THE ROLE OF THREAT DETECTION IN CHILDREN'S PHYSIOLOGICAL RESPONSES TO MARITAL CONFLICT

by

LAUREN N. TIDMAN

Bachelor of General Studies, 2016
Texas Tech University
Lubbock, Texas

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TABLE OF CONTENTS

LIST OF TABLES

The Role of Threat Detection in Children's Physiological Responses To Marital Conflict

Marital conflict occurs in all families regardless of culture, age, income, family type, and many other variables. Parents can engage in constructive or destructive conflict and the ways in which parents resolve their conflict can impact children's development (Goeke-Morey, Cummings, Harold, & Shelton, 2003). However, the mechanisms responsible for how children interpret the meaning of marital conflict are unclear. Recently, it has been theorized that children may be attuned to social threat cues, such as angry faces, during interparental conflict and those cues may be influencing their responses (Davies & Martin, 2013). To date, there is no empirical research that has tested this hypothesis. The current study seeks to understand whether children's bias toward threat influences how they interpret marital conflict and what cues they focus on when witnessing marital conflict.

Marital Conflict

Marital conflict typically refers to negative behaviors between partners, such as yelling, insulting or threatening one another, withdrawing from the conversation, and disrespect (Easterbrooks, Cummings, & Emde, 1994; Grych, Oxtoby, & Lynn, 2013). It can also include physical aggression, although this is rarely the case (Easterbrooks et al., 1994). Marital conflict can encompass large issues such as intimacy, parenting, and religious or political differences, as well as minor disagreements (e.g., where to store peanut butter, if toilet paper rolls go over or under; Backer-Fulghum, Anders, & Sanford, 2018). Conflict occurs in every relationship and partners may engage in constructive and destructive behaviors during these disagreements (Goeke-Morey et al., 2003; McCoy, Cummings, & Davies, 2009). Destructive conflict behaviors include parents not respecting each other's opinions, insulting one another, not coming to a solution, and remaining upset toward one another after the conflict concludes (McCoy, George,

Cummings, & Davies, 2013). It also includes contempt, which is when one partner feels that they are above the other, which is detrimental to the couples' relationship and may lead to the dissolution of the relationship (Carrere & Gottman, 1999). On the other hand, constructive conflict is mainly characterized by respecting each other's opinions, resulting in parents coming to a resolution and acting on that resolution after the conflict has ended (Miller-Graff, Cummings, & Bergman, 2016). This kind of conflict includes rational negotiation, compromise, and apologies if an individual does not feel that they are being respected (Zhou & Buehler, 2017). Partaking in this form of conflict, couples may become closer to each other emotionally and result in higher report of satisfaction in their marriage (Johnson, Horne, Hardy, & Anderson, 2018).

Destructive marital conflict not only negatively impacts the couple, it also affects children in the home (Cummings & Davies, 2002). This type of conflict negatively influences various domains of children's development (Grych & Fincham, 1990; Rutter, 1994). Research over the past half century shows that destructive marital conflict is related to negative cognitive and emotional outcomes, including higher levels of depression and anxiety, disordered eating, and problems coordinating emotional and physiological responses to stress during childhood and adolescence (Cummings & Davies, 2002; Ellis & Garber, 2000; Katz & Gottman, 1993; Lucas-Thompson, 2012; Salafia, Schaefer, & Haugen, 2014). Higher levels of destructive marital conflict are also associated with poorer school performance, impaired problem-solving skills, more aggressive behavior, poor social development, and elevated externalizing problems during adolescence (Cummings, Goeke-Morey, & Papp, 2004; Fosco & Grych, 2008; McCoy, George, Cummings, & Davies, 2014; Petit, Dodge, & Brown, 1988).

The effects of exposure to destructive marital conflict are not only salient during childhood and adolescence but can persist and impact individuals into adulthood. For example, there is some evidence showing that children and adolescents who are exposed to destructive marital conflict report higher levels of alcohol abuse and are more likely to be diagnosed with major depressive disorder as adults (Turner & Kopiec, 2006). Research also shows that those exposed to high levels of destructive marital conflict as children have a harder time managing conflict within their own relationships (Doucet & Aseltine, 2003; Feldman, Fisher, & Seitel, 1997). Children and adolescents exposed to high levels of destructive marital conflict are also more likely to have chronic stress as adults, which in turn is related to a decrease in immunological function and higher frequency of illness (Duric, Clayton, Leong, & Yuan, 2016; Goldstein & McEwen, 2002).

Contrary to the evidence presented above, not all forms of marital conflict are harmful to children's outcomes. For example, if marital conflict is resolved while the child is watching, children are less likely to suffer from negative emotions due to the conflict (McCoy, Cummings, & Davies, 2009). This form of marital conflict includes constructive problem solving, support of each other's opinions, and effective conflict resolution (Bergman, Cummings, & Warmuth, 2016; Zhou & Buehler, 2017). Watching ones' parents have a discussion with these key aspects helps children learn how to handle their own conflicts in a constructive way (Feldman, Fisher, & Seitel, 1997) in both childhood and adulthood (Grych & Finchm, 1990). Children also experience a decrease in distress, emotional dysregulation, and perceived threat when they believe that their parent's conflict was resolved, and an increase in constructive family representations (Cummings & Davies, 1994; Zhou & Buehler, 2017). In a constructive family representation, children view their family in a positive way, which is related to the child having

more positive emotional and behavioral outcomes as listed above (Bascoe, Davies, Sturge-Apple, & Cummings, 2009). Research has also found a positive association between effective conflict resolution (i.e., constructive marital conflict) and children's emotional security (McCoy et al., 2009). Emotional security refers to children's ability to feel confident in their family subsystem, or in the relationship between themselves and their parents (Cheung, Cummings, Zhang, & Davies, 2016). This heightened emotional security leads to fewer internalizing problems among adolescents (Siffert & Schwarz, 2011; Laurent, 2014).

Physiological Reactions to Marital Conflict

When children are exposed to marital conflict, they experience physiological changes that may have long-term consequences for their physical and psychological health (Cummings & Davies, 2002). The autonomic nervous system has many functions, such as regulating breathing, digestion, and heart rate (Karemaker, 2017). For the purpose of emotional responses, the main function is controlling deviations from homeostasis that are experienced during anxiety-provoking situations (Levinson, 2014). It has been hypothesized that constant activation of the autonomic nervous system wears down an individual's physiological system (Juster, McEwen, & Lupien, 2010) and can have negative impacts on children's physical health (Anderson, 2003). Specifically, activation from the parasympathetic nervous system (PNS) and the sympathetic nervous system (SNS) can cause an allostatic load burden, which occurs when the deviations from homeostasis have a negative impact on the body (Korte, Koolhaas, Wingfield, & McEwen, 2005). The PNS and the SNS operate at the same time and perform opposing functions. Activation of the PNS slows heart rate and lowers physiological arousal, while the SNS speeds heart rate and increases physiological arousal (Bear, Connors, & Paradiso, 2016). In both systems, physiological arousal can be measured by resting sinus arrythmia (RSA), heart rate

(HR), and electrodermal activity (EDA; Grossman & Taylor, 2007; Siepmann et al., 2007). A strongly supported way to measure this type of data is to collect a baseline measure of one system, such as HR, and then compare it to a situation that may be stress-inducing, resulting in a reactivity measure (e.g., marital conflict videos; Hinnant & El-Sheikh, 2009).

Heart rate reactivity has been commonly used as a predictor of child adjustment when exposed to marital conflict, with family conflict predicting hyper-reactive responses (El-Sheikh & Harger, 2001; El-Sheikh, Keller, & Erath, 2007; Lucas-Thompson, 2012). Hyper-reactive responses occur when a child's HR is elevated while watching marital conflict when compared to their typical baseline HR. Having hyper-reactive responses to marital conflict shows an activation of the SNS. EDA is a measure of sweat production, where higher EDA signifies more sweat production, which is due to an increase in activity of the SNS (Lucas-Thompson, 2018). RSA is also a commonly used measure of ANS activity, but it works in the opposite manner of HR. A decrease in RSA signifies an increase in ANS activity (high arousal), while an increase in RSA signifies a decrease in ANS activity (under-arousal; Tonhajzerova et al., 2016). RSA measures the difference in HR from inhalation to exhalation. When the difference between inhalation and exhalation is higher, this signifies that the vagal nerve is continuously working to lower the HR, and when the difference between inhalation and exhalation is lower, the result is an elevated HR (El-Sheikh & Whitson, 2006). Thus, higher RSA generally reflects better regulatory skills (Tonhajzerova et al., 2016). Finally, it has been shown that children who have a higher HR, higher EDA, and lower RSA while exposed to marital conflict have more internalizing and externalizing problems (Beauchaine, 2001; El-Sheikh & Whitson, 2006; El-Sheikh, Keller, & Erath, 2007).

Little is known about how physiological reactivity is related to children's responses to marital conflict. It has been shown that children who have high physiological reactiveness to interparental conflict are more likely to have poor adjustment outcomes (El-Sheikh & Whitson, 2006). There is also no research examining how HR, RSA and EDA reactivity relate to what part of the marital conflict is being watched. Thus, this study will examine the relationship between these three physiological measures and attention towards threatening behavior with adolescents. Based on the extant research that has been conducted, it is expected that as adolescents increase gaze attention towards threatening behavior, their HR and EDA reactivity will increase, and their RSA will decrease, signifying a physiological response to the situation.

Marital Conflict Theories

In trying to explain how and why marital conflict impacts children, particularly the differential outcomes related to destructive versus constructive conflict, several theories have been put forth. The cognitive-conceptual theory (Grych & Fincham, 1990) postulates that how children are appraising their parent's marital relationship has an important role in explaining how marital conflict influences children's development. It may not be the actual marital conflict that influences the child, but how they interpret it. Grych and Fincham (1990) postulated that the degree to which adolescents believe they were the reason for the conflict to occur impacts how negatively the conflict impacts them. Exposure to destructive forms of marital conflict may contribute to a child's development of negative appraisals and cognitive representations, such as heightened perceptions of threat (Davies et al., 2002; Gerard, Buehler, Franck, & Anderson, 2005; Grych, Fincham, Jouriles, & McDonald, 2000). Adolescents may also develop negative coping mechanisms when having their own disagreements, such as avoidance and acting out, as a result of exposure to destructive forms of marital conflict (Oh, Lee, & Park, 2011). This theory,

however, does not incorporate the emotional climate of the family and how that might impact children's responses.

The emotional security theory posits that children's emotional security is impacted by the quality of their parent's relationship (Davis & Cummings, 1994). Children's emotional security is influenced by their feelings of security in their family system, which includes the interparental relationship (Cummings & Davies, 2013). Marital conflict can threaten the child or adolescents' emotional well-being, with their emotional security in the family suffering because of it (Cumming & Davies, 1994). Thus, children's responses to marital conflict are hypothesized to be the result of the child feeling that their emotional security is threatened. Similar to the consequences of marital conflict in general, feelings of emotional insecurity also predict future difficulties, such as internalizing and externalizing symptoms and emotional regulation problems (Davies & Martin, 2013). Research has shown that child emotional insecurity links interparental conflict and child maladjustment (Davies, et al., 2002; Harold & Shelter, 2004). According to this theory, constructive conflict may also increase adolescent's sense of security in their relationships with their parents (Cummings & Davies, 2010). These two theories of how children react to marital conflict are not asynchronous; it has been suggested that both cognitive and emotional responses are present and important mediators when examining child outcomes in the context of marital conflict (Mann & Gilliom, 2004). For example, exposure to negative conflict may be most disruptive when adolescents develop both negative cognitive appraisals and have diminished emotional security (Mann & Gilliom, 2004).

Recently, Davies and Martin (2013) have created an evolutionary alternative to the emotional security theory (EST-R). This differs from the original emotional security theory in that the security that a child has is organized around the operation of the social defense system

(SDS). The goal of the SDS is to protect oneself from interpersonal harm, and is a way that children organize their response patterns to interparental conflict (Davies & Sturge-Apple, 2007; Davies & Martin, 2016). In concordance with behavioral responses to marital conflict, Davies and Martin (2013) theorize that the physiological responses to marital conflict that are used to cope with stress may alter a child's typical homeostasis and impact their physiological responses to other situations. The EST-R theory states that interpersonal threat cues such as angry faces, aggressive and dominant posturing, and yelling receive more attention than non-threatening cues, and play an important role in organizing children's distress responses (Davies, Martin, & Cicchetti, 2012; Gilbert, 1993). The goal of the SDS is to minimize threat, and it is hypothesized that there are four basic social defense strategies children use when exposed to threats in marital conflict.

One pattern of social defense that children can have is the secure pattern. These children tend to experience mild distress and are confident that a dispute between their parents will be managed effectively and that their parents will come to a resolution. Children with a mobilizing strategy are clearly distressed from conflict and may be more controlling or vulnerable in terms of involvement in their parent's conflict (Davies & Sturge-Apple, 2007). They may try to manage the threat by being overly appeasing, submissive, or by trying to play a caretaking role to their parents. Conversely, those who have a dominant strategy attempt to engage and overcome interpersonal threat directly, and may minimize their emotions, become demanding, coercive, and controlling (Gilbert, 1993). Finally, children who demobilize utilize involuntary defeat strategies, such as freezing and quiet disengagement, trying to appease their parents, or displaying helplessness (Gilbert, 2001; Sloman, Farvolden, Gilbert, & Price, 2006). However, there is little research examining what adolescents are attending to during a discussion between

their parents and how that might influence these behavioral responses. To understand how adolescents are interpreting marital conflict, it is important to identify cues that are present in marital conflict that are triggering these negative appraisals (Davies et al., 2012).

Attention Bias and Marital Conflict

According to the EST-R, when confronted with marital conflict, children attend to certain cues in order to distinguish non-threatening situations from threatening ones using their SDS (Davies & Martin, 2013). The most common way to examine this bias toward threat is the dot probe task (Bar-Haim Lamy, Pergamin, Bakermans-Kranenburg, & Van IJzendoorn, 2007). In this task, individuals are shown two faces, one emotional and one neutral. Then, when the faces disappear, they are asked to indicate with the press of a button what side of the screen the probe appears on. Previous research has shown that individuals have a bias in spatial attention, meaning that they respond quicker when an emotional face matches the targeted location (Bradley et al., 1997; Fox, 2002; Holmes, Green, & Vuilleumier, 2005). When shown images of emotionally threatening faces during this task, anxious individuals tend to be faster at detecting the target when it appears on the same side of the screen as the emotional face, because their attention is more drawn toward the threatening face (Wells & Matthews, 1994). This bias is also present in those without anxiety disorders, as research has shown that non-clinical populations also automatically focus more on threatening stimuli, and have more difficulty disengaging with threatening stimuli than non-threatening stimuli (Fox, Russo, & Dutton, 2002; Yiend & Mathews, 2001). However, it is unclear as to how this translates to everyday situations, such as when watching parents engage in conflict.

One prevalent outcome of having an attention bias to threatening faces (e.g., angry faces, threatening body positions and movements) is the development and maintenance of anxiety

disorders (Azarian, Esser, & Peterson, 2016; Bar-Haim et al., 2007; Eldar et al., 2012; Mathews & MacLeod, 2005). Worry, a symptom of many anxiety disorders and a precursor of those who may be at risk of developing an anxiety disorder, has been found to be related to having a threat bias on the dot-probe task (Goodwin, Yiend, & Hirsch, 2017). Although there is less research with adolescents, a meta-analysis showed that children with anxiety have a bias toward threat related stimuli that is larger in magnitude than those without an anxiety disorder (Dudeney, Sharpe, & Hunt, 2015). Anxious individuals may also be motivated to focus their attention to sources of safety (e.g., happy faces) that help them cope with threat (Derryberry & Reed, 1996, 2002). Therefore, both threatening and happy faces and postures will be examined in the current study.

Children's reactions to marital conflict have been measured in a variety of ways. Although there are no studies examining what children attend to when watching conflict between parents, videotaped recordings of actors are a common method of exposing children to marital conflict in a lab setting (Davies, Myers, Cummings, & Heindel, 1999). To determine children's reactions to marital conflict, experimenters have asked children to rate their emotions after viewing the conflict and to imagine what they would do if they were present when this argument occurred (Davies et al., 1999). Unfortunately, asking retrospective questions does not allow researchers to determine what aspects of the conflict they are paying attention to, which may be particularly important in light of the EST-R. Fortunately, newer technologies exist that allow researchers to capture children's attention. One way to obtain responses for examining if and how adolescents pick up on threat cues and how they react to them while watching marital conflict is to use eye tracking.

Using eye tracking with young adults has shown that not only are facial expressions important, but threatening postures are detected more easily and quickly than non-threatening body postures (Gilbert, Martin, & Coulson, 2011; Azarian, Esser, & Peterson, 2016). Both body positions and facial expressions are interpersonal threat cues that are important when considering how children are going to respond to conflict (Martin & Davies, 2016). Also, when individuals rate facial expressions, they may be influenced by a conflicting emotional body posture (Aviezer et al., 2008). For example, an individual is more likely to rate a facial expression as angry if their body is positioned in an angry way, such as clenched fists and large arm movements (Gilbert, Martin, & Coulson, 2011). These angry postures can be present even if their face is not inherently angry. It has also been shown that individuals have an inability to immediately look away from the threatening expressions, and this extended attentional focus occurs with threatening faces and body postures (Eastwood, Smilek, & Merikle, 2001; Fox, Russo, Bowles, & Dutton, 2001; Fox et al., 2002). Thus, for the purposes of this study, both attention to bodily position and facial expression will be examined.

Research Questions

The overall purpose of this research is to examine whether adolescents with a threat bias, as measured during the standardized dot probe task, show a similar bias when looking at faces and body postures during a naturalistic marital conflict video task, and how physiological and behavioral responses are impacted during the constructive and destructive marital conflict videos. It is hypothesized that individuals with a threat bias will attend more to faces and body positioning and movements more than those without a threat bias, and that attending to body positioning and facial expressions during the destructive marital interaction will increase physiological reactivity (e.g., faster HR, elevated EDA, and decreased RSA) and increase

negative behavioral responses, but the relationship will not be present in the constructive marital interaction. This was accomplished through four specific aims.

1. The first specific aim of this research was to examine threat bias to emotional faces as seen in the dot probe task. It was hypothesized that adolescents will have a threat bias toward threatening faces, as previous research has shown (Bradley et al., 1997; Fox, 2002).
2. The second specific aim was to examine the relationship between threat bias and time spent watching the facial expressions, body posturing, and movements of the parents during the marital interaction videos. Based on Davies and Martin's EST-R theory (2013), it was predicted that individuals that show a bias toward threat in the dot probe task will also show a threat bias in a naturalistic video task. Thus, adolescents were expected to show elevated gaze rate toward threat cues during the videos (i.e., negative facial expressions, large arm movements). It was hypothesized that adolescents with a threat bias will spend more time attending to these threat cues during the destructive conflict video than those without a threat bias. It was also hypothesized that during the constructive conflict video, there would be less of a relationship between having a threat bias and attending to threatening facial and body movements.
3. The third specific aim of this research was to examine if threat bias while looking at faces and body postures is associated with behavioral responses to watching the conflict videos, and how it differs between the constructive and destructive marital interactions. It was hypothesized that individuals who attend more to threatening body positions and facial expressions will have more mobilizing and dominant behavioral responses to watching the destructive marital conflict video. It was also hypothesized that children

will respond in a more secure manner in response to the constructive marital conflict video.

4. The fourth specific aim of this research was to examine if threat bias while looking at faces and body postures is associated with increased HR reactivity, RSA reactivity, and EDA reactivity while watching the conflict videos, and how it differs between the constructive and destructive marital interactions. It was hypothesized that individuals who attend more to threatening body positions and facial expressions will have higher HR reactivity and electrodermal activity during the destructive marital conflict video. It was also hypothesized that this relationship between attending to threatening body and facial expressions and increased HR activity and EDA will be present to a lesser extent for the constructive marital conflict video.

Method

Participants

Twenty-eight adolescents between the ages of 10 and 17 were recruited for this study. About half were male (n = 15) and the average age of the adolescents was 12.90 years (SD = 2.52). The sample was mostly high SES, with 25% of participants' parents earning over $150,001 a year ($n$ = 7), 32.1% between $100,001 and $150,000 ($n$ = 9), 10.7% between $80,001 and $100,000 ($n$ = 3), 14.3% between $60,001 and $80,000 ($n$ = 4), 10.7% between $40,001 and $60,000 ($n$ = 3), and 7.2% earning less than $50,000 ($n$ = 2). Although adolescents did not report on their ethnicity, most parents reported being white (n = 23), with a few reporting being African American (n = 2) or Hispanic (n = 3). Participants were recruited from the area surrounding the university and do not have any developmental disabilities. All participants had no sight difficulties that could not be corrected with glasses or contact lenses. Families were

compensated with a $50 gift card for participating in the study, and the adolescent participant was compensated with a $10 gift card.

Procedure

Participants provided assent when they first entered the lab. Since the participants in this study were not adults, their parent provided consent and the adolescent provided assent to participate in the study. Both the parent and the child also provided permission for video and audio recordings to be used during the study.

Dot-probe task. For the current study, participants sat approximately 12”away from an 11” by 21” computer screen. Happy, angry and neutral faces (male and female) were used as the stimuli (see Appendix A for example photos). An emotional face was always presented with a neutral face, and the face pairs were presented in a random order. Some neutral faces were paired with other neutral faces, but emotional faces were never paired together. Each trial began with a fixation cue (+) in the center of the screen for 500 ms. Next, two faces were presented at the same time on the screen, one on the left side and one on the right for 500 ms. After the faces disappeared, an asterisk (*) appeared. Participants were asked to then press the “A” key if the asterisk was on the left side of the screen, and the “L” key if the asterisk was on the right side of the screen. Participants were given as much time as they needed to respond to the target. Participants were instructed to focus on the fixation cue before each trial. This task was used previously with children and adolescents with and without a psychiatric diagnosis (Pine et al., 2005; Roy et al., 2008; Salum et al., 2017).

Participants first completed a learning trial, which used blue and red cars for the stimuli to ensure they understood the instructions. For each of the following trials, participants saw 90 face pairs (Calvo & Lundqvust, 2008; Lundqvist, Flykt, & Ohman, 1998). There were two sets

with the 90 emotional faces, with a one-minute break between each set. Each participant saw a total of 180 face pairs. Face pairs were randomized for each participant and for each trial. Congruent (target is on the same side as the emotional face) and incongruent pairs (target is on the opposite side of the emotional face) were presented equally. Faster responses on congruent pairs of angry faces compared to incongruent pairs were considered to represent an attentional bias to threat (MacLeod, Mathews, & Tata, 1986; Roy et al., 2008).

Exposure to marital conflict. Following completion of the dot-probe task, a set of sensors were placed on the participants in order to measure their physiological reactivity. Sensors were either placed by the researcher or by each participant's parent, depending on what the participant was most comfortable with. Regardless of the participants' choice, the parent was always present during the application of the sensors. Two sensors were placed on either side of the participant's torso, on their lowest rib, and one sensor was placed on the left clavicle. To measure skin conductance, two smaller sensors were placed on the palm of the non-dominant hand of the participant. Participants were instructed to refrain from touching their sensors.

Participants then completed a calibration procedure in order for researchers to track their eye movements during exposure to the study stimuli. The participants sat approximately 12" away from a 12" by 20.5" computer monitor and completed the calibration task. In this calibration task, participants were asked to follow a red dot around the screen with their eyes, without moving their head. There were five calibration points that needed to be successfully completed, one in each corner of the computer screen and one in the middle. The calibration task was repeated until all five calibration points were confirmed. Once confirmed, the participants were able to begin viewing the videos.

After completing the calibration, participants were instructed to sit as still as possible and not talk for three minutes to get the first baseline measurement of the physiological measures. The second baseline was completed while the participant was watching a short, 2-min video of nature (e.g., sunflowers blowing in the wind). This allowed researchers to obtain a baseline measurement of the participant's HR, RSA, and EDA while watching a neutral video.

Participants then watched two staged conflict videos, filmed by previous graduate students at a nearby university. Before watching the videos, the participants were told to "pretend your house is a mess. Dishes are dirty and papers and laundry are everywhere. Your dad just came home from work and both your parents are tired." The order of the videos was selected randomly before the study visit began by the flip of a coin. In both videos, the father came home from work and had a discussion with the mother in the kitchen. Both videos had the same topic of disagreement (division of labor between parents and finances). In the constructive conflict video, the parents had a disagreement, but talked it out calmly and came to a solution at the end of the video. In the destructive conflict video, the parents had a disagreement, but did not come to a solution. They raised their voices at each other and ended the argument with the father leaving and the couple not coming to a solution. Participants were asked to sit quietly and try not to move during the conflict videos to get a clear measure of their HR, RSA, and EDA while they were watching. Regardless of video order, participants completed a 3-min quiet sitting baseline between the videos, to give them adequate time to recover from watching the previous conflict before starting the next video.

After watching each video, adolescents were asked to respond to the videos using a series of free response and scale questions. For the free response question to measure behavioral responses, adolescents were asked to tell the researcher what they would do if they were in the

same room as their parents during that discussion. If necessary, follow up questions such as "what would you say to your parents" were asked by the researcher. Participants were also asked to complete a feelings check-in by rating their current happiness from 1 (*super happy*) to 9 (*super sad*). If a child indicated a 6, 7, 8 or 9, they were asked if they needed a break. After completing all tasks, participants removed the physiological sensors and were debriefed.

Materials

Threat bias. A common way of measuring attention to threat cues is by using a dot-probe task. The dot probe task was developed by Macleod, Mathews, and Tata as a measure of attention bias (1986). Typical dot-probe tasks consist of three parts: a focus point, the stimulus items, and a target. Individuals are told to focus on the target and following that the stimulus items appear. Then, using a keyboard they select which side of the screen the target appears on (Macleod et al.,1986). Faces for the dot probe task were retrieved from the Karolinska Directed Emotional Faces database of faces (KDEF; Calvo & Lundqvist, 2008; Lundqvist, Flykt & Ohman, 1998). They have been used in multiple studies and have been shown to portray accurate emotions (Adamaszek et al., 2015; Goeleven, Raedt, Leyman, & Verschuere, 2006). The dot-probe task was programmed using E-Prime2 software (Psychology Software Tools, Pittsburgh, PA).

In this task latency time between when the participant saw the face to when they pressed the corresponding key was used to signify threat bias. Difference scores were calculated by taking the mean response latency to the congruent probes minus the mean response latency on incongruent trials (Chen, Ehlers, Clark, & Mansell, 2002). A positive score represents a bias toward emotional faces, and a negative score represents a bias away from emotional faces. Only

correct responses were analyzed, and those that are greater than 2,000 ms or less than 200 ms were excluded (Dewitte, Koster, Houwer, & Buysse, 2007).

Gaze tracking. Tobii Pro Studio was used to show the participants the videos of marital conflict. The Tobii Pro Studio software allows observation of the participants' gaze in real time to ensure that eye gaze data is being recorded. This program also has the ability to create areas of interest during videos, which were created around both parent's faces and bodies. Areas of interest are the most common way of examining fixation on a particular object and have been used in numerous studies (Holmqvist, Andersson, Dewhurst, & Jarodzka, 2010; Orquin, Ashby, & Clarke, 2015). For the current study, the areas of interest include two different aspects: the face of both the woman and male, as well as body movements made by the woman and male. For both areas of interest with both genders, time spent looking at each area of interest was acquired. This time spent looking at each area of interest (man's face, woman's face, man's body, woman's body) was used as a measure of threat detection.

Physiological data acquisition. Physiological data was collected using Mindware MW1000A Impedance Cardiography and GSC Monitor and Recording Software. The software used for acquisition in MindWare's PDA acquisition software, PDA ACQ. Data was collected wirelessly through Biolab 3.1.1. The PDA measured HR, EDA, and RSA activity. Heart rate analysis was conducted using the HRV 3.1.5 program. Segments of 60s were coded, and if the data was less than 60s long it was not analyzed (Berntson et al., 1997). The VLF Band (Hz) was set from .003 to .040, the LF Band (Hz) was set from .040 to .120, and the HF/RSA Band (Hz) was set from .120 to .400. Heart rate reactivity, or the difference score, was calculated from the baseline HR readings and the average HR during either the constructive or deconstructive video. Resting sinus arrythmia reactivity was calculated in the same way, and was coded in 60s long

segments, and segments less than 60s long were also not analyzed (Berntson et al., 1997). The EDA analysis was conducted using the EDA 3.1.5 program. Segments of 30s were coded, and if the data was less than 30s long it was not analyzed (Boucsein et al., 2012). Similar to HR, a reactivity score was calculated from the averaged baseline EDA and the average EDA during the constructive and deconstructive video.

Behavioral coding. Behavioral responses were first transcribed and then those transcripts were coded according to the children's reactions to interparental disagreements coding system (Davies, Hentges, & Sturge-Apple, 2016). Transcripts were coded on four different response types: secure, mobilizing, dominant, and demobilizing. Each response type was given a score from 1 (not at all characteristic) to 5 (mainly characteristic). As the responses were short, each child received codes of 1 for three of the response types, and then a code of 2, 3, 4, or 5 for the response category they fell into. Both the constructive and destructive videos were coded. All videotapes were coded by two trained coders, with a percent agreement of 93.86%. Of the transcripts that the coders disagreed on, they met and discussed discrepancies and came to an agreement on what response type that adolescent displayed.

Results

Threat Detection

In the dot probe task, participants selected the correct side the target (i.e., asterisk) appeared 91.67% to 100% of the time. There were 10 instances of adolescents answering correctly but taking over 2000-ms to respond, and six instances of them answering correctly but taking under 200-ms to respond. Once these responses were removed, each participant had between 162 to 180 valid data points (M = 177.71, SD = 3.83). As all participants had at least

90% of their data in which they selected the correct answer and responded within the appropriate time range, all participants were included in further threat detection analyses.

An average score was calculated for each participant for each type of face pair they were presented: neutral-angry non-congruent, neutral-happy non-congruent, neutral-neutral, neutral-angry congruent, and neutral-happy congruent. Higher scores represent a longer delay between seeing the emotional face pairs and the target. Bivariate correlations were run between each of the five face pairs presented and all were highly correlated with one another, $p \leq .01$ (see Table 1). A within-subjects analysis of variance (ANOVA) was conducted to examine whether reaction times differed as a function of the face pair type. There was no main effect of face pair type, $F(1, 27) = 1.28$, $p = .27$, $\eta^2 = .05$ (see Table 2). However, a threat detection score was still calculated using the neutral-angry non-congruent and congruent face pairs for each participant. More than half ($n = 15$) of the participants did not have a threat bias toward angry faces. The average threat bias score is -3.09 ($SD = 30.45$), which is not considered a threat bias (MacLeod, Mathews, & Tata, 1986). This signifies that the participants were, on average, responding to the congruent face pairs slower than they were to the incongruent angry face pairs by 3.09 ms.

Table 1

Correlations Between Dot-Probe Face Pair Responses

Variable	1	2	3	4	5
1. neutral-angry non-congruent face pairs	-				
2. neutral-happy non-congruent face pairs	.95**	-			
3. neutral-neutral face pairs	.92**	.97**	-		
4. neutral-angry congruent face pairs	.95**	.94**	.93**	-	
5. neutral-happy congruent face pairs	.94**	.95**	.93**	.94**	-

Note: *** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$

Table 2

Pairwise Comparisons Between Dot-Probe Response Times in Milliseconds

Variable	M	SE
Angry-Neutral Non-Congruent	495.23^{a}	18.31
Happy-Neutral Non-Congruent	489.06^{b}	16.16
Neutral-Neutral	476.82^{abc}	16.09
Angry-Neutral Congruent	498.31^{cd}	17.89
Happy-Neutral Congruent	482.92^{d}	14.86

Note: Superscripts note a significant difference, $p \leq .024$

Physiological Reactions to Marital Conflict

Each participants' average HR, RSA, and EDA reactivity was calculated for the 3-min quiet sitting baseline, the baseline nature video, the constructive conflict video, and the destructive conflict video. To examine if the two baseline measures were equivalent, a bivariate correlation was computed for each physiological measure. For each physiological measure (HR, RSA, and EDA), the two baselines were significantly correlated, $p \leq .001$ (see Table 3). Due to the high correlation in reactivity during these two baselines, the first 3-min quiet sitting baseline and the nature video were averaged together to create an overall baseline variable for each physiological measure.

Table 3

Correlations Between Physiological Scores during the 3-min Quiet Sitting and Nature Baseline

Variable	1	2	3	4	5	6
1. Nature Video HR	1					
2. QSB HR	.97**	1				
3. Nature Video RSA	-.56**	-.58**	1			
4. QSB RSA	-.62**	-.60**	.89**	1		
5. Nature Video SCL	-0.18	-0.17	0.33	0.27	1	
6. QSB SCL	-0.17	-0.16	0.33	0.32	.98**	1

Note: *** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$

Heart rate reactivity. A paired samples t-test was used to examine the difference in HR when participants watched the constructive and destructive conflict videos. No significant difference was found between heart rate when watching the destructive versus the constructive conflict video, $p = .56$ (See Table 4 for descriptive statistics). A within-subjects ANOVA was conducted to examine differences in participant's baseline HR and HR during the two marital conflict videos, with the video type being the within-subjects factor. There was an overall effect

of episode (baseline, constructive video, and destructive video) on HR, $F(1, 2) = 9.10$, $p \leq .01$, $\eta^2 = .34$. Follow up analyses using Tukey's LSD revealed there was a significant difference between baseline HR and the constructive conflict HR, with participants having on average a 2.11 beats per minute decrease while watching the constructive conflict video, $p \leq .01$. There was also a significant difference between the baseline HR and the destructive conflict video, with participants having on average a 1.83 beats per minute decrease in HR during the destructive video, $p \leq .01$. However, there was no significant difference in HR between the destructive and the constructive video, $p = .53$.

Resting sinus arrythmia. A paired samples t-test was used to examine the difference in RSA when participants watched the constructive and destructive conflict videos. A significant difference was found between RSA when watching the constructive versus the destructive conflict, $p = .02$ (See Table 4 for descriptive statistics). Adolescents had lower RSA while watching the destructive conflict video, which signifies less emotional regulation than during the constructive conflict video. A within-subjects ANOVA was run to examine the differences between the baseline RSA and the participant's RSA during the conflict videos. There was an overall effect of episode on RSA, $F(1, 2) = 6.85$, $p \leq .01$, $\eta^2 = .25$. Follow up analyses using Tukey's LSD showed there was no difference between baseline RSA and constructive conflict videos' RSA, $p = .11$. There was a significant difference in RSA between the baseline and the destructive conflict video, $p \leq .01$. Participants on average had an RSA value .42 lower during the destructive conflict video than during the baseline. There was also a significant difference between constructive RSA and destructive RSA within-subjects, $p = .02$. RSA during both the destructive and constructive videos was lower than during the resting baseline, which signifies less emotional regulation during both videos than during the baseline.

Skin conductance. A paired samples t-test was used to examine the difference in EDA when participants watched the constructive and destructive conflict videos. No significant difference was found between EDA when watching the destructive versus the constructive conflict, $p = .99$ (See Table 4 for descriptive statistics). A within-subjects ANOVA was run to examine the differences between the baseline EDA and the participant's EDA during the two conflict videos. There was an overall effect of episode on EDA, $F(1,2) = 10.46$, $p \leq .01$, $\eta^2 = .39$. Follow up analyses using Tukey's LSD revealed there was a significant difference between baseline EDA ($M = 8.71$, $SE = .1.46$) and constructive conflict videos' EDA, $p \leq .01$. Participants on average had a 2.00 higher EDA value during the baseline than the constructive conflict video. There was also a significant difference in EDA between the baseline and the destructive conflict video, $p \leq .01$. Participants on average had a 1.99 higher EDA value during the destructive conflict video than during the baseline. There was no significant difference in EDA between the constructive and destructive videos, $p = .99$.

Behavioral Reactions to Marital Conflict

In response to the constructive conflict video, the majority of participants ($n = 24$) responded in a secure manner. Some reported that "it seems like they figured it out on their own" with most reporting that they "would do nothing" in response to hearing the parent's discussion. One participant responded in a dominant manner, saying "I would find a whistle and blow it really loudly" and three responded in a demobilizing manner. None of the participants responded in a mobilizing way to this conflict.

For the destructive conflict video, the majority of participants ($n = 16$) responded in a demobilizing manner. Most participants reported that if they were in the same room as their parents during that discussion they would "leave the room" with one participant saying they

would “leave the room and take his little sister with him.” Two participants responded in a mobilizing manner, one saying that “I would cry” and the rest of the participants (n = 11) responded in a secure manner, saying they would either “just sit there” or “help them talk it out.” No participants responded dominantly.

Table 4

Means and Standard Deviations for the Three Physiological Responses

	Baseline		Constructive Conflict		Destructive Conflict	
	M	*SD*	*M*	*SD*	*M*	*SD*
HR	81.69	11.02	79.86	11.79	79.58	11.96
RSA	6.70	1.19	6.50	1.18	6.28	1.15
EDA	8.71	7.24	10.70	8.96	10.71	9.03

Eye Tracking

Due to an error with the eye tracking program, only 16 participants had viable data from the eye tracker. While watching the constructive marital conflict video, participants focused on the mother’s face 16.63% of the time, her body 10.55% of the time, the father’s face 19.10% of the time, and the father’s body 8.17% of the time. Participants were not always watching the mother or the father; 23.05% of the time adolescents were looking at other areas of the video, and 21.97% of the time they were looking away from the computer screen. Participants’ gaze data was tracked on average for a total of 91.68 seconds out of the 118.32 seconds in the full video. While watching the destructive marital conflict video, participants focused on the mother’s face 18.29% of the time, her body 5.71%, the father’s face 19.19%, and the father’s body 4.01% of the time. On average, 20.89% of the time adolescents were looking at other areas of the video, and 31.91% of the time they were looking away from the computer screen.

A within-subjects ANOVA was run to examine the differences between the time spent looking at the mother's body in the constructive and destructive videos. There was not an overall effect of episode on time spent fixated on the mother's body, $F(1,15) = 3.72$, $p = .07$, $\eta^2 = .25$. The next within-subjects ANOVA examined the differences between time spent fixating on the mother's face in the constructive and destructive videos, and the results were also insignificant, $F(1,15) = .02$, $p = .88$, $\eta^2 \leq .01$. The next set of within-subject ANOVAs examined the differences between the time spent looking at the father in the constructive and destructive videos. There was not an overall effect of episode on time spent fixated on the father's face, $F(1,15) = 1.03$, $p = .33$, $\eta^2 = .07$, or on the father's body, $F(1, 15) = 1.69$, $p = .21$, $\eta^2 = .11$.

Threat Detection and Areas of Interest

To examine the relationship between threat detection in the dot probe task and threat detection during the naturalistic video task, multiple simple linear regressions were run with the difference score from the angry faces being used as the independent variable, and the time spent attending to threatening stimuli during both the destructive and constructive conflict video as the dependent variable. The relationship between threat detection and time spent attending to threatening stimuli was looked at across all areas of interest during both video types. Three significant paths were found. A significant regression relationship was found when looking at threat detection and time spent looking at the father's face in both the constructive and destructive videos (See Table 5). For both videos, as threat detection bias increases, time spent focusing on the father's face significantly decreases. A significant relationship was also found between threat detection and time spent looking at the mother's face in the destructive video (See Table 5). As the adolescents' threat bias increases, the time spent focusing on the mother's face during the destructive video decreases (See Table 5 for all other insignificant results).

Table 5

Regression Results for Time Spent Viewing Different Areas of Interest while Viewing Conflicts

	B	*SE*	*β*	*t*	*p*
Constructive					
Mother's Face	-0.18	0.10	-0.45	-1.86	0.08
Father's Face	-0.24	0.11	-0.49	-2.11	0.05
Mother's Body	0.10	0.10	0.26	1.00	0.33
Father's Body	0.06	0.12	0.14	0.51	0.62
Destructive					
Mother's Face	-0.21	0.08	-0.57	-2.56	0.02
Father's Face	-0.24	0.10	-0.54	-2.38	0.03
Mother's Body	0.05	0.06	0.23	0.87	0.40
Father's Body	0.01	0.04	0.06	0.24	0.82

Final Models

Attention towards faces and the full body during the naturalistic conflict videos were used as the mediators between threat detection and the behavioral and physiological reactions. Each model was examined with both the mother and the father in the videos. A multiple mediation model was run using Preacher and Hayes' PROCESS Macro (2014) in SPSS with 5,000 bootstrap samples to examine the relationship between threat detection and HR reactivity during the constructive conflict video mediated by time spent focusing on the mother's face, the mother's body, the father's face, and the father's body. The 95% confidence intervals for the indirect effects of all mediators contained zero and were thus non-significant (See Table 6). The next multiple mediation model examined the relationship between threat detection and HR during the destructive conflict video mediated by time spent focusing on the mother's face, the mother's body, the father's face, and the father's body during that same conflict. The 95% confidence intervals for the indirect effects of all mediators were non-significant. The last model using the constructive conflict video used RSA as the physiological outcome variable. Again, the

95% confidence intervals for the indirect effects of all mediators were non-significant (See Table 6).

Table 6

Indirect Effects of Time Spent Focused on Parents and Physiological Reactivity while Watching the Constructive Conflict

	b	*SE*	95% CI
HR			
Total Effect	-.09	.27	-.64, .42
Father Face	-.11	.21	-.51, .06
Father Body	-.02	.19	-.27, .22
Mother Face	-.04	.27	-.54, .43
Mother Body	.09	.23	-.24, .54
EDA			
Total Effect	.07	.09	-.04, .29
Father Face	.02	.06	-.11, .18
Father Body	.02	.05	-.04, .14
Mother Face	.07	.09	-.05, .26
Mother Body	-.04	.08	-.19, .07
RSA			
Total Effect	.01	.02	-.04, .03
Father Face	.02	.02	-.01, .05
Father Body	.01	.03	-.02, .02
Mother Face	-.01	.06	-.07, .01
Mother Body	-.01	.08	-.03, .05

The next model was run examining the relationship between threat detection and RSA during the destructive conflict video mediated by time spent focusing on the mother's face, the mother's body, the father's face, and the father's body during that constructive conflict. The 95% confidence intervals for the indirect effects of all mediators was non-significant. The final set of multiple mediation models use EDA reactivity as the physiological outcome variable. The next model examined the relationship between threat detection and EDA reactivity during the

constructive conflict video mediated by time spent focusing on the mother's face, the mother's body, the father's face, and the father's body during that constructive conflict. The 95% confidence intervals for the indirect effects of all mediators were non-significant. The final physiological model examined the relationship between threat detection and RSA reactivity during the destructive conflict video mediated by time spent focusing on the mother's face, the mother's body, the father's face, and the father's body during that constructive conflict. The 95% confidence intervals for the indirect effects of all mediators were non-significant (See Table 7).

Table 7

Indirect Effects of Time Spent Focused on Parents and Physiological Reactivity while Watching the Destructive Conflict

	b	*SE*	95% CI
HR			
Total Effect	-.12	.32	-.68, .21
Father Face	-.16	.20	-.58, .06
Father Body	.01	.19	-.20, .28
Mother Face	-.01	.19	-.46, .28
Mother Body	.04	.23	-.21, .40
EDA			
Total Effect	.06	.13	-.18, .16
Father Face	.03	.09	-.22, .12
Father Body	.01	.11	-.06, .27
Mother Face	.06	.09	-.09, .26
Mother Body	-.03	.14	-.39, .05
RSA			
Total Effect	.02	.02	-.02, .05
Father Face	.02	.02	-.01, .06
Father Body	-.01	.01	-.04, .02
Mother Face	-.01	.01	-.04, .01
Mother Body	.01	.01	-.02, .04

To examine the impact of threat detection mediated by time spent on each area of interest on behavioral responses, the next set of between-subject mediational models were run. A multiple mediation model was run with 5,000 bootstrap samples to examine the relationship between threat detection and secure behavioral responses during the constructive conflict video mediated by time spent focusing on the mother's face, the mother's body, the father's face, and the father's body. The 95% confidence intervals for the indirect effects of all mediators were non-significant. The same non-significant relationship occurred when the outcome was having a dominant behavioral response as well as a demobilizing response. There was no variation within the mobilizing response, thus it was not tested (See Table 8). The same multiple mediational models were run using the behavioral responses to the deconstructive conflict video. Time spent focusing on the mother's face, mother's body, father's face, and father's body were used as mediators between threat detection and behavioral responses. The 95% confidence interval for having secure responses, mobilizing responses, and demobilizing responses contained zero, thus being non-significant. Responding dominantly was not tested due to no variation in responses (See Table 9).

Table 8

Indirect Effects of Time Spent Focused on Parents and Behavioral Reactivity While Watching the Constructive Conflict

	b	*SE*	95% CI
Secure Response			
Total Effect	.01	.04	-.01, .10
Father Face	.01	.02	-.01, .08
Father Body	-.01	.05	-.05, .01
Mother Face	-.01	.10	-.07, .05
Mother Body	.01	.17	-.01, .13
Dominant Response			
Total Effect	-3.6	5.45	-11.05, 10.33
Father Face	-.70	4.81	-9.49, 9.36
Father Body	4.44	22.68	-4.40, 44.89
Mother Face	-10.21	15.45	-31.30, 29.26
Mother Body	-12.50	21.77	-43.92, 41.42
Demobilizing Response			
Total Effect	-.01	.03	-.06, .04
Father Face	.14	.12	-.09, .37
Father Body	.24	.36	-.46, .94
Mother Face	.05	.29	-.52, .63
Mother Body	-.24	.58	-1.38, .90

Table 9

Indirect Effects of Time Spent Focused on Parents and Behavioral Reactivity While Watching the Destructive Conflict

	b	*SE*	95% CI
Secure Response			
Total Effect	-.01	.05	-.13, .04
Father Face	.01	.04	-.10, .05
Father Body	-.01	.03	-.05, .04
Mother Face	-.02	.03	-.08, .06
Mother Body	.01	.03	-.06, .05
Mobilizing Response			
Total Effect	-.70	.59	-1.27, 1.43
Father Face	-.32	.40	-1.08, .51
Father Body	.28	.70	-.41, 2.37
Mother Face	.33	.42	-.19, 1.44
Mother Body	-.99	.84	-2.98, .13
Demobilizing Response			
Total Effect	.01	.05	-.03, .14
Father Face	-.01	.03	-.03, .10
Father Body	-.01	.03	-.09, .03
Mother Face	.01	.03	-.06, .06
Mother Body	.01	.04	-.02, .12

Discussion

The goal of this study was to examine how adolescents respond to marital conflict through the lenses of the Revised Emotional Security Theory. The results found were not as expected. Adolescents did not show a bias toward threat in the dot probe task, rather they showed a bias away from threat. When watching the videos of adults engaged in conflict, the only significant physiological difference was in RSA reactivity, with RSA being higher during the destructive conflict video than the constructive conflict video. Finally, although there was a relationship between threat detection to both parent's faces during the destructive video, but

there was not a significant relationship with the mother's face and threat detection during the constructive conflict video.

The first major aim of this study was to examine if there was a bias toward threat detection present through the dot probe task. A bias toward threat is defined as taking a longer time to respond to the incongruent angry face pairs than the congruent ones, but the results found did not align with this definition (MacLeod, Mathews, & Tata, 1986). Participants responded faster to the incongruent angry face pairs than the congruent ones. This shows a bias away from threat (Bar-Haim et al., 2007). This bias away from threat may be occurring because the presentation times for the faces was too long. Although it is standard procedure to show faces for 500 ms, there has been one study that found for those who have low anxiety, similar to the current sample, have difficulty disengaging from threatening stimuli when faces are presented for 200 ms or more (MacLeod, Mathews, and Tata, 1986; Sagliano, Trojano, Amoriello, Miglozzi, and D'Olimpio, 2014). Had we presented the face pairs to the adolescents under this length of time, we may have seen results more consistent with a bias toward threat.

The next step to examining the relationship between threat detection and physiological reactions to marital conflict was to look at the physiological reactivity results for both types of conflict. For the destructive conflict video, the adolescents did not show an increase in heart rate or skin conductance when compared to the constructive conflict video, contradicting the hypothesis. Research has shown that typically heart rate and skin conductance increase while watching negative interactions (Obradovic, Bush, & Boyce, 2011); however, in this study participants did not exhibit an increase in heart rate compared to their baseline while watching either the constructive or destructive conflict videos (Appelhans & Luecken, 2006). The adolescents also showed a decrease in RSA from their baseline while watching both the

constructive and destructive videos, which indicates that participants were able to regulate their emotions while viewing the videos. Adolescents had significantly lower RSA while watching the destructive conflict video than during the constructive conflict video, which signifies better emotional regulation during the constructive conflict video. This may be linked back to the social defense system not being activated. If the social defense system is not activated while watching the destructive conflict video, it would make sense that they are not reacting more strongly physiologically to watching it.

The next major aim of this study was to examine the relationship between threat bias and time spent focused on each area of interest (mother's face, mother's body, father's face, father's body) during both the constructive and destructive video. As the adolescent's bias toward threat increased, the time spent watching the parent's faces decreased for both the father and mother during the destructive conflict video, and only the father in the constructive conflict video. This is the opposite of what would be expected based on the EST-R theory. As the adolescents watch the disagreement, their social defense system should be activated (Davies, Martin, & Cicchetti, 2012). However, it is possible that the adolescents are attending to the faces in these videos because they are not seeing them as threatening, and thus are not needing to look away from them. Attending to faces during an argument is a social threat cue as defined by the EST-R theory, but if the adolescents do not see them that way, they would have no desire to look away. There were no relationships between threat bias and time spent watching the parent's bodies. In this study, there was a kitchen counter with a laundry basket blocking some of the movements of both the mother and the father This may be one reason that we do not see any sort of significant relationship with between threat detection and time spent looking at the parent's bodies. Blocking these movements from view does not give the child the opportunity to be exposed to

the threatening body movements that the parents are performing which would be expected to activate the social defense system (Davies & Martin, 2013).

The final two aims of this study were to examine the impact of the time spent viewing the mother and father's face and body as mediators of the relationship between threat bias and various physiological and behavioral responses. Overall, the results of this study were not as expected based on the EST-R. There were no significant relationships between threat detection (independent variable), gaze focus on both parent's faces or bodies during both types of conflict videos (mediators), and the behavioral or physiological responses (dependent variables). This lack of relationship may be due to the social defense system not being activated. The social defense system is activated when an individual believes their environment is being threatened (Davies & Cummings, 2014). The videos the adolescents watched were not considerably long and the actors in the videos may not have displayed strong enough threat cues, such as talking with their hands, yelling, or being condescending enough for the adolescents to develop feelings of feeling threatened by the situation. To elicit a threatening response, researchers typically use videos with fighting, yelling, and behaviors that would potentially cause harm if the viewer was in that situation (Davies, Martin, & Cicchetti, 2012; Gilbert, 1993). However, if an individual does not feel like they are in danger, their social defense system will not be activated (Davies & Martin, 2016). Another possible reason that could explain why there was no mediational relationship between the variables is the sample size. Due to an unforeseen error in the eye tracking system, only 16 participants had useable eye tracking data. The consequence of smaller sample sizes results in limiting the way in which the data can be examined.

Although there is no research examining how adolescents may respond differently to marital conflict that is initiated by either their mother or by their father, there has been research

showing that when the conflict is child-centered children react more negatively (O'Leary & Vidair, 2005; Chen & Johnston, 2012). Neither of the videos the adolescents watched in the current study were child focused, which may be another reason the participants did not view the videos as being threatening, thus not reacting very negatively to them. It is also possible that the participants are not agitated by disagreements about bills or chores as the video depicts. However, if the parents in the videos discussed child-centered problems, such as how the child prevents the parents from spending time together, their social defense system may have been activated.

Limitations and Future Directions

One of the reasons that could explain why there was no mediational relationship between the variables is the sample size. Due to an unforeseen error in the eye tracking system, only 16 participants had useable eye tracking data. Even before some of the eye tracking data became corrupted the small sample size was already a study limitation. The consequence of smaller sample sizes results in limiting the way in which the data can be examined, as well as the variability in the participant's responses. The low number of participants reduces the power of the analyses conducted and prevents the data from being analyzed in different ways. Structural equation modeling would have been appropriate for the proposed analyses, but it was not possible due to the small sample size. Since this is a pilot study, future research examining the impact of marital conflict on children should sample more adolescents. A larger sample will increase power while reducing the risk of limited data from software issues or corrupted data. Not being able suitably conduct the study as a within subject mediation or SEM were also limitations mentioned above, due to having a between subject variable in the equation and too few participants. MEMORE does not allow for an X variable to be anything other than the

within-subject variable. However, in this study the X variable (threat detection on the dot probe task) is not a within-subjects variable.

Another technology-based limitation that resulted from the eye-tracking program is that the software, Tobi Pro, fails to provide the percentage of the video that each area of interest takes up. The program will only allow the screen area percentage for an area of interest to be calculated with pictures, not videos. It is possible that the adolescents are watching the areas of interest in proportion to the ratio of the background to the parents, but with the current data and program, we cannot determine this.

These videos were also not filmed with the knowledge that they would be used for an eye-tracking study. Although research has shown that adolescents can watch a conflict video with actors and react in a way that is consistent with how they would react to their own parents having a discussion, the videos for this study were not filmed by professional actors, they were filmed by graduate students at a nearby University. Even though this is more time consuming, having the adolescent's actual parents engage in conflict may increase the likelihood that the child responds similar to how they would at home (Davies et al., 1999). These graduate students may not appropriately portray what a typical couple looks like who has an adolescent child. They were young adults and the video was scripted. Although this may have impacted how the adolescents reacted to the video, when asked, they did not report having trouble imagining that these were their parents. The combination of the inadequate acting, busy scene, and lack of actual parents may have made it harder for the adolescents in this study to imagine themselves in the situation where they would react more naturally.

Visual impairments were not screened, but there has been no research examining the effect of color blindness on gaze or eye tracking. Future research however may want to examine

this effect by obtaining information about participant's visual impairments, such as color blindness, and seeing if there is a relationship between color blindness and gaze during a naturalistic video task. Additionally, future research should use eye-tracking to understand how non-typically developing adolescents watch marital conflict. For example, it has been shown that individuals with autism spectrum disorder (ASD) focus less on faces and have trouble understanding social situations (Rigby, Stoesz, & Jakobson, 2016). It would be reasonable to assume that they will focus on different aspects of a conflict than their typically developing peers would.

Although the results of this study were not as expected, they still shed light on some of the key components EST-R. One of the most important elements of the EST-R is that individuals are using an evolutionary-based system to deal with threat. The goal of the social defense system is to protect oneself from interpersonal harm and to organize response patterns during the threatening situation (Davies & Sturge-Apple, 2007; Davies & Martin, 2016). Thus, there needs to be a real and tangible threat present for the behaviors predicted by the EST-R to be present. Therefore, it may be important to consider the amount of threatening conflict that an adolescent has been exposed to during their childhood. Adolescents who have not been exposed to parental conflict, other than small constructive disputes in the past, may not typically activate their social defense system while watching a conflict. Additionally, both of the conflict videos were around two minutes long, which may not be enough time to activate the social defense system.

One of the goals of the EST-R is to examine individual differences in reactions to interparental conflict, but it must also consider that individuals will find different things threatening. While one adolescent may be more threatened by yelling, another may be more threatened by watching a parent throw their arms around while talking. The topics of the

argument are also important to consider – while taking the trash out may not be threatening, listening to one's parents arguing over bills or getting a divorce may be threatening enough for the social defense system to be activated. Thus, it may be beneficial for future research to systematically vary the topics of interparental conflict to determine these potential individual differences.

References

Adamaszek, M., Kirkby, K. C., D-Agata, F., Olbrick, S., Langner, S., … Hamm, A. (2015). Neural correlates of impaired emotional face recognition in cerebellar lesions. *Brain Research*, *1613*, 1-12. Doi: 10.1016/j.brainres.2015.01.027

Anderson, S. A., Russell, C. S., & Schumm, W. R. (1983). Perceived marital quality and family life-cycle categories: A further analysis. J*ournal of Marriage and Family*, *45*(1), 127-139. Doi: 10.1307/351301

Andersen, S. L. (2003). Trajectories of brain development: Point of vulnerability or window of opportunity? *Neuroscience and Biobehavioral Reviews*, *27*, 3–18. Doi: 10.1016/S0149-7634(03)00005-8

Appelhans, B. M. & Luecken, L. J. (2006). Heart rate variability as an index of regulated emotional responding. *Review of General Psychology*, *10*, 3, 229-240. Doi: 10.1037/1089-2680.10.3.229

Aviezer, H., Hassin, R. R., Ryan, J., Susskind, J., Anderson, A., Moscovitch, M., & Bentin, S. (2008). Angry, disgusted, or afraid? Studies on the malleability of emotion perception. *Psychological science*, *19*(7). Doi: 10.1111/j.1467-9280.02148.x.

Azarian, B., Esser, E. G., & Peterson, M. S. (2016). Evidence from the eyes: Threatening postures hold attention. *Psychological Bulletin & Review*, *23*, 764-770. Doi: 10.3758/s13423-015-0942-0

Bar-Haim, Y., Lamy, D., Pergamin, L., Bakermans-Kranenburg, M. J., & Van IJzendoorn, M. (2007). Threat-related attention bias in anxious and non-anxious individuals: A meta-analytic study. *Psychological Bulletin*, *133*(1), 1-24. doi: 10.1037/0033-2909.133.1.1

Bascoe, S. M., Davies, P. T., Sturge-Apple, M. L., & Cummings, M. E. (2009). Children's representations of family relationships, peer information processing, and school adjustment. *Developmental Psychology*, *45*(6), 1740-1751. Doi: 10.1037/a0016688

Bear, M. F., Connors, B. W., & Paradiso, M. A. (2016). *Neuroscience: Exploring the brain*. Philadelphia, PA: Lippincott Williams & Wilkins.

Bergman, K. N., Cummings, E. M., & Warmuth, K. A. (2016). The benefits of marital conflict. In D. Narvaez, J. M. Braungart-Rieker, L. E. MillerGraff, L. T. Gettler, & P. D. Hastings (Eds.), *Contexts for young child flourishing: Evolution, family, and society* (pp. 233–245). New York, NY: Oxford University Press. Doi: 10.1093/acprof:oso/9780190237790.003.0012

Berntson, C. G., Bigger, J. T., Eckberg, D. L., Grossman, P., Kaufmann, P. G., Malik, … van der Molen, M. W. (1997). Heart rate variability: origins, methods, and interpretive caveats. *Psychophysiology*, *35*(6), 623-648. Doi: 10.1111/j.1469-8986.1997.tb0214.x

Bornstein, M. H., & Suess, P. E. (2000). Physiological self-regulation and information processing in infancy: Cardiac vagal tone and habituation. *Child Development*, *71*(2), 273-287. Doi: 10.1111/1467-8624.00143

Boucsein, W., Fowles, D.C., Grimnes, S., Ben-Shakhar, G., Roth, W.T., Dawson, M.E., & Filion, D.L (2012). Publication recommendations for electrodermal measurements. *Psychophysiology*, *49*(8), 1017-1034. Doi: 10.1111/j.1469-8986.2012.01384.x

Bradley, B., Mogg, K., Millar, N., Bonham-Carter, C., Fergusson, E., Jenkins, J. & Parr, M. (1997). Attention biases for emotional faces. *Cognition and Emotion*, *11*, 25-42. Doi: 10.1080/026999397380014

Calvo, M. G., & Lundqvist, D. (2008) Facial expressions of emotion (KDEF): Identification under different display-duration conditions. *Behavioral Research Methods*, *40*(1), 109-115. Doi: 10.3758/BRM.40.1.10

Carrere, S., & Gottman, J. M. (1999). Predicting divorce among newlyweds from the first three minutes of a marital conflict discussion. *Family Process*, *38*(3), 293-301. Doi: 10.1111/j.1545-5300.1999.00293.x

Chen, Y. P., Ehlers, A., Clark, D. M., & Mansell, W. (2002). Patients with generalized social phobia direct their attention away from faces. *Behaviour Research and Therapy*, *40*, 677-687.

Chen, M., & Johnston, C. (2012). Interparent childrearing disagreement, but not dissimilarity, predicts child problems after controlling for parenting effectiveness. *Journal of Clinical Child and Adolescent Psychology*, *41*(2), 189-201. Doi: 10.1080/15374416.2012.651997

Cheung, R. Y. M., Cummings, M. E., Zhang, Z., & Davies, P. T. (2016). Trivariate modeling of interparental conflict and adolescent emotional security: An examination of mother-father-child dynamics. *Journal of Youth and Adolescence*, *45*, 2336-2352. Doi: 10.1007/s10964-015-0406-x

Christensen, A. (1987). Detection of conflict patterns in couples. In K. Hahlweg & M. J. Goldstein (Eds.). *Understanding major mental disorders: The contribution of family interaction research* (pp. 250-265). New York: Family Process Press.

Christensen, A. (1988). Dysfunctional interaction patterns in couples. In P. Moller & M. A. Fitzpatrick (Eds.), *Perspectives on marital interaction* (pp. 31-52). Clevedon, England: Multilingual Matters.

Christensen, A., & Heavey, C. L. (1990). Gender and social structure in the demand/withdraw pattern of marital conflict. *Journal of Personality and Social Psychology*, *59*(1), 73-81. Doi: 10.1037/0022-3514.59.1.73

Cisler, J. M., & Koster, E. H. (2010). Mechanisms of attentional biases towards threat in anxiety disorders: An integrative review. *Clinical Psychology Review*, *30*(2), 203-216. Doi: 10.1016/j.cpr.2009.11.03

Cummings, J. S., Pellegrini, D. S., Notarius, C. I., & Cummings, E. M. (1989). Children's responses to angry adult behavior as a function of marital distress and history of interparent hostility. *Child Development*, *60*(5), 1035-1043. doi: 10.2307/1130777

Cummings, M. E., & Davies, P. T. (1994). *Children and marital conflict: The impact of family dispute and resolution*. New York: Guilford Press.

Cummings, M. E., & Davies, P. T. (2002). Effects of marital conflict on children: Recent advances and emerging themes in process-oriented research. *Journal of Child Psychology and Psychiatry*, *43*(1), 31-63. doi: 10.1111/1469-7610.00003

Cummings, M. E., & Davies, P. T. (2010). *Marital conflict and children: An emotional security perspective*. New York, NY: Guilford Press.

Cummings, M. E., Goeke-Morey, M. C., & Papp, L. M. (2004). Everyday marital conflict and child aggression. *Journal of Abnormal Child Psychology*, *32*(2), 191-292. Doi: 0091-0627/04/0400-0191/0

Davies, P. T., & Cummings, M. E. (1994). Marital Conflict and child adjustment: An emotional security hypothesis. *Psychological Bulletin*, *116*(3), 387-411. Doi: 10.1037/0033-2909.116.3.387

Davies, P. T., Harold, G. T., Goeke-Morey, M. C., Cummings, E. M., Shelton, K., & Rasi, J. A. (2002). Child emotional security and interparental conflict. *Monographs of the Society for Research in Child Development*, *67*(3), 1–115. Doi: 10.111/1540-5834.00205

Davies, P. T., & Sturge-Apple, M. L. (2007). Advances in the formulation of emotional security theory: An ethologically based perspective. *Advances in Child Behavior and Development*, *35*, 87-137. Doi: 10.1016/B978-0-12-009735-7.50008-6

Davies, P. T., Sturge-Apple, M. L., Cichetti, D., Manning, L. G., & Zale, E. (2009). Children's patterns of emotional reactivity to conflict as explanatory mechanisms in links between interpartner aggression and child physiological functioning. *Journal of Child Psychology and Psychiatry*, *50*(11), 1384-1391. Doi: 10.1111/j.1469-7610.2009.02154.x

Davies, P. T., Martin, M. J., & Cicchetti, D. (2012). Delineating the sequelae of destructive and constructive interparental conflict for children within an evolutionary framework. *Developmental Psychology*, *48*(4), 939-955. Doi: 10.1037/a0025899

Davies, P. T., & Martin, M. J. (2013). The reformulation of emotional security theory: The role of children's social defense in developmental psychopathology. *Development and Psychopathology*, *25*, 1435-1454. Doi: 10.1017/S0954579413000709

Davies, P. T., Hentges, R. F., & Sturge-Apple, M. L. (2016). Identifying the temperamental roots of children's patterns of security in the interparental relationship. *Development and Psychopathology*, *28*, 335-370. Doi: 10.1017/s0954579415001078

Derryberry, D., & Reed, M. A. (1994). Temperament and attention: Orienting toward and away from positive and negative signals. *Journal of Personality and Social Psychology*, *66*(6), 1128-1139. Doi: 10.1037/0022-3514.66.6.1128

Derryberry, D., & Reed, M. A. (2002). Anxiety-related attentional biases and their regulation by attentional control. *Journal of Abnormal Psychology*, *111*(2), 225-236. Doi: 10.1037//0021-843X.111.2.225

Dewitte, M., Koster, E. H., De Houwer, J., & Buysse, A. (2007). Attentive processing of threat and adult attachment: A dot-probe study. *Behaviour Research and Therapy*, 45, 1307-1317. Doi: 10.1016/j.brat.2006.11.004

Doucet, J. & Aseltine, R. H. (2003). Childhood family adversity and the quality of marital relationships in young adulthood. *Journal of Social and Personal Relationships*, *20*(6), 818-842. Doi: 10.1177/0265407503206006

Dudeney, J., Sharpe, L., & Hunt, C. (2015). Attention bias towards threatening stimuli in children with anxiety: A meta-analysis. *Clinical Psychology Review*, *40*, 66-75. Doi: 10.1016/j.cpr.2015.05.007

Duric, V., Clayton, S., Leong, M. L., & Yuan, L. (2016). Comorbidity factors and brain mechanisms linking chronic stress and systemic illness. *Neural Plasticity*, *2016*, 1-16. Doi: 10.1155/2016/5460732

Easterbrooks, M., Cummings, E., & Emde, R. N. (1994). Young children's responses to constructive marital disputes. *Journal of Family Psychology*, *8*, 160 –169. Doi: 10.1037/0893-3200.8.2.160

Eastwood, J. D., Smilek, D., & Merikle, P. M. (2001). Differential attentional guidance by unattended faces expressing positive and negative emotion. *Perception & Psychophysics*, *63*, 1004-1013. Doi: 10.3758/BF03194519

Eldar, S., Apter, A., Lotan, D., Edgar, K. P., Naim, N. A., … Bar-Haim, Y. (2012). Attention bias modification treatment for pediatric anxiety disorders: A randomized controlled trial.

The American Journal of Psychiatry, *169*(2), 213-220. Doi: 10.1176/appi.ajp.2011.11060886

Ellis, B. J., & Garber, J. (2000). Psychological antecedents of variation in girls' pubertal timing: Maternal depression, stepfather presence, and marital and family stress. *Child Development*, *71*(2), 485-501. Doi: 10.1111/1467-8624.00159

El-Sheikh, M., & Harger, J. (2001). Appraisals of marital conflict and children's adjustment, health, and physiological reactivity. *Developmental Psychology*, *37*(6), 875-885. Doi: 10.1037/0012-1649.37.6.875

El-Sheikh, M., & Whitson, S. A. (2006). Longitudinal relations between marital conflict and child adjustment: Vagal regulation as a protective factor. *Journal of Family Psychology*, *20*, 30 –39. Doi: 10 .1037/0893-3200.20.1.30

El-Sheikh, M., Keller, P. S., & Erath, S. A. (2007). Marital conflict and risk for child maladjustment over time: Skin conductance level reactivity as a vulnerability factor. *Journal of Abnormal Child Psychology, 35*(5), 715-727. Doi: 10.1007/s10802-007-9127-2

Feldman, S. S., Fisher, L., & Seitel, L. (1997). The effect of parents' marital satisfaction on young adults' adaptation: A longitudinal study. *Journal of Research on Adolescence*, *7*(1), 55-80. Doi: 10.1207/0893-3200.21.2.248

Fosco, G. M., & Grych, J. H. (2008). Emotional, cognitive, and family systems mediators of children's adjustment to interparental conflict. *Journal of Family Psychology*, *22*(6), 843-854. Doi: 10.1037/a0013809

Fox, E. (2002). Processing emotional facial expressions: The role of anxiety and awareness. *Cognitive, Affective, & Behavioral Neuroscience*, *2*(1), 52-63. Doi: 10.3758/CABN.2.1.52

Fox, E., Russo, R., Bowles, R. J., & Dutton, K. (2001). Do threatening stimuli draw or hold attention in subclinical anxiety? *Journal of Experimental Psychology: General*. *130*(4), 681-700. Doi: 10.1037/0096-3445.130.4.681

Fox, E., Russo, R., & Dutton, K. (2002). Attentional bias for threat: evidence for delayed disengagement from emotional faces. *Cognition & Emotion*, *16*(3), 355-379. Doi: 10.1080/02699930143000527

Fung, M. T., Raine, A., Loeber, R., Lynam, D. R., Steinhauer, S. R., Venables, P. H., & Stouthamer-Loeber, M. (2005). Reduced electrodermal activity in psychopathy-prone adolescents. *Journal of Abnormal Psychology*, *114*, 187–196. Doi: 10.1037/0021-843X.114.2 .187

Gerard, J. M., Buehler, C., Franck, K., & Anderson, O. (2005). In the eyes of the beholder: cognitive appraisals as mediators of the association between interparental conflict and youth maladjustment. *Journal of Family Psychology*, *19*(3), 376-384. Doi: 10.1037/0893-3200.19.3.376

Gilbert, P. (1993). Defense and safety: Their function in social behaviors and psychopathology. *Journal of Clinical Psychology*, *32*(2), 131-153. Doi: 10.1111/j.2044-8260.1993.tb01039.x

Goeke-Morey, M. C., Cummings, E. M., Harold, G. T., & Shelton, K. H. (2003). Categories and continua of destructive and constructive marital conflict tactics from the perspective of U.S. and Welsh children. *Journal of Family Psychology*, *17*, 327–338

Goeleven, E., Raedt, R. D., Leyman, L., & Verschuere, B. (2008). The Karolinska directed emotional faces: A validation study. *Cognition and Emotion*, *22*(6), 1094-1118. Doi: 10.1080/02699930701626582

Goldstein, D. S. & McEwen, B. (2002). Allostasis, homeostats, and the nature of stress. *Stress*, *5*(1), 55-58.

Goodwin, H., Yiend, J., & Hirsch, C. R. (2017). Generalized anxiety disorder, worry and attention to threat: A systematic review. *Clinical Psychology Review*, *54*, 107-122. Doi: 10.1016/j.cpr.2017.03.006

Grossman, P., & Taylor, E. W. (2007). Toward understanding respiratory sinus arrhythmia: Relations to cardiac vagal tone, evolution and biobehavioral functions. *Biological Psychology*, *74*, 263-285. Doi: 10.1016/j.biopsycho.2005.11.014

Grych, J. H., & Fincham, F. D. (1990). Marital conflict and children's adjustment: A cognitive-contextual framework. *Psychological Bulletin*, *108*(2), 267-290. Doi: 10.1037/0033-2909.108.2.267

Grych, J. H., Fincham, F. D., Jouriles, E. N., & McDonald, R. (2000). Interparental conflict and child adjustment: testing the mediational role of appraisals in the cognitive-contextual framework. *Child Development*, *71*(6), 1648-1661. Doi: 10.1111/1467-8624.00255

Harold, G. T., Shelton, K. H., Goeke-Morey, M. C., & Cummings, E. M. (2004). Marital conflict, child emotional security and family relationships and child adjustment. *Social Development*, *13*(3), 350-376. Doi: 10.1111/j.1467-9507.2004.00272.x

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression based approach*. New York: The Guilford Press

Hinnant, J. B., & El-Sheikh, M. (2009). Children's externalizing and internalizing symptoms over time: The role of individual differences in patterns of RSA responding. *Journal of Abnormal Child Psychology*, *37*(8), 1049-1061. Doi: 10.1007/s10802-00909341-1

Holmes, A., Green, S., & Vuilleumier, P. (2005). The involvement of distinct visual channels in rapid attention towards fearful facial expressions. *Cognition & Emotion*, *19*(6), 899-922. Doi: 10.1080/02699930441000454

Holmqvist, K., Nystrom, M., Andersson, R. Dewhurst, R., Jarodzka, H., & Van de Weiher, J. (2011). *Eye tracking: A comprehensive guide to methods and measures*. Oxford University: Press.

Johnson, M. D., Horne, R. M., Hardy, N. R., & Anderson, J. R. (2018). Temporality of couple conflict and relationship perceptions. *Journal of Family Psychology*, *32*(4), 445-455. Doi: 10.1037/fam0000398

Juster, R. P., McEwen, B. S., & Lupien, S. J. (2010). Allostatic load biomarkers of chronic stress and impact on health and cognition. *Neuroscience Behavioral Research*, *35*, 2-16. Doi: 10.1016/j.neubiorev.2009.10.002

Karemaker, J. M. (2017). An introduction into autonomic nervous function. Physiological Measurement, 38(5), 89-118. Doi: 10.1088/1361-6579/aa6782

Katz, L. F., & Gottman, J. M. (1993). Patterns of marital conflict predict children's internalizing and externalizing behaviors. *Developmental Psychology*, *29*(6), 940-950. Doi: 10.1037/0012-1649.29.6.940

Korte, S. M., Koolhaas, J. M., Wingfield, J. C., & McEwen, B. S. (2005). The Darwinian concept of stress: Benefits of allostasis and costs of allostatic load and the trade-offs in

health and disease. *Neuroscience & Biobehavioral Reviews*, *29*(1), 3-38. Doi: 10.1016/j.neubiorev.2004.08.009

Kuhlman, K. R., Repetti, R. L., Reynolds, B. M., & Robles, T. F. (2018). Interparental conflict and child HPA-axis responses to acute stress: insights using intensive repeated measures. *Journal of Family Psychology*, *32*(6), 773-782. Doi: 10.1037/fam0000437

Laurent, H. K. (2014). Clarifying the contours of emotion regulation: Insights from parent-child stress research. *Child Development Perspectives*, *8*, 30–35. doi:10.1111/cdep.12058.

Levenson, R. W. (2014). The autonomic nervous system and emotion. *Emotion Review*, *6*(2), 100-112. Doi: 10.1177/1754073913512003

Lucas-Thompson, R. G. (2012). Associations of marital conflict with emotional and physiological stress: Evidence for different patterns of dysregulation. *Journal of Research on Adolescence*, *22*(4), 704-721. Doi: 10.1111/j.1532-7795.2012.00818.x

Lundqvist, D., Flykt, A., & Ohman, A. (1998). *The Karolinska Directed Emotional Faces-KDEF [CD-ROM]*. Department of Clinical Neuroscience, Psychology section, Karolinska Institutete, Stockholm, Sweden.

MacLeod, C., Mathews, A., & Tata, P. (1986). Attentional bias in emotional disorders. *Journal of Abnormal Psychology*, *95*(1), 15-20. Doi: 10.1037/0021-843X.95.1.15

Mann, B. J., & Gilliom, L. A. (2004). Emotional security and cognitive appraisals mediate the relationship between parents' marital conflict and adjustment in older adolescents. *Journal of Genetic Psychology: Research and Theory on Human Development*, *165*(3), 250-271. Doi: 10.3200/GNTP.165.3.250-271

Mathews, A. MacLeod, C. (2002). Induced processing biases have causal effects on anxiety. *Journal of Cognitive Emotion*, *16*(3), 331-354. Doi: 10.1080/02699930143000518

McCoy, K. P., Cummings, M. E., & Davies, P. T. (2009). Constructive and destructive marital conflict, emotional security and children's prosocial behavior. *Journal of Child Psychology and Psychiatry*, *50*(3), 270-279. Doi: 10.1111/j.1469-7610.2008.01945.x

McCoy, K. P., George, M. R., Cummings, E. M., & Davies, P. T. (2013). Constructive and destructive marital conflict, parenting, and children's school and social adjustment. *Social Development*, 22(4). Doi: 10.1111/sode.12015

Miller-Graff, L. E., Cummings, E. M., & Bergman, K. N. (2016). Effects of a brief psychoeducational intervention for family conflict: Constructive conflict, emotional insecurity and child adjustment. *Journal of Abnormal Child Psychology*, *44*, 1399-1410. Doi: 10.1007/s10802-015-0102-z

Montoya, A. K., & Hayes, A. F. (2017). Two-condition within-participant statistical mediation analysis: A path-analytic framework. *Psychological Methods*, *22*(1), 6-27. Doi: 10.1037/met0000086

Obradovic, J., Bush, N. R., & Boyce, T. W. (2011) The interactive effect of marital conflict and stress reactivity on externalizing and internalizing symptoms: The role of laboratory stressors. *Development and Psychopathology*, *23*, 1, 101-114. Doi: 10.1017/S0954579410000672

Oh, J. K., Lee, S., & Park, S. H. (2011). The effects of marital conflict on Korean children's appraisals of conflict and psychological adjustment. *Journal of Child and Family Studies*, 20(*4*), 444-451. Doi: 10.1007/s10826-010-9411-6

O'Leary, S. G. & Vidair, H. B. (2005). Marital adjustment, child-rearing disagreements, and overreactive parenting: Predicting child behavior problems. *Journal of Family Psychology*, *19*(2), 208-216. Doi: 10.1037/0893-3200.19.2.208

Orquin, J. L., Ashby, N. J. S., Clarke, A. D. F. (2016). Areas of interest as a signal detection problem in behavioral eye-tracking research. *Journal of Behavioral Decision Making*, *29*, 103-115. Doi: 10.1002/bdm.1867

Petit, G. S., Dodge, K. A., & Brown, M. M. (1988). Early family experience, social problem solving patterns, and children's social competence. *Child Development*, *59*(1), 107-120. Doi: 10.2307/1130393

Pine, D. S., Mogg, K., Bradley, B. P., Montgomery, L., Monk, C. S., McClure, E., & Kaufman, J. (2005). Attention bias to threat in maltreated children: Implications for vulnerability to stress-related psychopathology. *American Journal of Psychiatry*, *162*, 291-296. Doi: 10.1176/appi.ajp.162.2.291

Psychology Software Tools, Inc. [E-Prime 3.0]. (2016). Retrieved from http://www.pstnet.com.

Rigby, S. N., Stoesz, B. M., & Jakobson, L. S. (2016). Gaze patterns during scene processing in typical adults and adults with autism spectrum disorders. *Research in Autism Spectrum Disorders*, *25*, 24-36. Doi: 10.1016/j.rasd.2016.01.012

Roy, A. K., Vasa, R. A., Bruck, M., Mogg, K., Bradley, B. P., Sweeny, M., & CAMS Team (2008). Attention bias toward threat in pediatric anxiety disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*, *47*, 1189-1196. Doi: 10.1097/CHI.0b013e3181825ace

Rutter, M. (1994). Family discord and conduct disorder: Cause, consequence, or correlate? *Journal of Family Psychology*, *8*(2), 170-186. Doi: 10.1037/0893-3200.8.2.170

Sagliano, L., Trojano, L., Amoriello, K., Migliozzi, M., & D'Olimpio, F. (2014). Attention biases toward threat: the concomitant presence of difficulty of disengagement and

attentional avoidance in low train anxious individuals. *Frontiers in Psychology*, *5*, 685-690. Doi: 10.3389/fpsyg.2014.00685

Salafia, E. H., Schaefer, M. K., & Haugen, E. C. (2014). Connections between marital conflict and adolescent girls' disordered eating: Parent-adolescent relationship quality as a mediator. *Journal of Child and Family Studies*, *23*, 1128-1138. Doi: 10.1007/s10826-013-9771-9

Salum, G., A., Mogg, K., Bradley, B. P., Stringaris, A., Gadelha, A., …Leibenluft, E. (2017). Association between irritability and bias in attention orienting to threat in children and adolescents. *Journal of Child Psychology and Psychiatry*, *58*(5), 595-602. Doi: 10.1111/jcpp.12659

Siepmann, M., Heine, B., Kluge, A., Ziemssen, T., Much-Weymann, M., & Kirch, W. (2007). The effects of lorazepam on skin conductance responses to aversive stimuli in healthy subjects. *Clinical Autonomic Research*, *17*, 160-164. Doi: 10.1007/s10286-007-0407-2

Siffert, A., & Schwarz, B. (2011). Parental conflict resolution styles and children's adjustment: Children's appraisals and emotion regulation as mediators. *The Journal of Genetic Psychology: Research and Theory on Human Development*, *172*(1), 21-39. Doi: 10.1080/00221325.2010.503723

Sullaway, M., & Christensen, A. (1983). Assessment of dysfunctional interaction patterns in couples. *Journal of Marriage and the Family*, *45*(3), 653-660. Doi: 10.2307/351670

Tavassolie, T., Dudding, S., Madigan, A. L., Thorvardarson, E., & Winsler, A. (2016). Differences in perceived parenting style between mothers and fathers: Implications for child outcomes and marital conflict. *Journal of Family Studies*, *25*, 2055-2068. Doi: 10.1007/s10826-016-0376-7

Turner, H. A., & Kopiec, K. (2006). Exposure to interparental conflict and psychological disorder among young adults. *Journal of Family Issues*, *27*(2), 131-158. Doi: 10.1177/0192313X05280991

Wells, A., & Matthews, G. (1994). *Attention and emotion: A clinical perspective*. Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Yiend, J. & Mathews, A. (2001). Anxiety and attention to threatening pictures. *Quarterly Journal of Experimental Psychology*, *54*(3), 665-681. Doi: 10.1080/713755991

Zhou, N., & Buehler, C. (2017). Adolescents' responses to marital conflict: The role of cooperative marital conflict. *Journal of Family Psychology*, *31*(7), 910-921. Doi: 10.1037/fam0000341

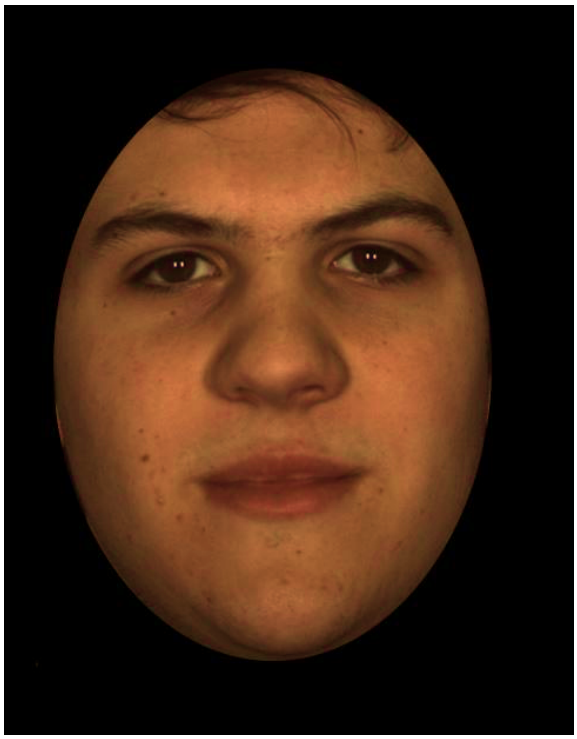
Appendix A

Dot Probe Faces

Angry Face Examples

Neutral Face Examples

Happy Face Examples



VITA

Lauren Nicole Tidman was born August 26, 1995, in Houston, Texas. She is the daughter of Melissa Tidman and James Tidman. A 2013 graduate of Cedar Ridge High School, Round Rock, Texas, she then received a Bachelor of General Studies degree with a focus on psychology, biology, and addictive disorders from Texas Tech University in Lubbock, Texas, in 2016.

After receiving her Bachelor of General Studies degree, she enrolled in the Experimental Psychology Program at Texas Christian University, where she received her Master of Science degree in 2019. While working on her Master of Science degree, she held a Teaching Assistantship during the years 2017-2019. Since August 2019 she has been working as a project manager and research analyst at a market research company.

She is engaged to Cody Lee Braun of Round Rock, Texas. They have two dogs and three fish.

ABSTRACT

THE ROLE OF THREAT DETECTION IN CHILDREN'S PHYSIOLOGICAL RESPONSES TO MARITAL CONFLICT

by Lauren Nicole Tidman, M.S., 2019
Department of Psychology
Texas Christian University

Thesis Advisor: Naomi Ekas, Associate Professor

Destructive marital conflict can negatively impact children's socioemotional development. Emotional security theory (EST) postulates that the quality of the parent's relationship impacts the child's security in their family. Revisions to EST have hypothesized that children may be attuned to social threat cues, such as angry faces, during marital conflict and those cues may be influencing their responses to marital conflict. The current study had several goals: 1) to examine factors influencing attention to social threat cues, and 2) to determine the extent to which attention to social threat cues predicts responses to interparental conflict. Participants consisted of 28 adolescents between the ages of 10 and 17, who completed a dot probe task and viewed marital conflict videos while having their physical responses measured. Results showed that time spent viewing threat cues was not a mediator of physiological or behavioral responses to marital conflict, but that as threat bias increased, time spent focusing on facial threat cues decreased. Implications and future directions are discussed as well.