidance, cognitive fusion, and trait anxiety while also displaying the most difficulties forming classes on the experimental tasks. Participant 1, on the other hand, had one of the lower scores in experiential avoidance, cognitive fusion, and close to average in trait anxiety, while her performance on the first experimental tasks was the opposite to the other participants (i.e., she did not formed classes with aversive stimuli faster than with neutral or appetitive stimuli). Participant 4 responded to the experimental tasks the fastest, and her performance on all three experimental tasks corroborate the hypotheses (see results section). Her self-reported experiential avoidance and trait anxiety were about one standard deviation below the mean. Her cognitive fusion was average.

While just an exploratory visual analysis, these results may suggest a connection between derived relational responding abilities and anxiety related constructs. It is possible that there is a relationship between a mother's ability to form classes within the context of child anxiety and her tendency to avoid distressing experience, be fused with her thoughts, and experience anxiety. The implications of these findings are important given the lack of studies connecting both basic units of analysis (e.g., derived relational responding) and mid-level constructs (e.g., cognitive

fusion, parental experiential avoidance, trait anxiety). Future studies would need to explore these associations with more participants and more in depth. For example, in addition to conducting analysis of variance between these variables, qualitative interviews and or behavioral observations can be done to explore a mother's experience with her child. Finally, including children to future studies could provide a more precise analysis.

Implications of findings

The study's findings suggest the importance of targeting parental cognitions in mothers for the treatment of child anxiety. Understanding how parental cognitions work within the context of child anxiety may give us insights on what clinicians can target when working with this population. Looking at all the participant's performance and reports, it might be possible that the inflexibility in derived relational responding is not equivalent to a pathological process, but instead, a process consistent with mother's ability to think and plan regarding their children's anxiety. The problem, however, may be in its overreliance, especially at the expense of losing contact with direct contingencies. From this perspective, clinical treatments could highlight more the workability of cognitions rather than their pathology.

If mothers of anxious children have a tendency to quickly relate their child anxiety worries to other things in life, almost in an insensitive or automatic way, perhaps it could be helpful to teach them to notice such processes, and to slow them down. Similarly, it is important for therapists to take into account these potential cognitive processes when asking mothers to engage in behavioral or cognitive responses that may contradict learning based on their personal histories (i.e., skills training). Perhaps, prior to expecting mothers to respond differently from the ways in which they have historically responded, it could be productive to help them explore whether they engage in cognitive processes that get them "stuck" in unhelpful experiential loops

that include distressing thoughts and accommodating or controlling behaviors. Many therapists employ functional analyses to explore the function of client's experiences and responses.

Another way that could help loosen the rigid tendency of mothers to relate things to child anxiety is by transforming the psychological functions of child anxiety aversive stimuli themselves.

Values is theorized to provide a feasible way to accomplish this. For example, Coyne and Moore's parenting protocol teaches parents to lean into their difficult experiences and acknowledge difficult thoughts without the need to avoid or control them. Instead, they invite parents of anxious children to let their worries about their children's anxiety be a reminder to contact and engage in responses that are consistent with the type of parents they ultimately want their children to remember them as (2015).

Probably, the most effective treatments would include targeting both direct and indirect learning histories (Coyne & Wilson, 2004; Murrell, 2005). Direct conditioning can be addressed through the teaching and practice of skills training. To target indirect conditioning, therapists can use processes that increase contact with thoughts and emotions that tend to be otherwise avoided, including acceptance, mindfulness, and functional analysis. Fortunately, these processes are already being targeted in several treatment modalities. For example, acceptance and mindfulness-based psychotherapies (e.g., Coyne & Moore, 2015; Coyne & Murrell, 2009; Orsillo, & Roemer, 2011) focus on the function or workability of particular thoughts within particular contexts. Additionally, they teach individuals to objectively track and open up to their experiences moment by moment. These processes may help individuals increase the psychological functions of stimuli that have only avoidant functions and subsequently broaden responses such as acceptance of the uncomfortable thoughts and feelings, as well as behavioral choices consistent with the individual's values.

Strengths

A unique contribution of the present study relates to its methodology. First, it seems to be the first study to design experimental procedures based on each participant's personal experience that is still comparable across participants. At the same time, it focuses on the function of stimuli (i.e., words), over their form or topography. These are two important points, given RFT's theoretical assumptions on the importance of personal contextual histories impacting the psychological functions of the stimuli with which each person interacts, as well as the value of a stimuli's psychological functions over their form. In this case, child anxiety can be and usually is manifested in myriad of ways and contexts. Previous studies that have used the same list of words for all participants have found that the words do not fit each participant's experience, which may have weakened the studies' effects. Regarding Murrell's study limitations, she states, "... words may not have been ideal with respect to emotional relevance. In several cases, the participants did not rate the words as expected... It is likely that the stimuli were not emotionally salient or personally relevant enough... Future studies should make attempts to make the stimuli more salient." (2005; p. 74). In a hypothetical example, it is not difficult to imagine a scenario where a mother's child who struggles with anxiety, manifests his or her anxiety by throwing tantrums and engaging in oppositional behavior. Another mother's child may show his or her anxiety by internalizing behaviors such as isolating and worrying. Both children experience anxiety, but this is manifested in very different ways. Using words related to oppositional or externalizing behavior might be relevant for one mother but not the other. Whatever results are yielded for the second mother, are less relevant to the words used, and thus it becomes difficult to attribute findings to the processes studied.

The methodology employed in this study showed a feasible way to assess for stimuli that fits each participant's personal history, are comparable in their psychological functions, even when the form varies. Moreover, this methodology can easily be used to design experimental implicit assessment procedures, not limited to matching-to-sample tasks (e.g., implicit association tests, implicit relational assessment procedures).

Consistent with evidence-based literature, this study employed an idiographic methodology that allows for the analysis of processes at the individual level. This practice may prevent individual differences being obscured by group averages (Barlow, Nock, & Hersen, 2009). Regarding the importance of both process- and individual-based research, Hayes et al. state that "In order to understand why and how changes happen in an individual, we need to study the processes of change at the level of the individual, and then to gather nomothetic summaries based on collections of such patterns." (2019; p. 43). For example, despite the low number of participants, several patterns were identified across their performance, including their tendency to respond faster to and with less errors to trials with aversive stimuli, particularly in the first experiment. Similarly, some differences between patterns were salient. Participant two's performance on the experimental tasks differed the most from that of the other four participants, as did her presentation in several factors including her lower educational achievement, lower income, lower age at which she became a mother, higher number of children, most problematic subjective report of stress, elevated self-reported levels on anxiety-related measures.

Limitations & future directions

Several limitations limit the conclusions that can be drawn from the results. While the small sample size allowed for an in-depth study of each participant's performance in the experimental tasks, it poses a restriction on generalizability. Thus, it is important that these

results be taken cautiously. Further studies are encouraged to increase the number of participants, which could increase the generalizability of results.

None of the participants included a mother of a non-anxious child. Thus, it is not clear if the results yielded in this study are particular of mothers of anxious children, or if they generalize to mothers of children who do not struggle with anxiety. For example, it is not clear whether mothers of non-anxious children will also form equivalence classes faster and with less errors when relating novel stimuli with aversive stimuli, compared to neutral or appetitive stimuli. The absence of a control subject or group poses an important limitation and the need to further explore verbal behavior in mothers of anxious as well as non-anxious children. Additionally, four of the five mothers reported being anxious, while only one reported not struggling with anxiety. While some patterns were different for Participant 1, the only mother who reported not being anxious, replication is needed to further explore whether these differences are related to maternal levels of anxiety.

Another potential limitation is related to the symptom presentation of the children. There was broad variability in the children's presenting concerns. The rationale for having a broad presentation of the children's anxiety is consistent with the idea that the function of anxiety is similar even though it may manifest in a wide variety of ways. Nevertheless, it is not clear whether specific presentations of anxiety (e.g., separation anxiety, social phobia) may yield different results. For example, at least one study showed that separation anxiety was more strongly associated with parental accommodation (Lebowitz et al., 2013). Likewise, the children's presentation was not confirmed with any diagnostic or self-report assessment. This warrants the question of whether the children met criteria for anxiety or related disorders and which ones, or if mother's report of their children's anxiety were more related to their own

perception and perhaps anxiety. Future studies are encouraged to include a direct assessments to children. Likewise, inclusion criteria could be restricted to mothers of children with an existing psychological diagnostic evaluation.

This study did not gather data on participants' race and ethnicity, which may be factors that impact relational responding to emotional stimuli. Existing literature suggests that ways in which people relate symbols (i.e., language), teach information to children, and learn skills may differ based on cultural backgrounds (e.g., Tamis-LeMonda, Song, Leavell, Kahana-Kalman, & Yoshikawa, 2012). It is possible that mothers from cultures with a tendency to over rely on verbal symbols for the understanding and transmission of information may be more at risk to develop inflexible behavior governed by verbal rules, compared to mothers from cultures where alternative ways of relating and transmitting information (e.g., non-verbally) are used.

The difference between neutral and appetitive symbol ratings for valence was less pronounced, probably since the avoidance Likert-type scale in the stimuli rating (see Appendix K) only asked for participants need to avoid, and failed to inquire about their need or wish to approach the words and symbols. This could explain there was almost no difference between avoidance ratings of neutral and appetitive stimuli. Studies that seek to replicate this method, should include wider scales, perhaps a 7-point Likert-type scale that assesses level of appetitive function as well as avoidance one (i.e., 1 = strong need/desire to avoid to 7 = strong need/desire to approach/desire).

There is some indication that the “neutral” symbols were not neutral before they were even associated with study stimuli. This was evident after Participants 1 and 2 assigned high or low valence values to some of the symbols prior to engaging in the experimental tasks, and even when they reported not having seen the symbols in the past. After consulting with RFT experts, it

was determined to remove the pre-experimental symbol ratings, as participants seemed to be attributing psychological functions to symbols just by being exposed to them when asked to rate them. It appears that “neutral” symbols are not neutral but instead symbols *without specified psychological functions*.

Direct comparison between Experiment 1 and 2 are not possible given the differences in structure. Experiment 1 required participants to form symbol-words-symbol equivalence classes, while Experiment 2 required them to form symbol-words-words classes. Perhaps, it is easier to form classes with visual rather than written stimuli, as evidenced by one participant’s report as well as all participants completing Experiment 1 faster. Thus, future studies can design comparable experimental tasks that allow for a comparison between them. For example, instead of experiment one using novel symbols, it could use words without specified functions that participants might provide or select from a broader list of potential neutral words, given their personal histories with such words. While comparisons in performance between Experiments 1 and 2 are not feasible, it is important to note that Experiment 2 words were more aversive than Experiment 1 at baseline. This result is unexpected, given the word selection process was semi-randomized. One potential reason why words that appear in Experiment 2 were rated as more aversive could be that those words, as compared to words from Experiment 1, were closer to the parenting value words in the rating forms. It could be possible that having parenting value words close in proximity to the aversive words from Experiment 2 intensified their contrast, making them feel more aversive than words used in Experiment 1, which were farther away from the parenting value words.

The influence that the parenting value words had on participants’ performance on Experiment 2 is unclear, given there was no manipulation of those words. For example, it is

possible that participants may have performed comparably with other set of words, such as words associated with personal values not associated with parenting. To draw conclusions about the influence of values words, future studies are encouraged to experimentally manipulate these words and compared them to different set of words. One way to do this would be by giving matching-to-sample tasks with three different conditions including 1) words related to parenting values, 2) value words not related to parenting, and 3) non-value words.

The analyses in hypotheses four and five were exploratory and require or a more in-depth qualitative methodology or quantitative methods with more participants. Future studies should consider including interviews, writing samples, behavioral observations of parent-child interactions, self-reported data at various points in time, and more participants. Given the small sample, there needs to be caution about generalization to other mothers of children struggling with anxiety. In particular, given that Participant 2's demographic information as well as her results were the most different from the other four mothers, future studies are encouraged to recruit mothers from more heterogeneous backgrounds and explore to what extent such variables (e.g., level of education, socio-economic status, number of children, age at which the participant first became a mother, as well as race and ethnicity) play a role in a mother's ability to derive relations, form functional classes, as well as her anxiety, experiential avoidance, cognitive fusion, autonomy granting behavior, and perception of child's anxiety.

The absence of physiological and alternative implicit and behavioral assessing tools also weakens the study's result. It may not be difficult for future studies to assess alternative implicit measures such as skin conductance, heart rate, or brain activity. Future studies can also assess both mother's and child's behavior directly, perhaps as they interact while solving a puzzle, or while they have a conversation about anxiety provoking situations.

An interesting way of extending the present study is by providing matching-to-sample tasks to mothers of anxious children before and after therapeutic interventions. It would be expected that mothers who successfully complete interventions targeting indirect conditioning through the use of acceptance, mindfulness, functional analysis, and psychoeducation would show more flexible abilities to derive relations and create functional classes after the intervention has taken place. Other future directions may include the exploration of cognitive processes in fathers or other salient caregivers of children struggling with anxiety and related disorders. Likewise, it would be interesting to assess if differences in the ability to form functional classes within the context of child anxiety and parental values also extends to other domains of participant's experiences, such as psychological flexibility in general or other mental health problems reported by participants.

Conclusion

While extensive research exists on child anxiety, and findings point at the association between parental cognition and behavior that inadvertently maintains child anxiety, less is known about the processes at play in parental cognitions. The rationale for this study was to experimentally explore mother's cognitive processes within the context of child anxiety and parenting, an under-explored area of study, yet one that has repeatedly been encouraged by research findings in the child anxiety literature. Given the current findings, it appears that derived relational responding may play a role in the way mothers experience their children's anxiety and in their parenting behavior. Mothers formed functional classes in the first experiment faster and with less errors, when new stimuli were related to child anxiety aversive stimuli as opposed to when related to neutral or appetitive stimuli. On the second experiment, there was a less clear trend and smaller difference, although mothers also tended to make less errors and

respond faster when forming functional classes between appetitive parenting values stimuli and child anxiety aversive stimuli, as compared to when they related parenting values stimuli with appetitive or neutral stimuli. In experiment three, while some mothers avoided the stimuli that had acquired aversive functions during the first experiment, four of them made choices and stuck with them across all the trials. The other mother showed a more flexible response behavior. These differences seem to be related to measures of mother's perception of child's anxiety, parental anxiety and avoidance, parental autonomy granting behavior, experiential avoidance, cognitive fusion, and trait anxiety.

Most of the findings in this study corroborate that parental cognitions are associated with parental behavior within the context of child anxiety. These findings further highlight the importance of studying parental cognitions using experimental methods. Understanding ways in which mothers inflexibly form functional classes and avoid behavior may help researchers and clinicians find ways and develop strategies to help mothers loosen these processes when facing their own distress about anxiety in their children, eventually helping mitigate unhelpful strategies and preventing the development and maintenance of child anxiety.

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APPENDICES

Appendix A: Site Recruitment Letter



Name of Contact Person, Titles
Office Title
Name of Site
Address
City, State Zip Code

Dear [Name of Site's Contact],

We are conducting a research study to learn more about how mothers of clinically anxious referred children think about their children's experiences. Our goal is to learn more about this so we can help mothers and their children experience emotions and deal with anxiety in more productive ways. I am writing to ask you to consider whether you would be willing to allow us to recruit participants by posting and distributing flyers in spots designated by you at [name of site]. This would not involve any extra work or time on the part of you or your staff.

We are interested in recruiting mothers of 6-18-year-old youth who have been referred for their anxiety and/or related symptoms. Interested participants will be contacted by telephone to explain the study. Those interested will complete an online preliminary task that includes eligibility screening, consent, and a writing sample and questionnaire about their children's anxiety and their parenting. Participants will then meet in person with a co-investigator to complete three computer tasks and several self-report measures. The in-person study is approximated to last 90 minutes, and will take place at Suffolk University in Boston, or at participants' residences if preferred. Participants will be compensated with \$50 in cash or as an Amazon gift card following their in-person participation. This study will be approved by Suffolk University's Internal Review Board prior to participant recruitment.

If you agree to allow recruitment of individuals who come to [name of site], we would bring flyers to the site, so that they can be posted and given to interested individuals. We are happy to speak with you more in detail to explain our study and answer any questions you have. If you have any questions about this study, please do not hesitate to contact us by phone or email. Thank you very much. We look forward to hearing from you.

Sincerely,

Lisa W. Coyne, Ph.D.
lcoyne@partners.org
774-419-1161
Principal investigator

Michael K. Suvak, Ph.D.
msuvak@suffolk.edu
617-994-6869
Co-Investigator

Carlos E. Rivera, M.S.
cerivera@suffolk.edu
864-363-6390
Co-Investigator

Suffolk University
Boston, MA

Does your child's anxiety worry you?



Are you a mother of an 6-18 year old child who struggles with anxiety?

You may qualify for the Study on Parenting, Anxiety, and Raising Kids (SPARK)
We are conducting a study looking at mother's experience of their children's anxiety.

What is involved?

- ☐ Completing a survey online (approximately 20 minutes)
- ☐ Participating in a 1-2-hour in-person study which involves:
 - o Completing a series of exercises in a computer
 - o Completing questionnaires about you and your child

Participation in this study is limited! Participants will be compensated with \$50 in cash or as an Amazon gift card for their participation. If you are interested in learning more and/or signing up, please contact us at 617-863-7275 or SPARKresearch2017@gmail.com for more information.

Participation may take place at Suffolk University or at participant's residence if unable to travel.

| |
|---|
| SPARK (Study on Parent Anxiety while Raising Kids) Earn \$50 Contact 617-863-7275 or SPARKresearch2017@gmail.com |
| SPARK (Study on Parent Anxiety while Raising Kids) Earn \$50 Contact 617-863-7275 or SPARKresearch2017@gmail.com |
| SPARK (Study on Parent Anxiety while Raising Kids) Earn \$50 Contact 617-863-7275 or SPARKresearch2017@gmail.com |
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| SPARK (Study on Parent Anxiety while Raising Kids) Earn \$50 Contact 617-863-7275 or SPARKresearch2017@gmail.com |
| SPARK (Study on Parent Anxiety while Raising Kids) Earn \$50 Contact 617-863-7275 or SPARKresearch2017@gmail.com |
| SPARK (Study on Parent Anxiety while Raising Kids) Earn \$50 Contact 617-863-7275 or SPARKresearch2017@gmail.com |

Appendix C: Script for initial phone conversation

Participant ID# _____

Script for initial phone conversation

Date of call-in: _____ Today's date: _____

Good morning/afternoon/evening, may I speak with (name of potential participant).

If potential participant is NOT available:

Do you know when is a good time to reach her? (get information and call back later). Thank you, I will call her back at the time you suggested. Have a nice day/afternoon/evening.

Best day and time to call _____ (call back)

If potential participant is available:

Hello (name of potential participant), my name is Carlos Rivera, and I am a doctoral candidate at Suffolk University in the Clinical Psychology doctoral program. I am calling because you expressed interest in participating in SPARK, the study on parenting anxiety, and raising kids. Do you have a few minutes to talk? I would like to tell you a little bit about the study.

No _____ Yes _____

If no:

When is a good time to call back when you can have about 5 minutes to talk? (set up phone call appointment). I will call you on **[date and time]**. Thank you and have a nice rest of your day.

If yes:

Ok. This study is conducted at Suffolk University and is to learn more about how mothers who have children struggling with anxiety think about their children's experiences. From our clinical experience, we know how hard this can be. Our goal is to learn more about this so we can help families cope with anxiety. Your participation may help us develop more effective ways of helping children with anxiety and their mothers. If you are eligible, you will be asked to read and sign a consent form online, fill out a screening questionnaire to make sure you are eligible to participate in the study, and conduct a written exercise to learn a little about your experience dealing with your child's anxiety. This whole process should take about 20 minutes. Once this step has been completed, I will call you to set up a time to meet in person to complete the study at Suffolk University in Boston. If you cannot come to Suffolk University, I can meet you at your home. During this visit, you will be asked to complete three computer tasks where you will match different words and symbols. You will also be asked to complete some questionnaires about you and your child. Approximately, this visit will last 90 minutes. At the end of your participation, you will receive cash or an Amazon gift card for \$50 as compensation for your time and participation. Do you have any questions?

No _____ Yes _____

If yes: (answer questions and continue).

Participant ID# _____

If no: (continue).

Are you still interested in participating?

No _____ Yes _____

If no:

Thank you very much for your time. I hope you have a nice day.

If yes:

Thank you! Next I need your email address where I will send a message with a link for you to read the consent form, complete the screening questionnaire, and the written exercise. What is an email address I can send you this link to?

(confirm email address)

Thank you, I will email you the link shortly and will call you again when I have received your information. If I don't get anything within a week, I will call again to check on the process. If you have any questions between now and next time I call you, please feel free to contact me, Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or my supervisor, Michael Suvak at msuvak@suffolk.edu. Thank you again for your time and interest. Have a nice day.

Participant ID# _____

KEEP THIS PAGE SEPARATE FROM SCREENING QUESTIONNAIRE!

Demographic information:

Name: _____ Phone: _____

Email: _____

Participant ID#: _____

Address (only if conducting the study at home): _____

Appendix D: Email message with link for online procedures

Email with link to complete online procedures

Dear [participant's name],

Thank you for your interest in SPARK (the Study of Parenting, Anxiety, and Raising Kids). Please click on the link below to complete the preliminary online procedure which includes a consent form, a writing exercise, and screening questions. This might take you about 20 minutes. You can start now and resume at a later time. Please let us know if you have any questions. You can contact Carlos Rivera M.S., at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu.

Thank you,

Follow this link to the Survey:

[Take the Survey](#)

Or copy and paste the URL below into your internet browser:

https://suffolk.co1.qualtrics.com/jfe/form/SV_bjAlM3OCIIWfV5j?Q_DL=6AwKBZvV1kBNq17_bjAlM3OCIIWfV5j_MLRP_1TUwsBWChVtxEln&Q_CHL=email

Follow the link to opt out of future emails:

[Click here to unsubscribe](#)

Start of Block: Introduction to online procedures

Q0 Hello and welcome to SPARK, the Study on Parenting, Anxiety, and Raising Kids! This is a study for mothers of children who struggle with anxiety. Thank you for your interest. Before we meet for the study, there is an online screening procedure. First, we will ask you two questions to make sure you are eligible to participate in the study. Then you will read and sign the consent form. Once you have agreed and signed the consent form, you will be asked to write about a situation you had with your child, tell us a bit about how you experience your child's anxiety, and answer a few questions. The screening procedure takes approximately 20 minutes. You can save your progress and continue later. We just ask that you complete this online screening within one week.

Click on the arrow below to continue.

Page Break

Q2 Please answer the two questions below to see if you are eligible to participate in the study. In order to participate, we need to know the answers to these questions, but you can choose to not answer any question if you don't want to.

Q2.1 Are you the mother of at least one 6 to 18-year-old child who struggles with anxiety or an anxiety related disorder (such as OCD, eating disorder, skin picking, etc.)?

- ☐ Yes (1)
 - ☐ No (2)
 - ☐ I prefer to not answer (3)
-

Q2.2 Has your child been diagnosed and/or referred for mental health services due to his/her anxiety or anxiety related disorder (such as OCD, eating disorder, skin picking, etc.)?

- ☐ Yes (1)
- ☐ No (2)
- ☐ I prefer to not answer (3)

Display This Question:

If Are you the mother of at least one 6 to 18-year-old child who struggles with anxiety? = No

Q2.1.99a Thank you so much for your time and for providing us with this information. Based on your responses, unfortunately you do not qualify to participate in our study. We do appreciate your time and interest. Would you like to be contacted in the future to receive information about potential studies in which you may participate?

- ☐ Yes (1)
- ☐ No (2)

Display This Question:

If Inclusion criteria not met = No

Q2.1.99a.1 That's ok. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu. Thank you again for your time and interest. Have a nice day.

Skip To: End of Survey If If does not want to be contacted for future studies() Is Displayed

Display This Question:

If Inclusion criteria not met = Yes

Q2.1.99a.2 Ok, we will keep your contact information in case we conduct a new study. Thank you for your time and interest. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu. Have a nice day.

Skip To: End of Survey If Ok, we will keep your contact information in case we conduct a new study. Thank you for your time...() Is Displayed

Display This Question:

If Are you the mother of at least one 6 to 18-year-old child who struggles with anxiety? = I prefer to not answer

Q2.1.99b Thank you so much for your time and for providing us with this information. Based on your responses, unfortunately we do not have enough information to determine your eligibility and proceed with the in-person study. We do appreciate your time and interest. Would you like to be contacted in the future to receive information about potential studies in which you may participate?

☐ Yes (1)

☐ No (2)

Display This Question:

If Thank you so much for your time and for providing us with this information. Based on your respons... = No

Q2.1.99b.1 That's ok. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu. Thank you again for your time and interest. Have a nice day.

Skip To: End of Survey If That's ok. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerive...() Is Displayed

Display This Question:

If Thank you so much for your time and for providing us with this information. Based on your respons... = Yes

Q2.1.99b.2 Ok, we will keep your contact information in case we conduct a new study. Thank you for your time and interest. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu. Have a nice day.

Skip To: End of Survey If Ok, we will keep your contact information in case we conduct a new study. Thank you for your time...() Is Displayed

Display This Question:

If Has your child been diagnosed and/or referred due to anxiety? = No

Q2.2.99a Thank you so much for your time and for providing us with this information. Based on your responses, unfortunately you do not qualify to participate in our study. We do appreciate your time and interest. Would you like to be contacted in the future to receive information about potential studies in which you may participate?

☐ Yes (1)

☐ No (2)

Display This Question:

If Thank you so much for your time and for providing us with this information. Based on your respons... = No

Q2.2.99a.1 That's ok. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu. Thank you again for your time and interest. Have a nice day.

Skip To: End of Survey If That's ok. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerive...() Is Displayed

Display This Question:

If Thank you so much for your time and for providing us with this information. Based on your respons... = Yes

Q2.2.99a.2 Ok, we will keep your contact information in case we conduct a new study. Thank you for your time and interest. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu. Have a nice day.

Skip To: End of Survey If Ok, we will keep your contact information in case we conduct a new study. Thank you for your time...() Is Displayed

Display This Question:

If Has your child been diagnosed and/or referred due to anxiety? = I prefer to not answer

Q2.2.99b Thank you so much for your time and for providing us with this information. Based on your responses, unfortunately we do not have enough information to determine your eligibility and proceed with the in-person study. We do appreciate your time and interest. Would you like to be contacted in the future to receive information about potential studies in which you may participate?

☐ Yes (1)

☐ No (2)

Display This Question:

If Thank you so much for your time and for providing us with this information. Based on your respons... = No

Q2.2.99b.1 That's ok. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu. Thank you again for your time and interest. Have a nice day.

Skip To: End of Survey If That's ok. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerive...() Is Displayed

Display This Question:

If Thank you so much for your time and for providing us with this information. Based on your respons... = Yes

Q2.2.99b.2 Ok, we will keep your contact information in case we conduct a new study. Thank you for your time and interest. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu. Have a nice day.

Skip To: End of Survey If Ok, we will keep your contact information in case we conduct a new study. Thank you for your time...() Is Displayed

Page Break

Q1

INFORMED CONSENT TO PARTICIPATE IN RESEARCH

Please read the information below carefully. If you have any questions, you can contact co-investigators Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak

at msuvak@suffolk.edu. If you decide that you would like to participate in this research study, you will be asked to sign this document and you will be given a copy.

TITLE OF RESEARCH STUDY: Study on Parenting, Anxiety, and Raising Kids (SPARK)

PRINCIPAL INVESTIGATOR: *Michael Suvak, Ph.D., Psychology Department, Suffolk University*

CO-INVESTIGATOR: *Lisa Coyne, Ph.D., Harvard Medical School, Carlos E. Rivera, M.S., Psychology Department, Suffolk University*

PURPOSE OF RESEARCH:

You are being invited to participate in this study because you are the mother of a 6 to 18-year-old child who struggles with anxiety. The purpose of this study is to learn more about how mothers think and feel about their children's emotions. Our goal is to learn more about this so that we can help mothers and their children deal with their emotions in more effective ways.

RESEARCH PROCEDURES:

If you decide to volunteer for this study, you will complete a screening procedure that takes about 20 minutes. You will be asked to write about a situation you had with your child and tell us a bit about how you experience your child's anxiety. The information you provide will help us determine your eligibility for the study. If you are eligible, co-investigator Carlos Rivera will schedule a time to meet with you, either at Suffolk University or at your home to complete some computer tasks and questionnaires. The in-person part of the study will take approximately 90 minutes.

RISK AND/OR DISCOMFORTS:

We do not foresee any significant risks associated with completing the study. You may experience some boredom in completing the computer tasks. We will also ask you questions about your child's anxiety and parenting situations. You can choose to not answer questions if you are not comfortable with them. If you do experience any discomfort with any part of the study that we have not anticipated or described, please let the investigators know.

BENEFITS:

There are no direct benefits to you from being in this study. However, it is possible that others may benefit from it. What we learn about mothers' thoughts and feelings about their children's anxiety may help us to better assist mothers raising children with anxiety. Your participation will help the investigators learn more about how mothers make sense of and relate to their children's anxiety.

ALTERNATIVES:

Participation in this study is voluntary, and you can choose to not participate. Remember, you have the option of withdrawing from the study at any time without consequences.

PRIVACY AND CONFIDENTIALITY:

We will do our best to protect your privacy during this study. No measures (including the

demographic questionnaire) will include questions that ask for any identifying information. Information from this study (i.e., questionnaires) will be stored on a secure computer database and identified by a code number only. The code number connecting your name to specific information will be kept in a separate, secure location. Five years after this information is no longer being used for research purposes, it will be stored in the principal investigator's lab space. Only the principle investigator, co-investigator, and research assistants working on this project will have access to this data.

All of your information will remain confidential. However, investigators and research assistants are mandated reporters, and so are required by law to report situations of possible abuse or neglect. If your answers reveal that you may be at risk for harming yourself or others, or if you report ongoing abuse of a minor or a disabled person, the researchers may be required to report this information to a local or state agency to ensure the safety of those involved.

If any of the results of the study are published or presented in a research meeting or conference, they will not contain your name or any identifying information. The information collected will become part of the laboratory's database. Information without your name may be used with information from future studies within the lab.

COMPENSATION:

To compensate you for the time you spend during the in-person study, we will give you \$50 either in cash or as an Amazon gift card when you complete the study. You always have the option to withdraw from this study once it has started. If that is the case, you will still be given the \$50 compensation. There is no compensation for this online portion of the study.

VOLUNTARY NATURE OF PARTICIPATION/ RIGHT TO WITHDRAW:

Participating in this study is voluntary. You have the right to refuse to participate. If you decide to participate, you may withdraw your consent at any time, and any information collected from you will be destroyed if you wish. The investigator may also determine that it is in your best interest to discontinue your participation at any time. Your withdrawal will not result in any penalty or loss of benefits and/or services that you might be entitled to receive.

CONTACT INFORMATION:

We are happy to answer any questions you have about the study, now or later. If you want to contact the researchers, you may call:

| | | |
|----------------------|----------------------|---------------------------|
| Michael Suvak, Ph.D. | Carlos Rivera, M.S. | Lisa Coyne, Ph.D. |
| (617) 994-6869 | (617) 863-7275 | (774) 419-1161 |
| msuvak@suffolk.edu | cerivera@suffolk.edu | lcoyne@mclean.harvard.edu |

If you have any questions about your rights as a volunteer in this research study, you can call Suffolk University's Institutional Review Board (IRB). The IRB is a group of people who ensure the rights and welfare of research participants are protected. You can call or email them at (617) 557-2006 or irb@suffolk.edu.

Please click one of the following two options below.

- ☐ I have read the information in this document, and I am aware of the risks and benefits involved. I have been given a chance to ask questions and enough time to decide whether to participate. I voluntarily agree to participate in the research study. (1)
- ☐ I do not agree to participate in the study (2)

Display This Question:

If Informed consent = I do not agree to participate in the study

Q1.99 You chose to not participate in this study. If you change your mind or have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu. Thank you for your time and interest.

Skip To: End of Survey If If participant does NOT consent() Is Displayed

Q1.1 Please type your name in the space provided. It will serve as your electronic signature. On the day of the meeting, you will be asked to sign a paper copy of this consent, and you will be given another copy for your records. To protect your identity, your signed consent form will be stored separately from the rest of the information you provide.



Q1.3 Please confirm today's date

Page Break

Q3 This following part requires that you are in a quiet place where you will not be interrupted. You will be asked to write for five to seven minutes about your experience of your child's

anxiety. Then, you will be asked to answer some questions. Click on “Continue” to start the written exercise now or “Save progress and continue later” to resume at a later time.

☐ Continue (1)

☐ Save progress and continue later (2)

Display This Question:

If This following part requires that you are in a quiet place where you will not be interrupted. You... = Save progress and continue later

Q3.99 Thank you so much for your time. Remember you have one week to complete the exercise. Use the same link on the email you received from us to log in and resume your online questionnaire at a later time. Exit the survey by closing this window. Have a nice day!

Page Break

Q3.1a Raising children with anxiety can be difficult. Not everyone struggles with their child’s anxiety the same way. We are interested in learning about your experience of your child’s anxiety.

For the next five to seven minutes, we would like you to write about a recent, perhaps challenging situation where your child struggled with anxiety and how it impacted you. Feel free to expand in terms of how your child's anxiety impacts you, your family, or your experience of being a parent more broadly.

Your writing will be confidential. Don’t worry about spelling, sentence structure, or grammar.

The only rule is that once you begin writing, continue to do so for five to seven minutes.

An arrow on the lower right side will appear after five minutes have passed. Click on it to proceed to the next section when you have finished. Otherwise, you will proceed to the next section automatically once the seven minutes are over. First, take a moment now to think about a recent situation you want to write about, then click on the arrow to the right to begin writing.

Page Break

Q3.1b Write for five to seven minutes about a recent, perhaps challenging situation where your child struggled with anxiety and how it impacted you. Feel free to expand in terms of how your child's anxiety impacts you, your family, or your experience of being a parent more broadly. Your writing will be confidential. Don’t worry about spelling, sentence structure, or

grammar. The only rule is that once you begin writing, continue to do so for five to seven minutes. An arrow on the lower right side will appear after five minutes have passed. Click on it to proceed to the next section when you have finished. Otherwise, you will proceed to the next section automatically once the seven minutes are over (*Once you have proceeded to the next window, please do not hit the left arrow because you will be asked to write again for five to seven minutes*).

Q3.1c Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

Display This Question:

If If Write for five to seven minutes about a recent, perhaps challenging situation where your child struggled with anxiety and how it impacted you. Feel free to expand in terms of how your child's anxie... Text Response Is Empty

Q3.1.99 It seems like you left the text box empty. In order to continue with the eligibility screening, it is necessary you complete the five to seven-minute writing sample. Remember you can choose to not answer any question you don't want to answer. If you choose to not complete the writing sample, that's fine, but it means we cannot proceed with the study. To go back and complete the writing sample, click on the left arrow below. To exit this survey click on the right arrow.

Display This Question:

If It seems like you left the text box empty. In order to continue with the eligibility screening, i... Is Displayed

Q3.1.99.1 Thank you so much for our time and for providing us with this information. Based on your responses, unfortunately we do not have enough information to proceed with the in-person study. We do appreciate your time and interest. Would you like to be contacted in the future to receive information about potential studies in which you may participate?

☐ Yes (1)

☐ No (2)

Display This Question:

If Thank you so much for our time and for providing us with this information. Based on your response... = No

Q3.1.99.1a That's ok. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu. Thank you again for your time and interest. Have a nice day.

Skip To: End of Survey If That's ok. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerive...() Is Displayed

Display This Question:

If Thank you so much for our time and for providing us with this information. Based on your response... = Yes

Q3.1.99.1b Ok, we will keep your contact information in case we conduct a new study. Thank you for your time and interest. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu. Have a nice day.

Skip To: End of Survey If Ok, we will keep your contact information in case we conduct a new study. Thank you for your time...() Is Displayed

Page Break



Q3.2

You are almost done. Please take your time to connect with each question and answer in the

space provided. For each question please try to answer with just one word (*for example, lonely, afraid, impairs, fidgety*). We know that could be difficult, so if you can't answer with just one word, use a two-word phrase (*for example, nail biting, skin picking*).

Please do not repeat the same word or phrase. If the answer to a question is a word you have already used, please think of something else.

☐ 1. What is the name or nickname of your child who struggles with anxiety? (the name or nickname you use when you think of him/her) (1)

☐ 2. What is one (or two) word(s) that best describe(s) how your child shows his/her anxiety? (2) _____

☐ 3. In one (or two) word(s), what is one concerning thing your child does when struggling with anxiety? (3) _____

☐ 4. What is one (or two) word(s) that best describe(s) how your child is feeling when she/he is struggling the most with anxiety? (4)

☐ 5. If you had the power to take away something of your child's anxiety, in one (or two) word(s), what would you take away to help ease his/her struggle? (5)

☐ 6. In one (or two) word(s), what do you fear the most about how anxiety affects your child in his/her daily life? (6) _____

☐ 7. If your child were to struggle with this anxiety for the rest of her/his life, what is one (or two) word(s) that describe(s) your fears or concerns? (7)

☐ 8. In one (or two) word(s), tell me what your child's anxiety means to you? (8)

Display This Question:

If If You are almost done. Please take your time to connect with each question and answer in the space provided. For each question please try to answer with just one word (for example, lonely, afraid, im... <nobr>1. What is the name or nickname of your child who struggles with anxiety?</nobr> (the name or nickname you use when you think of him/her) Is Empty

Or You are almost done. Please take your time to connect with each question and answer in the space provided. For each question please try to answer with just one word (for example,

lonely, afraid, im... 2. What is one (or two) word(s) that best describe(s) how your child shows his/her anxiety? Is Empty

Or You are almost done. Please take your time to connect with each question and answer in the space provided. For each question please try to answer with just one word (for example, lonely, afraid, im... 3. In one (or two) word(s), what is one concerning thing your child does when struggling with anxiety? Is Empty

Or You are almost done. Please take your time to connect with each question and answer in the space provided. For each question please try to answer with just one word (for example, lonely, afraid, im... 4. What is one (or two) word(s) that best describe(s) how your child is feeling when she/he is struggling the most with anxiety? Is Empty

Or You are almost done. Please take your time to connect with each question and answer in the space provided. For each question please try to answer with just one word (for example, lonely, afraid, im... 5. If you had the power to take away something of your child's anxiety, in one (or two) word(s), what would you take away to help ease his/her struggle? Is Empty

Or You are almost done. Please take your time to connect with each question and answer in the space provided. For each question please try to answer with just one word (for example, lonely, afraid, im... 6. In one (or two) word(s), what do you fear the most about how anxiety affects your child in his/her daily life? Is Empty

Or You are almost done. Please take your time to connect with each question and answer in the space provided. For each question please try to answer with just one word (for example, lonely, afraid, im... 7. If your child were to struggle with this anxiety for the rest of her/his life, what is one (or two) word(s) that describe(s) your fears or concerns? Is Empty

Or You are almost done. Please take your time to connect with each question and answer in the space provided. For each question please try to answer with just one word (for example, lonely, afraid, im... 8. In one (or two) word(s), tell me what your child's anxiety means to you? Is Empty

Q3.2.99 It seems you left at least one question without answering. While this is totally fine, it also means that we do not have enough information to proceed with the in-person study. If you think you skipped any question(s) by mistake, you can go back by clicking on the lower left arrow. Otherwise, click the lower right arrow to exit the interview.

Display This Question:

If It seems you left at least one question without answering. While this is totally fine, it also means we do not have enough information to proceed with the in-person study. Is Displayed

Q3.2.99.1 Thank you so much for your time and for providing us with this information. Based on your responses, unfortunately we do not have enough information to proceed with the in-person

study. We do appreciate your time and interest. Would you like to be contacted in the future to receive information about potential studies in which you may participate?

☐ Yes (1)

☐ No (2)

Display This Question:

If Thank you so much for your time and for providing us with this information. Based on your respons... = No

Q3.2.99.1a That's ok. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu. Thank you again for your time and interest. Have a nice day.

Skip To: End of Survey If That's ok. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerive...() Is Displayed

Display This Question:

If Thank you so much for your time and for providing us with this information. Based on your respons... = Yes

Q3.2.99.1b Ok, we will keep your contact information in case we conduct a new study. Thank you for your time and interest. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu. Have a nice day.

Skip To: End of Survey If Ok, we will keep your contact information in case we conduct a new study. Thank you for your time...() Is Displayed

Page Break



Q3.3 Letting all of these worries fall away, take a moment to connect with the love you have for your child, and think about all the ways in which you care for him/her. Imagine having a profound influence in helping your child have the life he/she loves.

Try to answer each question with just one word (*for example, loving*). If you cannot answer with just one word, use a two-word phrase (*for example, being present*).

Please do not repeat the same word or phrase. If the answer to a question is a word or phrase you have already used, please think of something else.

- ☐ What is one (or two) word(s) that ultimately describe(s) what kind of mother you want your child to remember you as for the rest of her/his life? (1)

- ☐ Using only one (or two) word(s) per answer, how would you like for your child to remember you or the role you played in his/her childhood? Write nine words you want him/her to use to describe you (*for example, loving, understanding*). Word 1: (2)

- ☐ Word 2: (3) _____

- ☐ Word 3: (4) _____

- ☐ Word 4: (5) _____

- ☐ Word 5: (6) _____

- ☐ Word 6: (7) _____

- ☐ Word 7: (8) _____

- ☐ Word 8: (9) _____

- ☐ Word 9: (10) _____

Display This Question:

If Letting all of these worries fall away, take a moment to connect with the love you have for your child, and think about all the ways in which you care for him/her. Imagine having a profound influen... <nobr>What is one (or two) word(s) that ultimately describe(s) what</nobr> kind of mother you want your child to remember you as for the rest of her/his life? Is Empty

Or Letting all of these worries fall away, take a moment to connect with the love you have for your child, and think about all the ways in which you care for him/her. Imagine having a profound influen... Using only one (or two) word(s) per answer, how would you like for your child to remember you or the role you played in his/her childhood? Write nine words you want

him/her to use to describe you (*for example, loving, understanding*). Word 1: Is Empty

Or Letting all of these worries fall away, take a moment to connect with the love you have for your child, and think about all the ways in which you care for him/her. Imagine having a profound influen... Word 2: Is Empty

Or Letting all of these worries fall away, take a moment to connect with the love you have for your child, and think about all the ways in which you care for him/her. Imagine having a profound influen... Word 3: Is Empty

Or Letting all of these worries fall away, take a moment to connect with the love you have for your child, and think about all the ways in which you care for him/her. Imagine having a profound influen... Word 4: Is Empty

Or Letting all of these worries fall away, take a moment to connect with the love you have for your child, and think about all the ways in which you care for him/her. Imagine having a profound influen... Word 5: Is Empty

Or Letting all of these worries fall away, take a moment to connect with the love you have for your child, and think about all the ways in which you care for him/her. Imagine having a profound influen... Word 6: Is Empty

Or Letting all of these worries fall away, take a moment to connect with the love you have for your child, and think about all the ways in which you care for him/her. Imagine having a profound influen... Word 7: Is Empty

Or Letting all of these worries fall away, take a moment to connect with the love you have for your child, and think about all the ways in which you care for him/her. Imagine having a profound influen... Word 8: Is Empty

Or Letting all of these worries fall away, take a moment to connect with the love you have for your child, and think about all the ways in which you care for him/her. Imagine having a profound influen... Word 9: Is Empty

Q3.3.99 It seems you left at least one question without answering. While this is totally fine, it also means that we do not have enough information to proceed with the in-person study. If you think you skipped any question(s) by mistake, you can go back by clicking on the lower left arrow. Otherwise, click the lower right arrow to exit the interview.

Display This Question:

If It seems you left at least one question without answering. While this is totally fine, it also me... Is Displayed

Q3.3.99.1 Thank you so much for your time and for providing us with this information. Based on your responses, unfortunately we do not have enough information to proceed with the in-person

study. We do appreciate your time and interest. Would you like to be contacted in the future to receive information about potential studies in which you may participate?

☐ Yes (1)

☐ No (2)

Display This Question:

If Thank you so much for your time and for providing us with this information. Based on your respons... = No

Q3.3.99.1a That's ok. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu. Thank you again for your time and interest. Have a nice day.

Skip To: End of Survey If That's ok. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerive...() Is Displayed

Display This Question:

If Thank you so much for your time and for providing us with this information. Based on your respons... = Yes

Q3.3.99.1b Ok, we will keep your contact information in case we conduct a new study. Thank you for your time and interest. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu. Have a nice day.

Skip To: End of Survey If Ok, we will keep your contact information in case we conduct a new study. Thank you for your time...() Is Displayed

Page Break



Q3.4 Please write the name of six random household objects that have no particular emotional value to you; anything you see that has no positive or negative meaning for you, and that you can describe with one or two words each (*for example, lamp, couch, water filter, light bulb*).

☐ Word 1: (1) _____

☐ Word 2: (2) _____

☐ Word 3: (3) _____

☐ Word 4: (4) _____

☐ Word 5: (5) _____

☐ Word 6: (6) _____

Display This Question:

If If Please write the name of six random household objects that have no particular emotional value to you; anything you see that has no positive or negative meaning for you, and that you can describe wi... Word 1: Is Empty

Or Please write the name of six random household objects that have no particular emotional value to you; anything you see that has no positive or negative meaning for you, and that you can describe wi... Word 2: Is Empty

Or Please write the name of six random household objects that have no particular emotional value to you; anything you see that has no positive or negative meaning for you, and that you can describe wi... Word 3: Is Empty

Or Please write the name of six random household objects that have no particular emotional value to you; anything you see that has no positive or negative meaning for you, and that you can describe wi... Word 4: Is Empty

Or Please write the name of six random household objects that have no particular emotional value to you; anything you see that has no positive or negative meaning for you, and that you can describe wi... Word 5: Is Empty

Or Please write the name of six random household objects that have no particular emotional value to you; anything you see that has no positive or negative meaning for you, and that you can describe wi... Word 6: Is Empty

Q3.4.99 It seems you left at least one question without answering. While this is totally fine, it also means that we do not have enough information to proceed with the in-person study. If you think you skipped any question(s) by mistake, you can go back by clicking on the lower left arrow. Otherwise, click the lower right arrow to exit the interview.

Display This Question:

If It seems you left at least one question without answering. While this is totally fine, it also me... Is Displayed

Q3.4.99.1 Thank you so much for your time and for providing us with this information. Based on your responses, unfortunately we do not have enough information to proceed with the in-person study. We do appreciate your time and interest. Would you like to be contacted in the future to receive information about potential studies in which you may participate?

☐ Yes (1)

☐ No (2)

Display This Question:

If Thank you so much for your time and for providing us with this information. Based on your respons... = No

Q3.4.99.1a That's ok. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu. Thank you again for your time and interest. Have a nice day.

Skip To: End of Survey If That's ok. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerive...() Is Displayed

Display This Question:

If Thank you so much for your time and for providing us with this information. Based on your respons... = Yes

Q3.4.99.1b Ok, we will keep your contact information in case we conduct a new study. Thank you for your time and interest. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu. Have a nice day.

Skip To: End of Survey If Ok, we will keep your contact information in case we conduct a new study. Thank you for your time...() Is Displayed

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Q3.5 In each space, please write things that are associated with happiness for you. It could be types of food, activities, or anything you enjoy that brings you happiness. Use one or two words per answer without repeating (*for example, concerts, visiting friends, traveling, pizza, Netflix, etc*).

- ☐ Word 1: (1) _____
- ☐ Word 2: (2) _____
- ☐ Word 3: (3) _____
- ☐ Word 4: (4) _____
- ☐ Word 5: (5) _____
- ☐ Word 6: (6) _____

Display This Question:

If In each space, please write things that are associated with happiness for you. It could be types... Word 1: Is Empty

Or In each space, please write things that are associated with happiness for you. It could be types... Word 2: Is Empty

Or In each space, please write things that are associated with happiness for you. It could be types... Word 3: Is Empty

Or In each space, please write things that are associated with happiness for you. It could be types... Word 4: Is Empty

Or In each space, please write things that are associated with happiness for you. It could be types... Word 5: Is Empty

Or In each space, please write things that are associated with happiness for you. It could be types... Word 6: Is Empty

Q3.5.99 It seems you left at least one question without answering. While this is totally fine, it also means that we do not have enough information to proceed with the in-person study. If you think you skipped any question(s) by mistake, you can go back by clicking on the lower left arrow. Otherwise, click the lower right arrow to exit the interview.

Display This Question:

If It seems you left at least one question without answering. While this is totally fine, it also me... Is Displayed

Q3.5.99.1 Thank you so much for your time and for providing us with this information. Based on your responses, unfortunately we do not have enough information to proceed with the in-person study. We do appreciate your time and interest. Would you like to be contacted in the future to receive information about potential studies in which you may participate?

☐ Yes (1)

☐ No (2)

Display This Question:

If Thank you so much for your time and for providing us with this information. Based on your respons... = No

Q3.5.99.1a That's ok. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu. Thank you again for your time and interest. Have a nice day.

Skip To: End of Survey If That's ok. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerive...() Is Displayed

Display This Question:

If Thank you so much for your time and for providing us with this information. Based on your respons... = Yes

Q3.5.99.1b Ok, we will keep your contact information in case we conduct a new study. Thank you for your time and interest. If you have any questions, you can contact us, Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu. Have a nice day.

Skip To: End of Survey If Ok, we will keep your contact information in case we conduct a new study. Thank you for your time...() Is Displayed

Page Break

Q4 This is the end of the online procedures. Thank you so much for your time! Co-investigator Carlos Rivera will contact you shortly to schedule an in-person meeting to participate in the study. If you have questions in the meantime, please contact him at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu.

And if you know of any mothers of anxious children ages 6 to 18 who you think would be interested in participating, please give them our information.

Thanks again and have a nice day!

End of Block: Introduction to online procedures

Appendix F: Reminder email message to complete online procedures

Email reminder to complete preliminary online procedures

Dear Participant,

Thank you for your interest in SPARK (the Study of Parenting, Anxiety, and Raising Kids). This is a reminder to complete the preliminary online procedure so that we can schedule a time to complete the study. Please let us know if you have any questions. You can contact Carlos Rivera M.S., at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu.

Thank you,

Follow this link to the Survey:

[Take the Survey](#)

Or copy and paste the URL below into your internet browser:

https://suffolk.co1.qualtrics.com/jfe/form/SV_bjAIM3OCIIWfV5j?Q_DL=4SgIJrb4TWscM5_bjAIM3OCIIWfV5j_MLRP_1TUwsBWChVtxEln&Q_CHL=email

Follow the link to opt out of future emails:

[Click here to unsubscribe](#)

Appendix G: Script to schedule meeting

Participant ID# _____

Script to schedule meeting (after completing online questionnaires)

Date of call-in: _____ Today's date: _____

Good morning/afternoon/evening, may I speak with (name of potential participant).

If potential participant is NOT available:

Do you know when is a good time to reach her? (get information and call back later). Thank you, I will call her back at the time you suggested. Have a nice day/afternoon/evening.

Best day and time to call _____ (call back)

If potential participant is available:

Hello (name of potential participant). This is Carlos Rivera, calling from SPARK, the study on parenting, anxiety and raising kids. I see that you completed the online procedures. Thanks a lot. I am calling to schedule a date and time we can meet to complete the study. Do you have time to schedule it now?

No _____ Yes _____

If no:

When is a good time to call back when you can have about 5 minutes to talk? (set up phone call appointment). I will call you on **[date and time]**. Thank you and have a nice rest of your day.

If yes:

Great. The study is done either at Suffolk University or at your home if you cannot come to Suffolk University. If we meet at your home, we would need to do the study in a quiet place. During this visit, you will be asked to complete three computer tasks where you will be asked to match different words and symbols. You will also be asked to complete some questionnaires about you and your child. Approximately, this visit will last 90 minutes. There will be breaks in between exercises for you to use the bathroom or your phone if necessary, but to minimize distractions, we ask that you silence your phone and don't use it while you are in the middle of the computer exercises. At the end of your participation, you will receive cash or an Amazon gift card for \$50 as compensation for your time and participation.

Do you have any questions?

No _____ Yes _____

If yes: (answer questions and continue).

If no: (continue).

Great. Would you like to meet at Suffolk University or at your home?

Suffolk University _____ Home _____

Participant ID# _____

If at home: (confirm home address given during initial conversation; keep information separate)

If at Suffolk University:

We are located at 73 Tremont street in Boston, MA. The zip code is 02116. We are close to T stops from every train. Street parking may be available, but their limit is 2 hours. There are also parking garages, but they are usually over \$25.

Do you want me to help you with directions on how to get to Suffolk University?

No _____ Yes _____

If no: (continue)

If yes: (ask where she is coming from and use google maps to find a route and share with participant).

When is a good date and time for you to meet? [Make appointments].

And would you like to receive the \$50 compensation in cash or as an Amazon gift card?

Cash _____ Amazon gift card _____

Ok, I have you for [day and time] for you to come to Suffolk University/ us to meet at your home. Please allow time to find parking and our office. If you have trouble finding the place, you can give me a call. If you have questions or need to reschedule, please contact us as soon as you know you need to reschedule. You can contact me, Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or my supervisor, Michael Suvak at msuvak@suffolk.edu. Thank you again for your time and interest. Have a nice day.

Appendix H: Informed consent



INFORMED CONSENT TO PARTICIPATE IN RESEARCH

Hello and welcome to SPARK, the Study on Parenting, Anxiety, and Raising Kids! This is a study for mothers of children ages 6 to 18 who struggle with anxiety. Please read the information below carefully. If you have any questions, you can contact co-investigators Carlos Rivera at 617-863-7275 or cerivera@suffolk.edu, or Dr. Michael Suvak at msuvak@suffolk.edu. If you decide that you would like to participate in this research study, you will be asked to sign this document and you will be given a copy.

TITLE OF RESEARCH STUDY: Study on Parenting, Anxiety, and Raising Kids (SPARK)

PRINCIPAL INVESTIGATOR: *Michael Suvak, Ph.D., Psychology Department, Suffolk University*

CO-INVESTIGATOR: *Lisa Coyne, Ph.D., Harvard Medical School, Carlos E. Rivera, M.S., Psychology Department, Suffolk University*

PURPOSE OF RESEARCH: You are being invited to participate in this study because you are the mother of a 6 to 18-year-old child who struggles with anxiety. The purpose of this study is to learn more about how mothers think and feel about their children's emotions. Our goal is to learn more about this so that we can help mothers and their children deal with their emotions in more effective ways.

RESEARCH PROCEDURES: If you decide to volunteer for this study, you will complete a screening procedure that takes about 20 minutes. You will be asked to write about a situation you had with your child and tell us a bit about how you experience your child's anxiety. The information you provide will help us determine your eligibility for the study. If you are eligible, co-investigator Carlos Rivera will schedule a time to meet with you, either at Suffolk University or at your home to complete some computer tasks and questionnaires. The in-person part of the study will take approximately 90 minutes.

RISK AND/OR DISCOMFORTS: We do not foresee any significant risks associated with completing the study. You may experience some boredom in completing the computer tasks. We will also ask you questions about your child's anxiety and parenting situations. You can choose to not answer questions if you are not comfortable with them. If you do experience any discomfort with any part of the study that we have not anticipated or described, please let the investigators know.

BENEFITS: There are no direct benefits to you from being in this study. However, it is possible that others may benefit from it. What we learn about mothers' thoughts and feelings about their children's anxiety may help us to better assist mothers raising children with anxiety. Your participation will help the investigators learn more about how mothers make sense of and relate to their children's anxiety.

ALTERNATIVES: Participation in this study is voluntary, and you can choose to not participate. Remember, you have the option of withdrawing from the study at any time without consequences.

PRIVACY AND CONFIDENTIALITY: We will do our best to protect your privacy during this study. No measures (including the demographic questionnaire) will include questions that ask for any identifying information. Information from this study (i.e., questionnaires) will be stored on a secure computer database and identified by a code number only. The code number connecting your name to specific information will be kept in a separate, secure location. Five years after this information is no longer being used for research purposes, it will be stored in the principal investigator's lab space. Only the principle investigator, co-investigator, and research assistants working on this project will have access to this data.



All of your information will remain confidential. However, investigators and research assistants are mandated reporters, and so are required by law to report situations of possible abuse or neglect. If your answers reveal that you may be at risk for harming yourself or others, or if you report ongoing abuse of a minor or a disabled person, the researchers may be required to report this information to a local or state agency to ensure the safety of those involved.

If any of the results of the study are published or presented in a research meeting or conference, they will not contain your name or any identifying information. The information collected will become part of the laboratory's database. Information without your name may be used with information from future studies within the lab.

COMPENSATION: To compensate you for the time you spend during the in-person study, we will give you \$50 either in cash or as an Amazon gift card when you complete the study. You always have the option to withdraw from this study once it has started. If that is the case, you will still be given the \$50 compensation. There is no compensation for this online portion of the study.

VOLUNTARY NATURE OF PARTICIPATION/ RIGHT TO WITHDRAW: Participating in this study is voluntary. You have the right to refuse to participate. If you decide to participate, you may withdraw your consent at any time, and any information collected from you will be destroyed if you wish. The investigator may also determine that it is in your best interest to discontinue your participation at any time. Your withdrawal will not result in any penalty or loss of benefits and/or services that you might be entitled to receive.

CONTACT INFORMATION: We are happy to answer any questions you have about the study now or later. If you want to contact the researchers, you may call:

Michael Suvak, Ph.D.
(617) 994-6869
msuvak@suffolk.edu

Carlos Rivera, M.S.
(617) 863-7275
cerivera@suffolk.edu

Lisa Coyne
(774) 419-1161
lcoyne@partners.org

If you have any questions about your rights as a volunteer in this research study, you can call Suffolk University's Institutional Review Board (IRB). The IRB is a group of people who ensure the rights and welfare of research participants are protected. You can call or email them at (617) 557-2006 or irb@suffolk.edu.

CONSENT: I have read the information in this document and I am aware of the risks and benefits involved. I have been given a chance to ask questions and enough time to decide whether to participate. By signing below, I am voluntarily agreeing to participate in this research study.

Signature of Participant

Date

Printed Name of Participant

Signature of Person Obtaining Consent

Printed Name of Person Obtaining Consent

IRB APPROVAL
STAMP
HERE

Appendix I: Contextualization task

Participant ID# _____

For the next two minutes, bring to mind a recent challenging situation where your child struggled with anxiety and how it impacted you. It could be the same situation you wrote about when you completed the online survey, or it could be another difficult experience. You can close your eyes if that helps you too. Where were you? What time of day was it? What was your child doing? See if you can call to mind your child, their face. Notice their anxiety and the emotions in their face. Notice your feelings and reactions. Connect with those memories, thoughts, and feelings until the time is up.

Let the investigator know when you are ready to begin so he can set up the timer.

Appendix J: Word and symbol ratings form

Note: Word ratings conducted before and after experimental tasks; symbol ratings conducted after experimental tasks.

Participant ID# _____

Please rate each of the following words, phrases, and symbols in the list using these 5-point rating scales.

How pleasant or unpleasant do you find each word, phrase, or symbol?

| | | | | |
|----------|----------|------------|------------|------------|
| 1 | 2 | 3 | 4 | 5 |
| very | pleasant | neither | unpleasant | very |
| pleasant | | pleasant | | unpleasant |
| | | nor | | |
| | | unpleasant | | |

Child anxiety word _____ Neutral word _____ Pleasant word _____

Child anxiety word _____ Neutral word _____ Pleasant word _____

Child anxiety word _____ Neutral word _____ Pleasant word _____

Child anxiety word _____ Neutral word _____ Pleasant word _____

Child anxiety word _____ Neutral word _____ Pleasant word _____

Child anxiety word _____ Neutral word _____ Pleasant word _____

Valued parenting word _____ Valued parenting word _____ Valued parenting word _____

Valued parenting word _____ Valued parenting word _____ Valued parenting word _____

Valued parenting word _____ Valued parenting word _____ Valued parenting word _____

Valued parenting word _____

Participant ID# _____

How pleasant or unpleasant do you find each word, phrase, or symbol?

1
very
pleasant

2
pleasant

3
neither
pleasant
nor
unpleasant

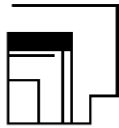
4
unpleasant

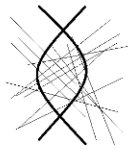
5
very
unpleasant



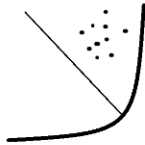






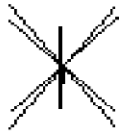


















Participant ID# _____

Please rate each of the following words, phrases, and symbols in the list using these 5-point rating scales.

When you think about each symbol, word, or phrase, how strongly do you need to avoid it (or the feelings that go with it)?

| 1 | 2 | 3 | 4 | 5 |
|------------------------|---|------------------------------|---|---------------------------|
| no need to avoid | | moderate need to avoid | | great need to avoid |

| | | |
|--------------------------|--------------------|---------------------|
| Child anxiety word _____ | Neutral word _____ | Pleasant word _____ |
|--------------------------|--------------------|---------------------|

| | | |
|--------------------------|--------------------|---------------------|
| Child anxiety word _____ | Neutral word _____ | Pleasant word _____ |
|--------------------------|--------------------|---------------------|

| | | |
|--------------------------|--------------------|---------------------|
| Child anxiety word _____ | Neutral word _____ | Pleasant word _____ |
|--------------------------|--------------------|---------------------|

| | | |
|--------------------------|--------------------|---------------------|
| Child anxiety word _____ | Neutral word _____ | Pleasant word _____ |
|--------------------------|--------------------|---------------------|

| | | |
|--------------------------|--------------------|---------------------|
| Child anxiety word _____ | Neutral word _____ | Pleasant word _____ |
|--------------------------|--------------------|---------------------|

| | | |
|--------------------------|--------------------|---------------------|
| Child anxiety word _____ | Neutral word _____ | Pleasant word _____ |
|--------------------------|--------------------|---------------------|

| | | |
|-----------------------------|-----------------------------|-----------------------------|
| Valued parenting word _____ | Valued parenting word _____ | Valued parenting word _____ |
|-----------------------------|-----------------------------|-----------------------------|

| | | |
|-----------------------------|-----------------------------|-----------------------------|
| Valued parenting word _____ | Valued parenting word _____ | Valued parenting word _____ |
|-----------------------------|-----------------------------|-----------------------------|

| | | |
|-----------------------------|-----------------------------|-----------------------------|
| Valued parenting word _____ | Valued parenting word _____ | Valued parenting word _____ |
|-----------------------------|-----------------------------|-----------------------------|

Valued parenting word _____

Participant ID# _____

**When you think about each symbol, word, or phrase, how strongly do you need to avoid it
(or the feelings that go with it)?**

1
no need
to
avoid

2

3
moderate
need to
avoid

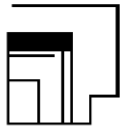
4

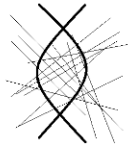
5
great need
to
avoid





















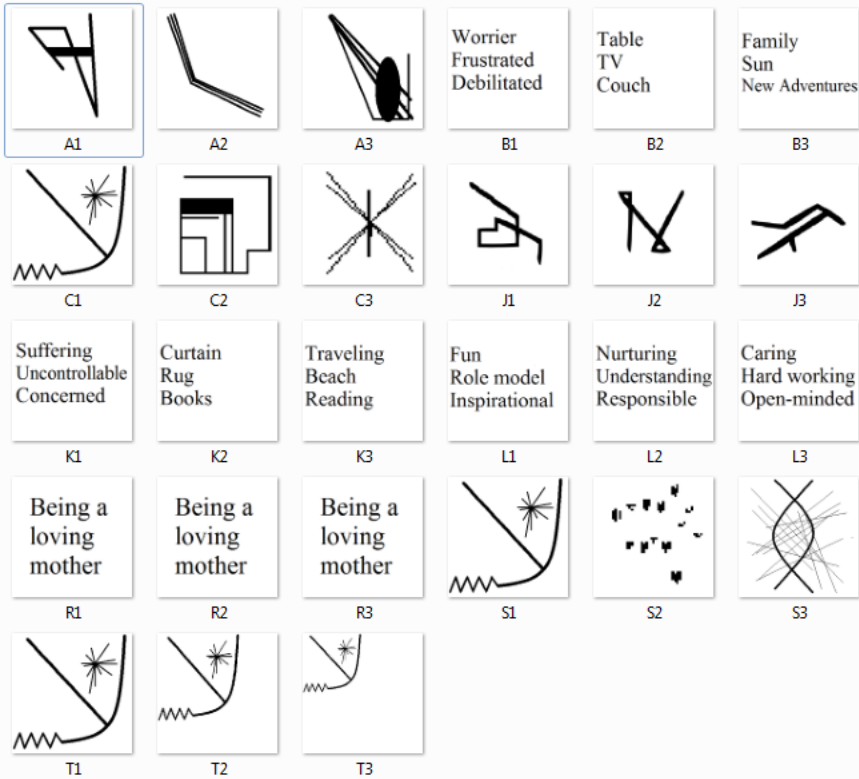




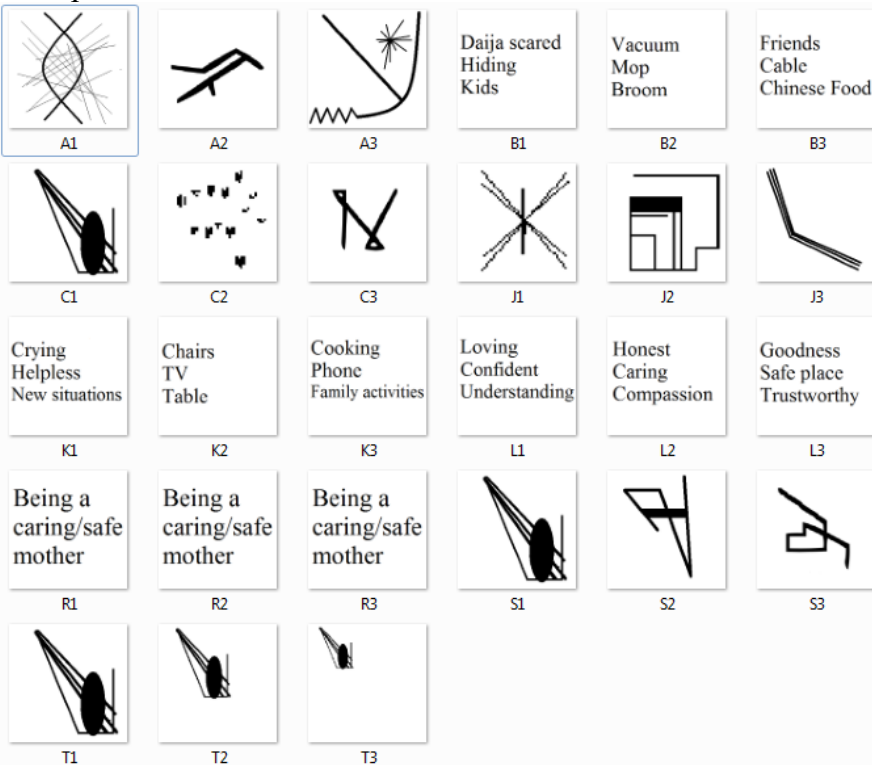


Appendix K: Personalized stimuli for MTS tasks per participant

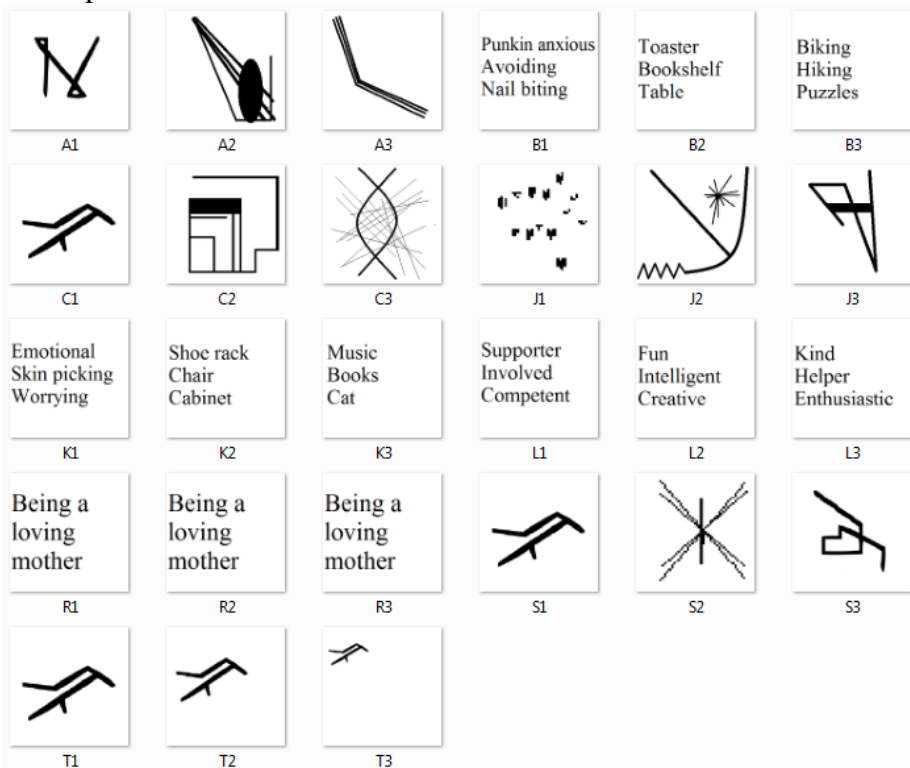
Participant 1



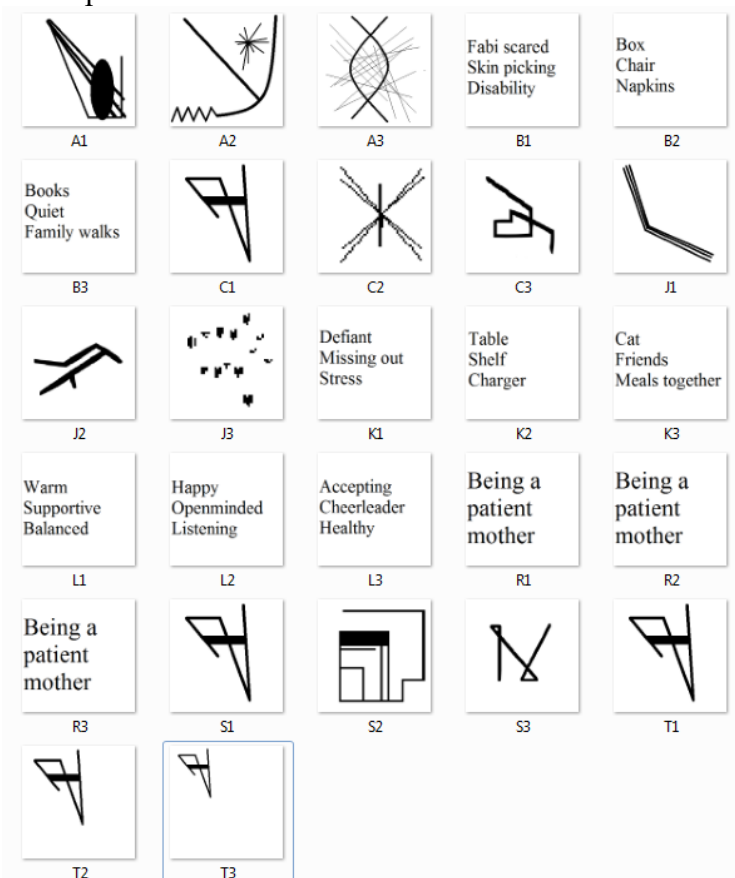
Participant 2



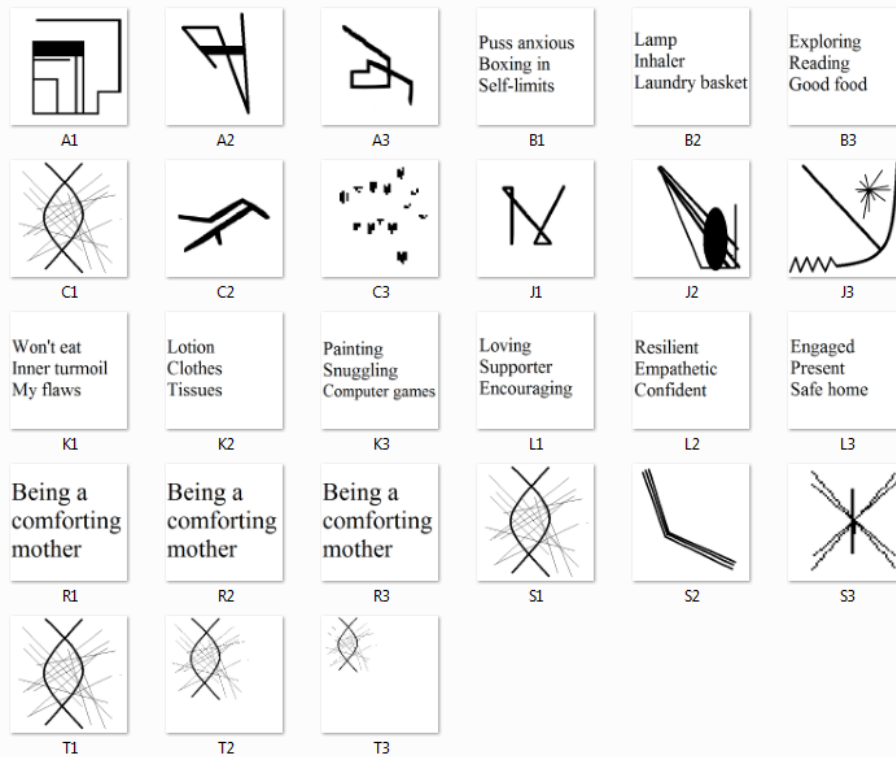
Participant 3



Participant 4



Participant 5



Appendix L: Demographic Questionnaire

Participant ID# _____

Demographic Questionnaire

1. What is your gender (please circle)?.....**Female Male Other**_____

2. What is your marital status (please circle)?.....

Single Married Separated Divorced Widowed Other_____

3. What is the highest level of education or grade that you completed (please circle)?

Less than 7th grade Junior high Some high school High school graduate/GED

Some college Associates degree 4-year college graduate Graduate school

4. What is your current income range per year (please circle)?.....**Less than \$15,000**

\$15,000-\$30,000 \$30,000-\$50,000 \$50,000-\$75,000 More than \$75,000

5. At what age do you first become a parent (please circle)?.....

Younger than 15 15-18 18-21 21-30 Older than 30

6. How old are you now? _____

7. How many children do you have? _____

8. List age(s) and gender of child(ren) _____

9. Which one(s) of your children struggles with anxiety or related disorders and which diagnosis do they have if any?

10. Do you struggle with anxiety or a related problems yourself? _____

Participant ID# _____

11. Have you ever been diagnosed with or treated for anxiety or a related disorder? _____

12. How many people do you have to count on when you need social support? _____

13. How did you hear about our study? _____

Appendix M: Brief Experiential Avoidance Questionnaire (BEAQ)

Participant ID# _____

BEAQ

Please indicate the extent to which you agree or disagree with each of the following statements

| | 1 | 2 | 3 | 4 | 5 | 6 |
|--|----------------------|------------------------|----------------------|-------------------|---------------------|-------------------|
| | strongly disagree | moderately disagree | slightly disagree | slightly agree | moderately agree | strongly agree |
| 1. The key to a good life is never feeling any pain | 1 | 2 | 3 | 4 | 5 | 6 |
| 2. I'm quick to leave any situation that makes me feel uneasy | 1 | 2 | 3 | 4 | 5 | 6 |
| 3. When unpleasant memories come to me, I try to put them out of my mind | 1 | 2 | 3 | 4 | 5 | 6 |
| 4. I feel disconnected from my emotions | 1 | 2 | 3 | 4 | 5 | 6 |
| 5. I won't do something until I absolutely have to | 1 | 2 | 3 | 4 | 5 | 6 |
| 6. Fear or anxiety won't stop me from doing something important | 1 | 2 | 3 | 4 | 5 | 6 |
| 7. I would give up a lot not to feel bad | 1 | 2 | 3 | 4 | 5 | 6 |
| 8. I rarely do something if there is a chance that it will upset me | 1 | 2 | 3 | 4 | 5 | 6 |
| 9. It's hard for me to know what I'm feeling | 1 | 2 | 3 | 4 | 5 | 6 |
| 10. I try to put off unpleasant tasks for as long as possible | 1 | 2 | 3 | 4 | 5 | 6 |
| 11. I go out of my way to avoid uncomfortable situations | 1 | 2 | 3 | 4 | 5 | 6 |
| 12. One of my big goals is to be free from painful emotions | 1 | 2 | 3 | 4 | 5 | 6 |
| 13. I work hard to keep out upsetting feelings | 1 | 2 | 3 | 4 | 5 | 6 |
| 14. If I have any doubts about doing something, I just won't do it | 1 | 2 | 3 | 4 | 5 | 6 |
| 15. Pain always leads to suffering | 1 | 2 | 3 | 4 | 5 | 6 |

Appendix N: Cognitive Fusion Questionnaire (CFQ)

Participant ID# _____

CFQ

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|------------------|-------------|----------------|-----------------|--------------------|-------------|
| never true | very seldom true | seldom true | sometimes true | frequently true | almost always true | always true |
| 1. My thoughts cause me distress or emotional pain | | | | 1 | 2 | 3 4 5 6 7 |
| 2. I get so caught up in my thoughts that I am unable to do the things that I most want to do | | | | 1 | 2 | 3 4 5 6 7 |
| 3. I over-analyse situations to the point where it's unhelpful to me | | | | 1 | 2 | 3 4 5 6 7 |
| 4. I struggle with my thoughts | | | | 1 | 2 | 3 4 5 6 7 |
| 5. I get upset with myself for having certain thoughts | | | | 1 | 2 | 3 4 5 6 7 |
| 6. I tend to get very entangled in my thoughts | | | | 1 | 2 | 3 4 5 6 7 |
| 7. It's such a struggle to let go of upsetting thoughts even when I know that letting go would be helpful | | | | 1 | 2 | 3 4 5 6 7 |

Thank you for completing this questionnaire

Appendix O: Parental Acceptance and Action Questionnaire (PAAQ)

Participant ID# _____

PAAQ

Below you will find a list of statements. Please rate the truth of each statement as it applies to you. Use the following scale to make your choices.

- | | | | | | | |
|------------|-------------|-------------|-----------|------------|---------------|-------------|
| 1----- | 2----- | 3----- | 4----- | 5----- | 6----- | 7 |
| Never True | Very Seldom | Seldom True | Sometimes | Frequently | Almost Always | Always True |
| | True | | True | True | True | |
-
- _____ 1. I am able to take action about my child's fears, worries, and feelings even if I am uncertain what is the right thing to do.
 - _____ 2. When I feel depressed or anxious, I am unable to help my child manage their fears, worries, or feelings.
 - _____ 3. I try to suppress thoughts and feelings about my child that I don't like by just not thinking about them.
 - _____ 4. It's OK for my child to feel depressed or anxious.
 - _____ 5. I rarely worry about getting my child's anxieties, worries, and feelings under control.
 - _____ 6. In order for my child to do something important, I have to have all my doubts about it worked out.
 - _____ 7. I'm not afraid of my child's feelings.
 - _____ 8. I try hard to avoid having my child feel depressed or anxious.
 - _____ 9. It is bad if my child feels anxious.
 - _____ 10. Despite my doubts, I feel as though I can set a plan for managing my child's feelings.
 - _____ 11. If I could magically remove all the painful experiences my child has had in his or her life, I would do so.
 - _____ 12. If I get frustrated with my child, then I can still help him or her.
 - _____ 13. Worries can get in the way of my child's success.
 - _____ 14. I often catch myself daydreaming about things I've done with my child and what I would do differently next time.
 - _____ 15. When I compare myself to other parents, it seems that most of them are handling their lives better than I do.

Appendix P: Compensation receipt

Participant ID# _____

Compensation receipt

I attest that I have been given compensation for the participation in this study.

Please mark which type of compensation you received:

Cash

Amazon gift card

Signature of participant: _____

Today's Date: _____

Appendix Q: Checklist and time stamp form

Participant ID# _____

Checklist and time stamp for In-person Procedure

Signed consent _____
Retained copy of consent _____
Contextualization exercise _____
Pre word/symbol ratings _____
Experiment 1 _____
Experiment 2 _____
Experiment 3 _____
Post word/symbol ratings _____
10-minute break _____
Demographic questionnaire _____
BEAQ _____
CFQ _____
STAI Trait _____
PAAQ _____
PCRI-AG _____
SCAS-P _____
Debriefed _____
Asked if questions and answered them _____
Provided compensation _____
Signed compensation receipt _____