

**Respiratory Sinus Arrhythmia and Emotional Responding to Dyadic Discussions of a  
Disagreement as Predictors of Helping Related Subjective Well-Being  
in Older Mothers and Their Adult Daughters**

by

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A thesis  
Submitted in partial fulfilment  
Of the requirements for the degree  
Master of Arts

Department of Psychology  
BROCK UNIVERSITY  
St. Catharines, Ontario

January 2014

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## Abstract

The current study considered affect-related variables as predictors of the quality of helping relationships between older mothers and their adult daughters. Specifically, self-reported and observed emotional responses to the dyadic discussion of a disagreement between mothers and daughters, as well as baseline measures of respiratory sinus arrhythmia were considered as predictors of mothers' and daughters' satisfaction with their helping relationships. Relationship satisfaction was measured by considering mothers' and daughters' subjective well-being specifically in regards to the help they gave and received. Overall, these variables predicted more variance in mothers' satisfaction with their helping relationships than daughters', and RSA (respiratory sinus arrhythmia) was a stronger predictor than the self-reported or observed emotional reactions to the dyadic discussion of a disagreement. Implications of these findings and limitations to the current study are discussed.

## Acknowledgements

I would first like to thank my advisor, Tanya Martini, for her countless hours of deliberation on this project. It has been a pleasure to work with Tanya for the last two years. From the beginning of our time together in this capacity I have appreciated that she has been approachable and always willing and available to help. Her professionalism and fair-mindedness have made the process of writing and editing this paper smooth, as she has always taken care to consider my needs and preferences. I have consistently felt that Tanya's intentions have been to help me grow as a professional. This has meant that she has spent a tremendous amount of time assisting me with this project as well as helping me with professional development outside of my thesis work. Tanya has gone beyond her duty in guiding me, including helping me learn the process of writing successful scholarship applications. I have learned a great deal from Tanya, who is an inspirational teacher, writer, and researcher. Perhaps most importantly, Tanya has provided a context for me to be comfortable in expressing my thoughts and concerns as a learner; I believe Tanya's genuine concern for me as her student has been pivotal in the successful completion of this research. I want to sincerely thank you Tanya for the insight and care you have shown in guiding me with this research, and for providing a supportive learning environment along the way. I feel grateful for the open communication we have shared - I have always been able to feel at ease about and look forward to our meetings and trust that we will have more positive interactions in the years ahead.

I would also like to thank my committee members, Kathy Belicki and Michael Busseri, for their dedication to this research. They have both given considerable effort to providing me valuable, detailed feedback that greatly improved the quality of this research. They have both been encouraging and extremely helpful throughout the process. Michael, I appreciate very much

the time you have taken to consult with me on numerous occasions. I have always left your office feeling that I could tackle the next step in my research competently with a solid understanding of something I did not know before I entered the room. I have been inspired on numerous occasions by your ability to skillfully lead me to find solutions to important theoretical and statistical problems, often by simply being positive and accepting, while asking questions that stimulate thought. Kathy, I appreciate you coming out to support me at presentations of this research and sharing your insight and positive encouragement along the way. Your attention to detail and the care you have put into drafts of this paper have been invaluable contributions. Having worked with you in other capacities (i.e., as your teaching assistant and undergraduate student), I have been moved by the dedication you have shown to your students on many occasions. In fact, as the professor of my first Psychology course, you were among the most influential figures affecting my decision to take Psychology as my undergraduate major and to attend graduate school in Psychology. I am grateful to have had the opportunity to work with such knowledgeable professionals who have been so willing to go out of their way to help.

I would like to thank those who have helped build the foundation for me entering graduate school: My father, who has always told me that I could achieve whatever I set my mind to. From the time I was a young child my father has celebrated every accomplishment I have had. I cannot express how this encouragement has influenced the course of my education and life. Thank you for pushing me to be all that I can be. I would also like to thank his wife, and my friend, Carole, for cooking me meals, lending a listening ear, and always being a support during my time as a student. I would like to thank my siblings, James, Brittney, and Brandon for always encouraging my educational goals and inspiring me to ask questions and find answers to social

dilemmas. Sharing experiences and stories with one another has been among the most valuable learning experiences I have had in studying family dynamics to this point.

I would like to thank my partner and his son for their unconditional love and understanding throughout the process of this research. They have both helped with other areas of my life when I have been hard at work. They have both supported me in pursuing my goals endlessly. Wayne, you have made my best days working on this research even brighter and have helped make the difficult days more bearable. I cherish the time that you have spent listening to my research ideas and sharing your intellect. I appreciate your patience and I owe so much credit to you and Aidan for respecting the quiet-time I have needed to spend to complete this research. You have both taught me a tremendous amount about honouring my own needs throughout the process. I appreciate so much that my celebration of having finished this research is one you will both celebrate as if it were your own. Above all else, I appreciate that together we create a family that continues to develop and grow as a unit. This provides a space where it is possible to flourish, evolve, and pursue our individual ambitions - I could not ask for a better context to achieve happiness and academic success.

I would like to thank my mother who passed along to me her spirit of strength and determination, which has brought me to this point. I have thought back to memories of her more times than I can count during this study of mothers and daughters - each time I have been grateful for the bond and unconditional love we shared. My mother's kind-heartedness has been a driving force for my career path to this point and I plan to continue to seek answers to questions that could help improve the lives of others as well as apply this knowledge in my work. Her father (my grandfather) also figured prominently in my drive to complete graduate school. My career aspirations became dreams that belonged to my grandfather as well. Having someone who

wants your success as much (or more) than you do is something not to be taken for granted. As I close this chapter of my life-long learning, I will remember the importance of love.

I want to thank those who have funded this research, as this would not have been possible without the financial means. I would like to acknowledge the Ontario Graduate Scholarship, as well as the Social Sciences and Humanities Research Council. I would also like to thank Ralph D. Morris for his generous donation to the Ralph D. Morris award and Brock University for their contributions to the Dean of Graduate Studies Excellence Award and the President's Surgite Award.

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## Introduction

Perhaps the most influential factor affecting relationship outcomes is emotional responding, which impacts social life from the very beginning of the lifespan (Coan, 2008). Areas of the prefrontal cortex that are implicated in emotional experience and regulation affect the development of attachment relationships by encoding automatic or conditioned responses to significant others (Coan, 2008). Thus, from infancy, an individual's emotional tendencies, in conjunction with their learned emotional responses, will affect outcomes in their most significant personal relationships. For example, infants who score higher on temperamental difficulty have been found to have lower attachment security than those who are less difficult (Ispa, Fine, & Thronburg, 2002). Further, greater emotional availability in mothers has been associated with more positive mother-infant relationship quality (relationship quality was assessed by measuring the attachment between mothers and infants; Iv, Aviezer, Gini, Sagi, & Koren-Karie, 2010). As children approach school age, and have more interaction outside of the family, their emotional responses may impact their relationships outside of the family unit to a greater extent than they had previously. At this stage of development, emotions are thought to play a fundamental role in moral development and social competence, both of which are crucial to positive interpersonal relationships in childhood and beyond (Eisenberg, 2000; Spegman, 2000).

With regard to adulthood, most research concerning the impact of emotional responding on interpersonal relationship outcomes has been conducted in the context of romantic relationships. In general, partners who display more positive affect and are better able to manage negative affect tend to have more satisfying and enduring relationships (Gottman et al., 2003). For example, displays of positive affective states during interactions between couples predict

greater relationship satisfaction, whereas the majority of negative emotional expressions predicted lower levels of relationship satisfaction (Gottman et al., 2003).

As opposed to investigating the widely studied population of adult romantic partners, the current study considers the relation between emotional responding and relationship outcomes in bidirectional intergenerational helping relationships. This research specifically examines the helping relationships between older mothers and their adult daughters, a group that is more likely to engage in helping behaviour than any other dyad combination within the family (Walker, Martin, & Jones, 1992). This tendency may be explained by the socially proscribed roles of women as helpers (Batson, 1998), women's greater expectations that they will experience increased positive mood as a result of both giving and receiving help (Sprecher, Fehr, & Zimmerman, 2007), and the fact that women tend to live longer and may require more help as they reach older adulthood (Barford, Dorling, Smith, & Shaw, 2006).

Studying helping relationships among aging family members is important for at least three reasons. First, it is not uncommon for familial helping patterns to change as parents age and have greater need for support (Brody, Johnsen, Fulcomer, & Lang, 1983), and North American demographics suggest that this type of helping will become increasingly common as the baby boomers and their children age (Needham et al., 2005). Second, much of the existing research on helping-related behaviour in intergenerational relationships has focused on the negative effects caregivers experience when providing help to frail elderly relatives (Rie, Satoshi, Taichi, & Marumi, 2003), though some studies have examined the benefits of providing such care (Koerner, Kenyon, & Shirai, 2009). In the present study helping-relationship outcomes are examined from both the provider's and the recipient's point of view, and the focus is on the more reciprocal intergenerational helping relationships that exist when older parents are still in

relatively good health (Blieszner, 2006). Third, helping relationships among family members are a particularly important realm of investigation because the outcomes in such relationships have been related to many other outcome measures such as job satisfaction, marital satisfaction, life satisfaction and mental and physical well-being (Burke & Weir, 1977).

### **Subjective Well-Being as a Measure of Relationship Quality**

Relationship quality has been assessed by several different means. For instance, one early conceptualization of relationship quality was that it could be assessed by measuring dyadic adjustment (or the degree to which a dyad experiences satisfaction, consensus, cohesion, and affectional expression; Spanier, 1976). Another line of research has measured relationship quality by assessing the degree to which a dyad experiences tenderness, togetherness, and communication (Bodenmann, Pihet, & Kayser, 2006). Other researchers have concluded that global evaluations of relationship satisfaction are the best indicators of relationship quality (Norton, 1983). To date, there has been no clear consensus among researchers regarding a set definition of relationship quality. While most studies, including the ones just mentioned, include subjective appraisals of well-being in relationships, some have also included assessments of affect in interpersonal relationships (Birditt & Antonucci, 2007).

The current study considers relationship-specific subjective well-being (SWB) as a measure of relationship quality. SWB refers to an individual's perceived level of happiness or well-being, and has been commonly used as an overall measure of life quality (Diener, 1984). A well-established view of SWB suggests that this construct includes three related but distinct components: satisfaction, positive affect, and negative affect (Diener, 1984). While satisfaction (the cognitive component of SWB) has been the focus of much research on specific life domains, such as work or relationships (Schimmack, 2009), the affective components (positive and

negative affect) of SWB specific to particular life domains have been addressed less often (Martini & Busseri, 2010). Assessing SWB as a composite reflecting both its cognitive and affective components provides a more complete account of an individual's perceived level of happiness than prior models, most of which neglected one or more of these three domains (Schimmack, 2009).

The current study investigates both the cognitive and affective components of SWB specifically in the domain of helping relationships (i.e., helping-related subjective well-being; HRSWB). Both the cognitive and affective components of SWB are likely to be prevalent within familial helping relationships, as these relationships are emotionally charged contexts (Collins & Feeney, 2000) that evoke a range of feelings and cognitions. For example, receivers of help may feel defensive, hostile, or thankful toward their helpers, and helpers may experience a spectrum of emotions such as resentment, concern, and affection toward the one they care for (Walker et al., 1992).

### **Socioemotional Processes as Predictors of Intergenerational HRSWB**

Personality factors underlying socioemotional processes have been found to be among the strongest predictors of SWB (Diener & Seligman, 2002). For instance, happier individuals have been found to have higher levels of agreeableness and extraversion, and lower levels of neuroticism, than those who were less happy (Diener & Seligman, 2002). Findings from this same research indicated that good social relations were essential for an individual to be happy and that very happy individuals were capable of a range of adaptive emotional responses. Given these findings, it is reasonable to investigate the role of emotions in determining SWB.

The quality of familial helping relationship outcomes also seem to vary according to partners' emotional reactions, although investigation in this area has been scarce. Only one study

to date has considered intergenerational helping behaviour in terms of all three components of SWB (satisfaction, positive and negative affect) for both partners in a relationship. This study was conducted by Martini and Busseri (2010), who investigated the relation between emotion regulation goals, emotion regulation strategies, and HRSWB among 77 older mothers and their adult daughters.

Emotion regulation strategies refer to the range of cognitive and behavioral processes that may be used to escape unwanted emotions, alter which emotions are experienced and expressed, and change the valence of emotional experiences and expressions (Campos, Mumme, Kermoian, & Campos, 1994; Gross & Thompson, 2007). In the adult development literature, emotion regulation strategies have been separated into two broad categories: passive and proactive (Coats & Blanchard-Fields, 2008). Passive strategies are those intentionally used to escape the experience of negative emotion (e.g., suppressing emotions, avoiding conflict, distracting oneself from an unwanted emotion, and reappraising a situation to avoid unwanted emotion). Alternatively, proactive strategies are those that involve the direct confrontation of negative emotion (e.g., expressing feelings, deliberate reflection on experienced emotions, and actively seeking advice regarding emotion-eliciting events).

Emotion regulation goals refer to the motives behind decisions to regulate emotion, and have been broken down into two distinct categories: self-oriented and other-oriented goals (Martini & Busseri, 2010). Self-oriented goals involve self-serving motivations aimed at avoiding negative consequences for oneself (e.g., being fired from work or going to jail). Conversely, other-oriented goals refer to motivations that stem from a desire to benefit other individuals or avoid negative consequences for them (e.g., causing someone else distress).

Martini and Busseri (2010) were interested in mothers' and daughters' emotion regulation goals and strategies as predictors of both their own and the other dyad members' HRSWB. To study these relations, Martini and Busseri used the Actor-Partner Interdependence Model (APIM), an analytic approach that has been used to study parent-child dyads at various life stages (Fingerman, Pitzer, Lefkowitz, Birditt, & Mroczek, 2008). This type of analysis considers two different dyadic effects (actor effects and partner effects), while addressing the statistical interdependence between data from each dyad member (Cook & Kenny, 2005). This approach is ideal for dyadic data, given that each member of the dyad plays a role in determining both their own outcomes and those of the other dyad member (Cook & Kenny, 2005).

With regard to *outcomes for the self*, both mothers' and daughters' greater endorsement of other-oriented goals to regulate emotion in the helping relationship were related to greater satisfaction and greater positive affect in the helping relationship. The results also indicated that mothers' and daughters' greater use of passive strategies to regulate emotion were related to reports of lower satisfaction, greater negative affect, and lower positive affect for the self.

Mothers' and daughters' emotion regulation strategies and goals were also considered as predictors of their *partners' outcomes*: Daughters' greater use of proactive strategies predicted lower negative affect for their mothers, whereas greater use of passive strategies predicted partner reports of lower satisfaction for both mothers and daughters, and greater negative affect for daughters only. These findings suggest a link between the emotional components of communication and HRSWB.

One limitation of the work by Martini and Busseri (2010) is that it relied solely on self-report measures of emotional responding. The current study seeks to extend Martini and Busseri's findings by investigating physiological and observational measures of mothers' and

daughters' emotional responding as predictors of both their own HRSWB, as well as that of their partner.

### **The Importance of Negative Affect and Conflict**

Given the established link between HRSWB and emotion regulation strategies and goals, it is worth investigating whether other aspects of emotional exchanges in helping relationships predict HRSWB. Although a host of both positive and negative emotional events are likely to impact the functioning of any relationship, there is a substantial body of literature that suggests that negative events such as interpersonal conflict are stronger and more reliable predictors of relationship outcomes and overall well-being than positive emotional events (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Taylor, 2011). It has been theorized that humans' greater attentiveness toward negative stimuli and greater sensitivity to negative stressors serve an adaptive function, as appropriate and immediate responses to negative events are more crucial to survival than reactions to positive events (Baumeister et al., 2001). This idea that humans have adapted in such a way that negative predictors matter more than positive ones has been called the *negativity effect* and it has been observed across a vast array of psychological phenomena (Baumeister et al., 2001). For example, Rafaeli, Cranford, Green, Shrout and Bolger (2008) found *social hindrance* (a broad measure of interpersonal conflict) to be a stronger predictor of negative relationship feelings than social support. Similar findings have been reported among older widowed females, for whom negative aspects of social life are more strongly related to psychological well-being than are positive aspects (Rook, 1984).

Given the importance of negative emotional events in predicting well-being and relationship outcomes, emotional responding during conflict is likely to be an important predictor of relationship quality. The salience of relationship conflict has been linked to the

perceived quality of mother, father, and friend relationships among adolescents (as measured by self-reported relationship satisfaction; Van Doorn, Branje, Hox, & Meeus, 2009). Moreover, results from this study revealed that relationship quality was perceived as lowest on days when unconstructive conflict occurred, suggesting that negative emotional reactions to conflict between dyad members is an important factor in determining relationship quality. Other findings in support of this notion come from research on romantic relationships. For example, when resolving a high conflict issue, couples that displayed defensiveness, stubbornness, and withdrawal from the interaction were more likely than those who did not display this type of negativity to end up in divorce (Gottman & Krokoff, 1989). Additionally, participants' ability to de-escalate negative affect presented by their romantic partner when discussing an ongoing source of disagreement (an ability that requires effective emotion regulation) has been negatively associated with divorce (Gottman, Coan, Carrere, & Swanson, 1998).

The importance of negative emotional events in determining subjective appraisals of relationship quality has been demonstrated in research specific to HRSWB as well. Prior research by Martini, Grusec, and Bernardini (2001) revealed that mothers' and daughters' attributions about their partner during a negative helping situation were among the strongest predictors of their own satisfaction during helping exchanges in which the daughter was providing help to her mother. This suggests that a relationship may exist between the cognitions and emotions that occur during negative interactions and HRSWB.

### **Measuring Emotion During Conflict**

In the current study, mothers and daughters engaged in a discussion regarding a recent disagreement that had occurred between them. The intent of this activity was to reveal dyadic patterns of emotional responding during conflict. Studying emotions as social phenomena that

are inseparable from social interactions answers a call from researchers to include social interactions in investigations of emotion (Fischer & van Kleef, 2010). These same researchers have contended that emotions may be theoretically viewed as *social movements* that are more than the sum of appraisals, behaviours, and physiological reactions (as they have typically been conveyed in the literature to date). Instead, emotions may be understood as a process of interaction between one individual and another who is the object of their emotion. This understanding of emotional expressions during interactions as social movements supports the idea that negative emotional expressions during interpersonal interactions may be negatively related to relationship quality for *both* partners. From this perspective, mothers' or daughters' expressions of negative emotion during conflict will influence both their own and the other dyad member's emotional reactions in other contexts in such a way as to diminish both members' perception of relationship quality. By studying mothers' and daughters' emotions during the joint construal of a recent disagreement (i.e., their co-constructed emotional reactions), rather than solely measuring independent reactions to relational conflict-related stimuli, the richness of the social element of this emotionally charged context is largely preserved.

While the preceding discussion elucidates the importance of eliciting emotion in social contexts, there is great debate in affective research regarding which measures will best capture emotional responding. Some researchers have endorsed subjective appraisals of emotion (Zhou et al., 2002), whereas others have employed more objective measures of physiological arousal (Vos, DeCock, Petry, Van Den Noortgate, & Maes, 2010), or behavioural responses (Ekman & Rosenberg, 2005). Still, there are researchers who argue that these three different types of measures, although related, assess distinct aspects of emotional responding and that none should be considered superior to any other (Mauss & Robinson, 2009). Further, each method comes

with its own strengths and limitations. The following sections outline some of the key issues relevant to the measure of emotion in the current study.

**Self-report measures of emotion.** Asking participants to answer a series of questions related to their emotional experience and expression has been the predominant method used in both emotion and HRSWB research. Some researchers have affirmed this approach as having sound construct validity, given that self-report measures of emotion correspond with measures of personality as well as other measures of emotion (Watson & Clark, 1994; Watson & Vaidya, 2003). There are several reasons why subjective reports of emotion are useful, not the least of which is that these methods are easy to administer and avoid introducing the bias of a coder or observer. Furthermore, some constructs involving an affective component, such as those that are inherently subjective in nature (e.g. SWB), may be best measured by means of self-report measures for theoretical reasons (Eid & Larsen, 2008). The current study employed a self-report measure of affect to capture the affective responses of mothers and daughters to the dyadic discussion of a disagreement. *It was expected that both mothers' and daughters' self-reported affect regarding the dyadic discussion of a disagreement would predict HRSWB for both the self and the partner, such that lower negative affect and greater positive affect would be associated with greater HRSWB (Hypothesis 1a).*

Despite the benefits of self-report measures, the sole use of self-report to measure affect presents limitations. It has been suggested that self-report measures of emotion are problematic insofar as their usefulness depends on the capacity and willingness of participants to recognize, quantify, and accurately report their emotional responses (Gray & Watson, 2001). There are a multitude of reasons to take these concerns seriously. First, the retrospective nature of many self-report measures presents an issue that has been referred to as *duration neglect*: the tendency of

people to recall peak moments when reporting on their experiences, while neglecting the duration of such feelings (Gray & Watson, 2001; Sato & Kawahara, 2011). *Recency effects* may also present a dilemma for researchers, as participants tend to weigh the significance of proximal events more heavily than those events that are more distal (Gray & Watson, 2001; Sato & Kawahara, 2011). Even in cases where these two effects do not impede the accuracy of the data and participants are aware of how they are feeling, participants may respond to many items on a rating scale in a similar manner while neglecting the content therein (i.e., *acquiescence*), or they may choose to tailor their answers in order to portray themselves in a particular fashion (i.e., *socially desirable responding*; Gray & Watson, 2001). Furthermore, some findings suggest that the ability to accurately identify positive and negative emotions may change depending on one's physiological state (e.g., low physiological arousal has been associated with greater ability to detect positive emotions; Levenson & Ruef, 1992). Thus, physiologically arousing events and social situations may present additional difficulties for using self-report measures of emotion.

Despite these limitations, past research on HRSWB (e.g., Martini & Busseri, 2010) has relied heavily on self-report measures to address questions related to emotion. The present study seeks to extend the existing body of literature through the inclusion of observational and physiological measures to supplement the use of self-report for measuring the affective component of conflict-based communication within helping relationships.

**Observational measures of emotion.** Observational coding schemes allow researchers to avoid many limitations associated with self-report measures. Initially, the observational methods developed to study emotion were concerned with micro-level measurements of muscle movement (i.e., measurement of the smallest units of facial expressions; Cohn, Ambadar, & Ekman, 2007; and measurement of emotion-related vocal acoustics; Owren & Bachorowski,

2007). More recently, microanalytic emotion coding schemes have been expanded to include emotional behaviours such as body language and the emotional quality and content of speech (Gottman & Krokoff, 1989). One example of this type of macroanalytic coding scheme for emotion is the *Specific Affect Coding System* (SPAFF).

***The Specific Affect Coding System as a measure of emotional responding.*** The SPAFF offers an important advantage over former microanalytic strategies because it allows coding of emotion at the level of constructs (or latent variables). Coan and Gottman (2007) have articulated the theoretical underpinnings of the SPAFF. These authors asserted that emotions are latent constructs identifiable by several visible discrete indicators. For example, affection (one of the psychological constructs measured by the SPAFF) is considered a core latent variable that cannot be observed directly, but must be identified by means of its observable features (i.e., visible expressions that are considered affectionate). The logic underlying the development of this coding system was that emotions are complex and are expressed in a wide variety of ways (Coan & Gottman). It follows that the best means to identify latent constructs of emotional expression is to employ human coders who have gathered a history of experiences with emotional expression and who can integrate information from their experiences with visible indicators (Coan & Gottman). This approach presents the possibility that coder bias may actually be viewed, in some respects, as a benefit rather than a limitation of observational measures, which can then provide something meaningful (namely the complex integration of information from lived experience with the social world when identifying emotional expressions) to the measurement of emotion research.

The SPAFF consists of neutral, 5 positive (*humor, affection, interest, joy and validation*), and nine negative codes (*anger, disgust, contempt, belligerence, defensiveness, whining, sadness,*

*stonewalling, and fear*) and was initially developed for coding interactions between married dyads (Gottman, McCoy, Coan, & Collier, 1995). Gottman and colleagues (2003) found that among gay and lesbian married dyads engaging in an interaction with one another, all of the positive and negative affect constructs on the SPAFF significantly predicted marital satisfaction in the expected direction (with the exception of fear/tension). Furthermore, among heterosexual couples, SPAFF codes of dyadic conflict between the couple significantly predicted divorce and stability of the relationship (Gottman, et al., 1998).

The SPAFF has also been adapted for use with other dyads, including adult siblings. Wu Shortt and Gottman (1997) coded sibling interactions and combined related constructs on the SPAFF to generate several composite variables. Results revealed that close siblings tended to experience greater positive affect (humor, affection, interest, and validation) and fewer power struggles (domineering, belligerence, and defensiveness) than those who were less close.

The current study employed the SPAFF as the means of measuring the affect expressed by older mothers and their adult daughters during the discussion of a recent disagreement. *It was expected that greater positive affect and less negative affect expressed during the discussion of a recent disagreement (as reflected in SPAFF scores) would be related to greater HRSWB for both the self and the other dyad member (Hypothesis 1b).*

**Physiological measures of emotion.** Physiological measures of emotion allow researchers to escape the limitations of both self-report and observational measures, while providing objective, continuous, and indirect means of measuring emotion (Johnstone, Kim, & Whalen, 2009). Physiological measures of emotion include electroencephalogram and functional magnetic resonance imaging (both of which measure brain activity; Johnstone et al., 2009), electromyography (which measures muscle movements in the face by means of electrodes;

Walla, Brenner, & Koller, 2011), as well as multiple measures of autonomic nervous system (ANS) functioning (e.g., electrocardiogram; Porges, 2009; and pupillary responses; Libby, Lacey, & Lacey, 1973). Most of these measures carry the benefit of being minimally invasive.

***Cardiac Vagal Tone as a physiological marker of emotional responding.*** One well-established ANS marker of emotional responding is cardiac vagal tone, which can be understood as the product of nerve impulses from the vagus nerve (Movius & Allen, 2005; Santucci, Silk, Shaw, Gentzler, Fox, & Kovacs, 2008). The vagus nerve (also referred to as the tenth cranial nerve) is located in the brain stem and is centrally controlled by the medial prefrontal cortex via the anterior cingulate cortex. The vagus nerve sends and receives information from various parts of the body (including both organs and brain structures) via myelinated nerve fibres (Porges, Doussard-Roosevelt, & Maiti, 1994).

The vagus nerve is responsible for the parasympathetic activity of a number of organ functions, including the parasympathetic suppression of heart rate (Porges et al., 1994). As a result, respiration has a direct influence on heart rate — with each inhale heart rate increases and with each exhale heart rate decreases. This decrease in heart rate that accompanies exhalation is the product of the parasympathetic nervous system suppressing unnecessary heartbeats. During this process, the vagus nerve asserts vagal control over the sympathetic nervous system (Benarroch, 1997).

This parasympathetic control (called cardiac vagal tone) is considered central to a number of adaptive functions including emotion regulation (Porges et al., 1994; Porges, 2009). According to *Porges' Polyvagal Theory* (2009), the benefit offered by vagal suppression of heart rate (i.e., control over an excited sympathetic nervous system that would otherwise run rampant) results from mammals' highly evolved parasympathetic nervous system (Porges et al., 1994).

Sympathetic hyperactivity has serious health consequences, ranging from metabolic syndromes and obesity (Lambert, Stranznicky, Lambert, Dixon, & Schlaich, 2010) to severe heart failure (Kaye, et al., 1995). Thus, higher vagal tone promotes health in a multitude of ways by reducing undue strain on the heart and improving cardiac gas exchange (Yasuma & Hayano, 2004). High vagal tone is also related to a host of other positive health-related outcomes such as reduced hypertension and cardiovascular disease (Thayer & Lane, 2007), and has been found to buffer individuals against the impact of psychological health risks. For example, vagal tone has been found to mediate the relation between smoking and depression (Taylor, et al., 2011).

Additionally, research has demonstrated that highly rejection-sensitive individuals reported a lessened ability to control their emotional states and greater hostility in conflict, but among those who also had lower vagal tone (Gyruk & Adyuk, 2008). The authors of this research explain that high vagal tone may protect highly rejection-sensitive individuals against the difficulties of controlling negative affect and a tendency to engage in hostile behaviours during romantic conflict.

***Baseline Respiratory Sinus Arrhythmia as a proxy for emotional responding.*** Normal vagal-controlled fluctuation of heart rate that occurs with breathing cycles is often assessed by means of a common physiological measure called respiratory sinus arrhythmia (RSA; Porges et al., 1994). While there is a vast body of literature that suggests RSA (which is extracted by means of ECG) is a reliable marker of emotional responding (Porges, 2009; Santucci et al., 2008; Vos et al., 2010), there is less certainty in the literature regarding the exact role of RSA in emotional responding (Butler, Wilhelm, & Gross, 2006).

One common analytical strategy used with RSA data is to consider baseline (i.e., resting) measures of RSA as an indicator of individual differences in adaptive emotional responding

(Beauchaine, 2001). *Polyvagal theory* states that vagal tone (commonly assessed by baseline RSA) is an index of the organization of an individual's central nervous system, and that this specific organization is what predisposes individuals to either be hypo- or hyper-reactive to arousing stimuli. Higher vagal tone promotes greater organization and consistency in autonomic responding because autonomic reactions can be enacted more quickly when necessary (Porges, 2009). Therefore, higher baseline RSA scores should be related to more adaptive emotional responding.

Developmental literature examining the period from infancy to middle adulthood (very little research has been done with older adults) supports this idea that baseline RSA is positively related to emotional flexibility and regulation, constructs which may present differently at different stages in life (Beauchaine, 2001). In a thorough review of the RSA literature, however, Beauchaine (2001) stresses that baseline measures of RSA should be understood in a developmental context, as RSA may be related to different aspects of emotional responding at different stages in the lifespan. For example, baseline RSA is generally positively related to negative emotionality in infancy, but positive emotionality and social competence in toddlerhood, childhood, adolescence and adulthood (Beauchaine, 2001). Beauchaine explains that these differences across the lifespan may represent generally adaptive changes in emotional responding, and that this is consistent with the idea that higher baseline RSA will show differential relations (positive or negative) with relationship-centred variables, depending on what is most adaptive in that context. For example, very young infants may express negative affect in order to elicit care, before they have the language needed to express their need for care. This is a normative, age-related stage in emotional development, characterised by greater engagement and responsiveness to the environment and higher baseline RSA. In contrast, by

adulthood, negative emotions are more likely to have negative implications for relationships (Gottman & Krokoff, 1989); consequently higher baseline RSA is often associated with the control of negative affect in dyadic interactions, particularly when the negative affect is directed at the partner (as opposed to an external target).

If it is understood that baseline RSA is an index of an individual's capacity to *appropriately* manage their autonomic responses (Beauchaine, 2001) then it need not be related specifically to either positive or negative emotional expressions under all conditions (Porges, 2009). Indeed, findings from the RSA literature appear to support this notion. For instance, Butler and colleagues (2006) asked women to watch an emotion-inducing film and to discuss this film in dyads. Results revealed a positive association between baseline RSA and expression of negative emotion during the dyadic exchange. Conversely, other researchers have found higher resting RSA in adults to be associated with lower negative emotional arousal to stressors and greater self-reported regulatory ability in the face of stressors (Fabes & Eisenberg, 1997). Though there is little research addressing emotional expressions during social interactions, at least one study demonstrated an inverse relation between baseline RSA and interpersonal hostility in normal healthy adults (Sloan et al., 1994).

For situations in which negative emotionality is an adaptive and appropriate response (as may have been the case in Butler et al.'s study in which participants discussed an upsetting film rather than expressing negative emotion toward one another), it makes sense that high baseline RSA is associated with greater expression of negative emotion. However, when the expression of negative emotion is likely to be maladaptive (e.g., directing hostile negative emotion toward a partner, as was the case in the study by Sloan et al., 1994), the most adaptive and appropriate response (i.e., the one that will preserve the quality of a significant interpersonal relationship) is

to carefully control the expression of negative emotions toward the other. Based on these findings, *mothers and daughters with higher baseline RSA in the current study were expected to show less negative emotion and greater positive emotion (assessed by the SPAFF) in response to a discussion of a disagreement (Hypothesis 2). Further, higher baseline RSA among mothers and daughters was expected to be positively related to greater levels of HRSWB for the self and other (Hypothesis 3).*

### **Baseline RSA as a Moderator of the Relationship Between Negative Affect and Relationship Quality**

The previous discussion outlined three associations based on previous research: expressions of negative emotion are inversely related to relationship quality; baseline RSA is positively associated with adaptive emotional responding (and presumably less negative and more positive affect in contexts such as interpersonal conflict); and baseline RSA is positively associated with adaptive social behaviour (and presumably the quality of interpersonal relationships). Given these relationships, another question that merits investigation is whether high baseline RSA serves as a protective factor against low relationship quality for those individuals who are exposed to greater negative affect from their relationship partners.

This question follows previous research that has considered baseline RSA as promoting resilience in the face of certain social stressors. For example, Katz and Gottman (1995) found that among children who had lower baseline RSA, greater exposure to parental marital hostility was related to greater externalizing behaviours. However, this relationship was not found for children who had higher resting RSA values. According to Katz and Gottman, children with higher baseline RSA were more resilient in the face of marital conflict between their parents than those children who did not have this protective factor. In addition, RSA has been found to

moderate the relation between parental marital conflict and children's socio-emotional difficulties and health problems: Higher resting RSA buffered children against higher levels of internalizing and externalizing behaviour, as well as other health problems associated with verbal marital conflict (El-Sheikh, Harger, & Whitson, 2001). Combined, these findings suggest that higher baseline RSA may serve as a buffer against the negative social outcomes associated with exposure to conflict and negative emotion.

In the context of the present study, high baseline RSA may act as a buffer against low HRSWB for individuals who are exposed to higher levels of negative emotion from their partners during conflict. The mechanism underlying this assertion may be as follows: Higher baseline RSA will provide individuals with a protective factor (i.e., the ability to manage their emotions adaptively) against their partners' negative emotional reactions to relational conflict, thereby diminishing the impact of these reactions on their perception of overall helping relationship quality. *Thus, it was expected that the hypothesized negative relationship between expressions of negative affect from the other dyad member (as assessed by the SPAFF) and HRSWB for the self (see Hypothesis 1b above) should be lower among those participants with high baseline RSA compared to those with lower RSA (Hypothesis 4).*

### **Generation and the RSA-Emotional Responding Relationship**

Age is an important factor that may affect both the expected inverse relationship between negative emotional responding and HRSWB, and the expected inverse relationship between baseline RSA and negative emotional responding. There are a multitude of reasons to expect generational differences in the current findings, the first of which is that there are developmental changes in RSA. Specifically, it has been found that baseline RSA is highest in infants but gradually diminishes with age (Porges et al., 1994; Uchino, Uno, Holt-Lunstad, & Flinders,

1999), a change that is thought to result from aging in the anterior cingulate cortex and the prefrontal cortex, both of which play key roles in vagal control (Thayer and Lane, 2007; Pardo et al., 2007).

While the majority of research reveals that older individuals have lower baseline RSA than their younger counterparts do, the expected deficits in the modulation of emotional responses have not been observed. In fact, a vast body of literature supports the assertion that aging does not bring about declines in emotion regulation (Charles & Carstensen, 2004; Charles & Carstensen, 2008; Carstensen, Fung, & Charles, 2003), and that older adults report *greater* control of negative affective states than younger individuals (Charles & Carstensen, 2008).

The tendency for older individuals to demonstrate a greater ability to regulate their emotions has been explained in Carstensen's *Socioemotional Selectivity Theory* (Carstensen et al., 2003). This theory posits that older adults tend toward greater control of their negative emotions as a function of differences in their perception of time. The feeling that time to accomplish social or emotional goals is diminishing with age leads older adults to be more careful or selective in their behaviours and activities. This sensitivity to the limits of time results in greater efforts to self-regulate and to experience positive emotions (Carstensen et al., 2003). Support for this idea comes from Fingerman (1995) who found that when older mothers and their adult daughters were asked to rate both their own and the other dyad members' behaviour during a relational conflict, older mothers underestimated the extent that their daughters employed destructive and avoidant behaviours (as measured by daughters' reports of their own behaviour). Conversely, daughters were found to underestimate the extent to which their mothers engaged in constructive behaviour (as measured by mothers' reports of their own behaviour). Additionally, mothers believed their daughters felt more positively about the disagreement than daughters

reported they felt about the event. These findings suggest that older members of intergenerational relationships may be less likely to acknowledge the negative aspects of relational conflict than their younger counterparts. Taken together, these findings indicate that mothers may be more likely to focus on the positive features of the relationship, and this tendency may override the increase in negative emotion that might be expected as a result of developmental declines in RSA.

Another explanation for older adults' tendency to better self-regulate is a larger repertoire of schemas (formed from years of experience with emotional events) that they are able to draw upon in the face of emotional stimuli (Wurm, Labouvie-Vief, Aycock, Rebusal, & Koch, 2004). There is evidence that supports this contention, as older adults seem to have difficulty with emotional tasks that do not allow them to use these well-integrated schemas, but instead require their cognitive and attentional resources (Wurm et al., 2004). For instance, it has been found that older adults showed greater response latency to emotional arousing words when asked to name the colour of a font. This effect was not found for their younger counterparts, indicating that older adults seemed to have greater difficulty processing and forming responses to emotional stimuli than younger participants when they are unable to engage their emotional schemas (Wurm et al., 2004). In the same sample, older adults were found to have difficulty inhibiting irrelevant information when the source was emotional in nature; an effect not found in younger participants. These results support the notion that older adults may be better at self-regulating due to their greater experience with emotional events, but that their strength in this domain is limited to circumstances where they are able to draw upon these experiences.

The improved emotion regulation skills that stem from older adults' greater motivation to experience positive emotions and their greater experience with emotional events may help to

explain a related phenomenon: the tendency for the older generation to perceive intergenerational relationships as more satisfying and generally more positive than their younger descendants may (Rossi & Rossi, 1990). Research supporting the existence of this phenomenon (which has been termed the *intergenerational stake*) is in keeping with *Socioemotional Selectivity Theory*, and has been found on several relationship outcomes (Rossi & Rossi, 1990).

Given that the central activity in the current study (the discussion of a disagreement) should not limit participants' ability to call upon well-established relationship schemas, mothers' processing of emotional information was not expected to be impaired by attentional strain. Rather, this research task should motivate older individuals to reduce negative affect (in order to maintain a positive tone in one of their significant interpersonal relationships) while permitting them the opportunity to draw upon their emotional repertoire during the discussion. Efforts of this nature on the mothers' part would also have consequences for their overall satisfaction with the relationship.

*In summary, older adults may experience greater capacity for emotion regulation in spite of the fact that they tend to have lower RSA. Thus, the hypothesized relationship between higher baseline RSA and less negative affect and greater positive affect when discussing a disagreement (see Hypothesis 2 above) would be attenuated in mothers compared to daughters, owing to the compensatory effects of mothers' improved emotion regulation and their greater experience with emotional events (Hypothesis 5). Furthermore, the hypothesized positive relationship between RSA and HRSWB (see Hypothesis 3 above) is expected to be attenuated among mothers compared to daughters, owing to mothers' tendency to focus on the positive rather than the negative aspects of the relationship (Hypothesis 6).*

## Summary of Hypotheses Being Tested in the Current Study

The current study was designed to measure the cognitive and affective components of HRSWB specifically in regards to the helping relationship between older mothers and their adult daughters. Six hypotheses were tested:

**Hypothesis 1 a).** *It was expected that mothers' and daughters' greater self-reported positive emotion and less self-reported negative emotion regarding the dyadic exchange would be related to greater HRSWB for both the self and partner (actor and partner effects).*

**Hypothesis 1 b).** *It was expected that mothers' and daughters' greater expression of positive emotion and less negative emotion during the dyadic exchange (as measured by the SPAFF), would be related to greater HRSWB for both the self and partner (actor and partner effects).*

**Hypothesis 2.** *Higher baseline RSA was expected to be related to greater positive and less negative affect expressed during the discussion of a disagreement (as measured by the SPAFF) for both mothers and daughters (actor effects).*

**Hypothesis 3.** *Higher baseline RSA was expected to be related to greater HRSWB for both mothers and daughters for both the self and other (actor and partner effects).*

**Hypothesis 4.** *The relationship between partner expression of negative affect during the dyadic discussion and HRSWB for the self is expected to be moderated by baseline RSA, such that the hypothesized association between less negativity on the SPAFF and greater HRSWB for the self (see Hypothesis 1b) will be weaker among those with higher baseline RSA than those with lower baseline RSA (moderation of partner effects).*

**Hypothesis 5.** *The hypothesized relationship between higher baseline RSA and greater positivity and less negativity expressed during the discussion of a disagreement (as measured by*

*the SPAFF; see Hypothesis 2) is expected to be attenuated in mothers compared to daughters (attenuated mother actor effects).*

**Hypothesis 6.** *The hypothesized relationship between higher baseline RSA and greater HRSWB (see Hypothesis 3) is expected to be attenuated in mothers compared to daughters (attenuated mother actor effects).*

## **Method**

### **Participants**

Participants were 81 older mother adult-daughter dyads. The mean age for mothers in the final sample was 75.5 years ( $SD = 7.71$ ) and the mean age for daughters was 47.1 years ( $SD = 8.0$ ). Participants were from southern Ontario, Canada and were recruited through advertisements in community newspapers, seniors' residences, community centers, and places of worship. Participants made the first contact by either leaving a telephone message on the researchers' telephone or signing up at the location where they had viewed the advertisement. Daughters made the initial contact with researchers in all cases but 27, where mothers were the initiators. In cases where mothers had more than one daughter, one daughter was chosen at random by the researchers (with the exception of five cases, when mothers selected the daughter who would participate with them). This was done to prevent possible ceiling effects resulting from mothers choosing to participate with the daughter with who they had the most positive relationship.

Inclusion criteria required that mothers were over the age of 65 and living within 100 km. of the participating daughter. Mothers were also required to be living alone and in their own home, to ensure that the helping relationship was not influenced by the presence of other individuals living with the mother. Mothers were also required to be relatively healthy, to enable

the study of reciprocal helping patterns between mothers and daughters. Scores on the *Instrumental Activities of Daily Living Scale* (IADL; Lawton & Brody, 1969) suggested that mothers met this criteria ( $M = 1.15$ ,  $SD = 0.35$ , on a scale from 0 to 8, with lower scores reflecting better functioning). To ensure that both mothers and daughters gave and received help, participants completed a multi-item questionnaire that assessed the amount of physical assistance, advice, and social support each member of the dyad provided to the other (no respondents were disqualified, as all met the above criteria). Participants were compensated for their time with a cash payment of \$40 each.

### **Measures and Procedure**

The data analysed for the present study were drawn from part of a larger study in which each participant completed an individual phone interview and one three-hour session in the lab that included face-to-face interviews, structured dyadic interactions, and the completion of questionnaires.

Research assistants initially contacted mothers and daughters by calling them individually. Upon giving verbal consent to participate, participants completed a phone interview during which they reported on demographic information (see Appendix 2) and the *Instrumental Activities of Daily Living Questionnaire* (see Appendix 3). Additionally, participants answered an opinion questionnaire containing questions related to a series of vignettes involving parents their adult children.

Dyads then visited the lab together, where they separately signed consent forms, provided saliva samples (used in the measurement of cortisol), and answered questions about the help that they gave and received in their relationship with the other dyad member. Each dyad then completed a semi-structured interview together (an adaptation of the *Oral History*

*Interview*; Buehlman, Gottman, & Katz, 1992) in which they were asked to answer questions about their past relationship. This interview was conducted by a trained research assistant and audio-recorded. Data from this interview were not analyzed in the current study.

Participants then were asked to complete three ten-minute interaction activities with their mother/daughter. Prior to beginning, three electrodes were positioned on each participant (two across the chest, below the ribs and one near the collarbone) to record a continuous ECG signal. Heart rate was recorded at 1000 Hz with Biolab Acquisition Software and a Bionex 8-slot chassis (model 50-3711-08). Data from these recordings were cleaned and analysed using Mindware software, which computed RSA at 30-second intervals.

Three mother-daughter interactions took place over a thirty-minute period (10 minutes each) in a private room, and were video recorded. In the first of these activities, each dyad mutually agreed on a topic upon which they had recently disagreed or shared a difference of opinion during the previous two weeks. Dyads were instructed to discuss together how they felt about the situation and why they felt this way. Written questions were provided as prompts (see Appendix 4) to encourage participants to engage in a full discussion of the topic if spontaneous conversation faltered (e.g., "Looking back, what parts of your thoughts and feelings seemed reasonable or unreasonable?"). Data from this interaction were used to assess emotional responding in the current study. The second and third interactions (which were not analyzed in the current study) required dyads to discuss hypothetical disagreements that might arise between mothers and daughters as well as a hypothetical vacation that the dyad might take together. Upon completion of these interactions, participants provided saliva samples and then independently completed a series of questionnaires concerning their emotions and relationship quality, including those designed to assess HRSWB.

**Expressed affect.** Mothers' and daughters' affect during the first interaction (during which mothers and daughters discussed a recent disagreement) was assessed using the SPAFF (Gottman et al., 1995). This coding scheme was developed for use with married dyads but was adapted for the current study to render it applicable to mothers and daughters. Codes were based on both body language as well as content of conversation during the dyadic exchange. This version of the SPAFF considers five positive (*humor, affection, interest, joy and validation*), and seven negative codes (*anger/disgust/contempt, belligerence, defensiveness, domineering, whining, sadness, and fear*). Codes for anger, disgust and contempt were collapsed to resolve issues with low reliability between coders. *Backchanneling*, which refers to the use of continuers such as "uh huh" or "hmm", is coded as *validation* in the original SPAFF. However, in the current study, it was coded separately as it was considered an indicator of neutral affect. *Stonewalling* was not coded in the current sample.

Coding took place in 30-second intervals and the total number of negative or positive codes was summed across each 30-second interval to generate an overall negative and overall positive affect score for the ten-minute discussion for both mothers and daughters (Cohen's Kappa = .61, based on all of the aforementioned codes). *Neutral* codes were assigned to utterances where there was an absence of any of the above emotions. *Neutral* and *Backchanneling* were not included in the overall positive or negative affect scores. Mothers' and daughters' behaviour was coded separately, and dyadic exchanges were assessed by two independent coders on each dimension of the SPAFF. Due to concerns about low reliability all of the interactions were coded by both raters and disputes were resolved through discussion until consensus was achieved. The four variables representing the total number of mother and daughter positive and

negative affect codes were highly correlated with one another (see Table 1 for means, standard deviations, and intercorrelations). Principal Component Analysis revealed that these four constructs measured a single component, which explained 64.30% of the variance in the four SPAFF variables (Eigenvalue = 2.6). The factor loadings for mothers' SPAFF-NA, daughters' SPAFF-NA, mothers' SPAFF-PA, and daughters' SPAFF-PA were .86, .83, -.74, and -.78, respectively. Thus, these four variables were collapsed to create one dyadic SPAFF score, with higher scores representing more positivity and less negativity expressed by the dyad during the discussion of a disagreement. First, the total number of codes was generated by summing all of the codes listed above, including neutral and backchanneling codes. Then the dyadic score was created by subtracting the proportion of negative codes (obtained by dividing the total number of negative codes listed above by the total number of codes) for both mothers and daughters from the proportion of positive codes (obtained by dividing the total number of positive codes listed above by the total number of codes) for both mothers and daughters. This produced a score for both mothers' and daughters', each ranging from -1 to 1. Mothers' and daughters' scores were then summed, resulting in a dyadic score with a range from -2 to 2 (note that the total number of codes included backchanneling and neutral codes, which were not included in the total number positive nor the total number of negative codes<sup>1</sup>).

**Respiratory Sinus Arrhythmia.** Measures of baseline RSA were extracted from five-minute ECG readings taken before the dyadic discussion. RSA was calculated in 30-second intervals and averaged across the five-minute baseline period (Crobach's alpha was .97 for mothers and .93 for daughters).

**Self-reported affect.** Participants responded to four items (see Appendix 5) that asked them to rate the degree to which they felt four emotions (happy/pleased, sad/disappointed,

Table 1

*Summary of Intercorrelations, Means, and Standard Deviations for the SPAFF Components*

Subscale	<i>1</i>	<i>2</i>	<i>3</i>	<i>M</i>	<i>SD</i>
1. Mother SPAFF - PA	—	—	—	13.53	8.63
2. Daughter SPAFF - PA	.69	—	—	13.65	8.61
3. Mother SPAFF - NA	-.42	-.42	—	6.38	11.75
4. Daughter SPAFF - NA	-.32	-.42	.85	7.45	13.65

*Note.* *N* = 81. SPAFF = Specific Affect Coding System. PA = positive affect. NA = negative affect.

angry/frustrated, and guilty), while discussing the recent disagreement with the other dyad member. Responses were recorded on a seven-point Likert-type scale from 1 (not at all) to 7 (very much so). Sad/disappointed, angry/frustrated, and guilty items were combined to create an overall self-reported negative affect score. Cronbach's alpha for the three items assessing negative emotion were .80 for mothers and .71 for daughters.

The self-reported positive and negative affect variables were moderately correlated for both mothers and daughters (see Table 2 for means, standard deviations, and intercorrelations). Principal components analysis revealed that the four self-report variables were measuring two separate components: mother affect and daughter affect. The total variance explained by these two components was 75.4 %, with the mother factor explaining 45.99% (Eigenvalue = 1.84) and the daughter factor explaining 29.4 % of this variance (Eigenvalue = 1.18). Factor loadings for the mother component were -.85 for mothers' self-reported negative emotion and -.88 for mothers' self-reported positive emotion. Factor loadings for the daughter component were .91 for daughters' self-reported negative emotion and -.79 for daughters' self-reported positive emotion. Thus, the self-reported positive and negative affect variables were collapsed. This resulted in two variables: one that represent self-reported affect for mothers, and one for daughters. Higher scores on these variables indicate greater positive affect and less negative affect.

**HRSWB.** Each of the three components of HRSWB (satisfaction, positive affect, and negative affect) was measured separately with the use of self-report questionnaires (see Appendix 6 and Appendix 7). Items assessing helping satisfaction, or the cognitive component of HRSWB, included 29 items taken from previous research in the field (e.g., Martini et al., 2001). Thirteen items assessed satisfaction with giving help (e.g., "providing help makes me feel closer

Table 2

*Summary of Intercorrelations, Means, and Standard Deviations for the Self-Reported Affect Subscales*

Subscale	<i>1</i>	<i>2</i>	<i>3</i>	<i>M</i>	<i>SD</i>
1. Mother - PA	—	—	—	4.97	1.85
2. Daughter - PA	.27	—	—	4.42	1.77
3. Mother - NA	-.51	-.24	—	1.93	1.35
4. Daughter - NA	-.05	-.47	.12	2.30	1.32

*Note.*  $N = 81$ . PA = positive affect. NA = negative affect.

to my daughter") and 16 items assessed receiving help (e.g., "receiving help from my daughter makes me feel as though I am a burden to her"). Responses were provided on a 7-point Likert-type scale ranging from 1 (not at all true) to 7 (very true), with half of the items being reverse scored such that higher scores indicated less satisfaction. Participant's scores on this scale were reversed scored in analyses, so that higher scores represent greater satisfaction. Cronbach's alphas for this scale were .78 for mothers and .89 for daughters.

The positive and negative affective components of HRSWB were assessed using a 28 - item questionnaire. Of the 28 items, nine were derived from an expanded version of the Positive and Negative Affect Schedule (Watson & Clark, 1994). Five additional questions were added (grateful, disgusted, or angry with partner, disappointed with self, disappointed with other). Items were rated on a 7-point Likert-type scale, with responses ranging from 1 (not at all) to 7 (very much) to indicate the extent to which the participant felt the emotion in question in relation to their current relationship with the other dyad member. This measure was completed twice, once to indicate how the individual felt about giving help and a second time to report their feelings toward receiving help. The items assessing giving and receiving were averaged to create a single index. Cronbach's alphas for the 6 items assessing positive affect for giving and receiving help (3 items each) were .88 for mothers and .82 for daughters. Cronbach's alphas for the 22 items assessing negative affect for giving and receiving help (11 items each) were .91 for mothers and .95 for daughters.

In addition to examining the three HRSWB components, individuals' scores for each component were combined to generate a composite score that measured overall HRSWB specifically in regards to the helping relationship between the participant and the other member of the dyad. This composite variable was generated by averaging the three components (after

reverse scoring the negative affect and satisfaction components - reverse scoring was done to ensure that all of the variables were keyed such that higher scores represent more positive outcomes). Principal components analysis supported this decision. Two components were revealed, with all of the mother HRSWB variables loading heavily on the same factor and all of the daughter HRSWB variables loading heavily on the other factor (combined, these factors explained 66.95% of the variance in the four HRSWB variables). The daughter HRSWB component explained 43.5 % of the variance (Eigenvalue = 2.6). The mother HRSWB component explained 23.44 % of the variance (Eigenvalue = 1.4). The factor loadings for the daughter HRSWB component were .91 for daughter's HRSWB-SAT, .86 for daughter's HRSWB-PA, and -.85 for daughter's HRSWB-NA. The factor loadings for the mother component were -.83 for mothers' HRSWB-SAT, -.49 for mothers' HRSWB-PA, and .82 for mothers' HRSWB-NA.

## **Results**

### **Preliminary Analyses**

Preliminary analyses involved testing for a statistically significant difference between mothers' and daughters' mean baseline RSA values using a paired samples t-test. Results of this analysis indicated that mothers had significantly lower RSA values than did daughters ( $t = -6.28$ ,  $p < .00$ ). Preliminary analyses also involved examining the patterns of missing data and testing the assumptions of regression analyses. The following sections describe the strategies employed to manage missing data as well as any concerns regarding violations to the assumption of regression analyses that arose during preliminary analyses.

**Missing data.** Missing data occurred on several of the study variables. A thorough missing values analysis was conducted to determine if imputing the missing values was the best

method of handling missing data. Missing values analyses are necessary to determine whether patterns of missing data on one variable are systematically related to scores on any of the other variables. Under such conditions, imputing missing data (which involves replacing missing values with values that are estimated from valid cases in the data set) would create bias in the results (Cohen, Cohen, West & Aiken, 2003). For instance, if daughters who were less satisfied with their relationships tended to refuse having electrodes placed on them to measure RSA, then replacing missing RSA values with estimated scores would bias significance tests of the relationship between these two variables.

The missing data analyses included the following two strategies: First, for each variable, a new "valid/missing" variable was created, which reflected each score in the original data set as either a missing (0) or valid (1) case. For each variable, t-tests were conducted to compare the means of the valid cases to the means of the missing cases on all of the other variables in the data set. A significant t-test indicates a systematic relation between the "valid/missing" data on one variable and original scores on another variable. Thus, significant t-tests in this case indicate that the data are not missing randomly. Although four of the 170 t-tests run were statistically significant, none of the  $r$  values computed for these t-tests exceeded .33, indicating relatively small effects. Furthermore, due to the large number of t-tests run, it is possible that these four tests were significant due to chance alone.

The second strategy for assessing missing data involved creating two data count scores - one that reflected the number of missing cases for each mother across all of the variables and another parallel score for daughters. Bivariate correlations between these variables and all other variables were examined in order to determine whether the number of missing variables for both mothers and daughters was related to scores on the other variables. Only one significant

correlation between these two scores and all other scores in the data set was observed (daughters' data count score was positively correlated with mothers' positivity on the SPAFF,  $r = .22$ ,  $p = .049$ ); however this was a very small effect. Therefore, there appears to be no reason for concern regarding mothers' and daughters' overall amount of missing data being related to any variable in the data set. Furthermore, there is no reason to expect that the pattern of missing data on any variable would differ systematically with the pattern of missing data for any of the other variables. Because deleting the participants with missing data from these analyses would create more bias in our results than imputation, imputation was chosen as the best available solution to the missing data in this sample<sup>2</sup>.

**Testing the assumptions of regression.** Five univariate *outliers* were identified by examining standardized scores for values greater than an absolute value of three (Cousineau & Chartier, 2010). Analyses omitting these five cases revealed a very similar pattern of results to those that retained these cases. In order to avoid biasing results due to a loss of cases that may represent variance that would occur in the population (which is of great concern when dealing with a small sample), all cases were retained.

In order to assess *univariate normality* of the independent variables, histograms with normal distributions were visually inspected. Additionally, the means, median and mode of each distribution were examined for similarity. These two processes led to concerns regarding normality for the mother self-reported affect variable as well as the dyadic SPAFF score, and the skewness and kurtosis statistics were therefore examined for further clarification with regarding the normality of these distributions. The skewness and kurtosis statistics for each variable were divided by their respective standard errors, which yielded a value of -3.6 for skewness of the mother self-reported affect variable, and -4.6 for skewness of the dyadic SPAFF variable. Given

that these values are greater than an absolute value of three (which is the conventional limit; Tabachnick & Fidell, 1996) concerns with non-normality remained for these two distributions (i.e., the mother self-reported affect variable as well as the dyadic SPAFF score were negatively skewed). It is important to note that the distributions that omitted the five univariate outliers revealed the same pattern of skewness and kurtosis as those that retained these cases. Therefore, simply removing these cases was not a viable solution to address issues with normality. Due to the severity of the skewness, a log 10 transformation was conducted on both variables (Cohen et al., 2003). Although the distributions of the log10 variables were slightly more normal than the original distributions, the pattern of results that emerged from these results largely matched that of analyses with the untransformed variables. Thus, to avoid complications in interpretation of results, it was judged prudent to avoid transformation in the final analyses (Tabachnick & Fidell, 1996).

*Normality of residuals* was assessed by examining histograms of the standardized residuals with a normal curve superimposed over them, as well as p-p plots of the standardized residual values (Cohen et al., 2003). Visual inspection of these graphs indicated the distributions of standardized residuals for each variable did not approximate the normal curve or line of best fit very well, with the exception of the distribution of mother composite HRSWB residuals. Scatterplots of the standardized predicted versus the regression standardized residuals were generated to assess *homoscedasticity*. Inspection of these graphs for each analysis revealed that the scores did not appear evenly distributed around the lines of best fit, with the exception of the mother composite HRSWB variable. Thus, the residuals do not appear to be approximately equal for all predicted scores on the dependent variables, except in the analyses predicting mother composite HRSWB scores. Further, more serious violations of homoscedasticity and normality

of residuals were observed when using pairwise and listwise deletion. Due to concerns regarding the normality and homoscedasticity of residuals, results should be interpreted with caution. It is important to note that the non-imputed data do not appear to meet these assumptions any better than the imputed data set.

With respect to *independence of residuals*, the Durbin Watson Statistic for each of the analyses was considered. In each case the value was between 1.5 and 2.5 (Cohen et al., 2003; Durbin & Watson, 1951); thus there was little concern with regard to an increased chance of a type I error.

Finally, *multivariate outliers* were identified as those cases with standardized residuals greater than three. Three cases met this criterion across all of the analyses. However, because none of these cases had Cook's D values greater than one, these outliers were not considered to be influential outliers (Cook & Dennis, 1977). Therefore, these cases remain in the final analyses.

### **Main Analyses**

In order to address the six aforementioned hypotheses, correlations between study variables were examined and regression analyses were conducted. All of the analyses presented were conducted on the standardized scores for each variable (interaction terms were calculated from standardized values as well). In total, eight regression analyses were run (four outcome variables for both mothers and daughters), each of which included seven predictors (see below). It is important to note that collapsing the SPAFF and self-reported affect variables, although necessary, limited how the study hypotheses may be tested (i.e. the effects of positive and negative emotion cannot be differentiated for either of these variables, nor can partner effects on the SPAFF be tested).

**Outcome variables.** HRSWB was considered by means of a composite variable. However, this construct was also broken down into its components to allow for separate consideration of the satisfaction and positive and negative affective components of HRSWB. This resulted in the following four dependent variables: composite HRSWB score, HRSWB satisfaction (HRSWB-SAT; where higher scores indicate more satisfaction), HRSWB positive affect (HRSWB-PA; where higher scores indicate more positive affect), and HRSWB negative affect (HRSWB-NA; where higher scores indicate less negative affect). These four variables were considered separately for mothers and daughters resulting in eight final outcome variables.

**Predictor variables.** The seven predictors included in each regression were the following: mother baseline RSA (where higher scores indicate greater baseline RSA), daughter baseline RSA (where higher scores indicate greater baseline RSA), a dyadic SPAFF score (with higher scores indicating greater positivity and less negativity on the SPAFF), mother self-reported affect (with higher scores indicating greater self-reported positivity and less negativity), daughter self-reported affect (with higher scores indicating greater self-reported positivity and less negativity), an interaction term for mother RSA and SPAFF dyad scores, and an interaction term for daughter RSA and SPAFF dyad scores. Means and standard deviations for these variables are presented in Table 3 and a summary of the intercorrelations between the study variables, are presented in Table 4.

Results of the regression analyses are presented in Tables 5 -8. The regressions predicting mothers' HRSWB composite scores, HRSWB-SAT-, and HRSWB-PA were significant. The regressions predicting daughters' outcomes and mothers' HRSWB-NA were not significant. Results are discussed in greater detail below in order of their respective hypotheses.

Table 3

*Means and Standard Deviations of Study Variables*

Variable	<i>M</i>	( <i>SD</i> )	<i>Possible Range</i>
1. Mother RSA	4.55	(1.1)	N/A
2. Daughter RSA	5.60	(1.16)	N/A
3. Observed Affect (SPAFF)	.56	(1.4)	(-2) - 2
4. Mother Self-Reported Affect	5.52	(1.39)	1 - 7
5. Daughter Self-Reported Affect	5.08	(1.32)	1 - 7
6. Mother HRSWB composite	6.23	(.63)	1 - 7
7. Daughter HRSWB composite	5.80	(.83)	1 - 7
8. Mother HRSWB - PA	6.17	(1.18)	1 - 7
9. Daughter HRSWB - PA	5.43	(1.06)	1 - 7
10. Mother HRSB - SAT	5.96	(.74)	1 - 7
11. Daughter HRSB - SAT	5.60	(.81)	1 - 7
12. Mother HRSWB - NA	6.57	(.70)	1 - 7
13. Daughter HRSWB - NA	6.23	(.94)	1 - 7

*Note.*  $N = 81$ , All variables are keyed in the direction of higher scores indicating a more desirable outcome. N/A = Not applicable. RSA = respiratory sinus arrhythmia. SPAFF = Specific Affect Coding System. HRSWB = helping-related subjective well-being. PA = positive affect. NA = negative affect. SAT = satisfaction.

Table 4

*Summary of Intercorrelations Between Study Variables*

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Mother RSA	–	–	–	–	–	–	–	–	–	–	–	–
2. Daughter RSA	.12	–	–	–	–	–	–	–	–	–	–	–
3. Observed Affect (SPAFF)	.06	.11	–	–	–	–	–	–	–	–	–	–
4. Mother Self-Reported Affect	.05	.05	.33**	–	–	–	–	–	–	–	–	–
5. Daughter Self-Reported Affect	.06	-.19*	-.27**	.25*	–	–	–	–	–	–	–	–
6. Mother HRSWB Composite	.43**	-.13	.09	.09	-.03	–	–	–	–	–	–	–
7. Mother HRSWB - SAT	.43**	-.19	.08	-.60	.10	.75**	–	–	–	–	–	–
8. Mother HRSWB -PA	.26*	-.10	.05	.24*	-.13	.78**	.30**	–	–	–	–	–
9. Mother HRSWB - NA	.28*	.01	.06	-.10	.03	.62**	.50**	.10	–	–	–	–
10. Daughter HRSWB Composite	-.00	.10	-.10	-.20*	.03	.23	.28**	.15	.08	–	–	–
11. Daughter HRSWB - SAT	.06	.08	-.11	-.18	.02	.22*	.29**	.15	.04	.90**	–	–
12. Daughter HRSWB - PA	-.14	.15	-.06	-.17	-.03	.16	.16	.16	-.01	.89**	.68**	–
13. Daughter HRSWB - NA	.10	.03	-.09	-.20	.09	.24**	.31**	.08	.19	.88**	.75**	.61**

*Note.*  $N = 81$ . \* $p < .05$  (two-tailed) \*\* $p < .01$  (two-tailed). HRSWB - SAT and HRSWB - NA have been reverse scored. For all variables higher scores indicate more desirable outcomes. RSA = respiratory sinus arrhythmia. SPAFF = Specific Affect Coding System. HRSWB = helping-related subjective well-being. PA = positive affect. NA = negative affect. SAT = satisfaction.

Table 5

*Multiple Regression Predicting HRSWB - Composites*

Predictor	Mother		Daughter	
	<i>b</i>	<i>sr</i> <sup>2</sup>	<i>b</i>	<i>sr</i> <sup>2</sup>
Mother RSA	.43***	.18***	-.03	.00
Daughter RSA	-.21	.04	.12	.01
SPAFF	.08	.01	-.02	.01
Mother Self-Reported Affect	.08	.01	-.23	.04
Daughter Self-Reported Affect	-.16	.02	.10	.01
Mother RSA * SPAFF	.14	.02	.05	.00
Daughter RSA * SPAFF	-.08	.01	-.06	.01
<i>F</i>	3.74**		.81	
<i>R</i> <sup>2</sup>	.26**		.07	
<i>adj R</i> <sup>2</sup>	.19		-.02	
<i>df</i>	7, 73		7, 73	

*Note.* *N* = 81. Results in the table are based on the *z* score for each predictor; Unstandardized regression coefficients are shown. \* *p* < .05 (two-tailed) \*\* *p* < .01 (two-tailed) \*\*\* *p* < .01 (two-tailed). RSA = respiratory sinus arrhythmia. SPAFF = Specific Affect Coding System. HRSWB = helping related subjective well-being.

Table 6

*Multiple Regression Predicting HRSWB - PA*

Predictor	Mother		Daughter	
	<i>b</i>	<i>sr</i> <sup>2</sup>	<i>b</i>	<i>sr</i> <sup>2</sup>
Mother RSA	.25*	.06*	-.16	.02
Daughter RSA	-.20	.04	.19	.03
SPAFF	.03	.00	.03	.00
Mother Self-Reported Affect	.29*	.08*	-.19	.03
Daughter Self-Reported Affect	-.28*	.08*	.05	.00
Mother RSA * SPAFF	.17	.03	.05	.00
Daughter RSA * SPAFF	-.09	.01	-.03	.00
<i>F</i>	3.01**		.92	
<i>R</i> <sup>2</sup>	.23**		.08	
<i>adj R</i> <sup>2</sup>	.15		-.01	
<i>df</i>	7, 73		7, 73	

*Note.* *N* = 81. Results in the table are based on the *z* score for each predictor. Unstandardized regression coefficients are shown. \* *p* < .05 (two-tailed) \*\* *p* < .01 (two-tailed). RSA = respiratory sinus arrhythmia. SPAFF = Specific Affect Coding System. HRSWB - PA = helping-related subjective well-being, positive affect component.

Table 7

*Multiple Regression Predicting HRSWB - NA*

Predictor	<i>Mother</i>		<i>Daughter</i>	
	<i>b</i>	<i>sr</i> <sup>2</sup>	<i>b</i>	<i>sr</i> <sup>2</sup>
Mother RSA	.30	.08	.07	.00
Daughter RSA	.04	.00	.05	.00
SPAFF	.07	.00	-.02	.00
Mother Self-Reported Affect	-.15	.02	-.24	.05
Daughter Self-Reported Affect	.05	.00	.14	.02
Mother RSA * SPAFF	-.02	.00	.15	.02
Daughter RSA * SPAFF	.11	.01	-.07	.01
<i>F</i>	1.34		.35	
<i>R</i> <sup>2</sup>	.12		.10	
<i>adj R</i> <sup>2</sup>	.03		.01	
<i>df</i>	7, 73		7, 73	

*Note.*  $N = 81$ . Results in the table are based on the  $z$  score for each predictor. Unstandardized regression coefficients are shown. RSA = respiratory sinus arrhythmia. SPAFF = Specific Affect Coding System. HRSWB - NA = helping-related subjective well-being, negative affect component.

Table 8

*Multiple Regression Predicting HRSWB - SAT*

Predictor	<i>Mother</i>		<i>Daughter</i>	
	<i>b</i>	<i>sr</i> <sup>2</sup>	<i>B</i>	<i>sr</i> <sup>2</sup>
Mother RSA	.43***	.17***	.05	.00
Daughter RSA	-.26*	.06*	.05	.00
SPAFF	.10	.01	-.07	.00
Mother Self-Reported Affect	.11	.00	-.18	.02
Daughter Self-Reported Affect	-.01	.00	.09	.01
Mother RSA * SPAFF	.12	.01	-.07	.01
Daughter RSA * SPAFF	-.17	.03	-.09	.01
<i>F</i>	4.24**		.58	
<i>R</i> <sup>2</sup>	.29**		.07	
<i>adj R</i> <sup>2</sup>	.22		-.02	
<i>df</i>	7, 73		7, 73	

*Note.*  $N = 81$ . Results in the table are based on the  $z$  score for each predictor. Unstandardized regression coefficients are shown. \*  $p < .05$  (two-tailed) \*\*  $p < .01$  (two-tailed) \*\*\*  $p < .00$  (two-tailed). RSA = respiratory sinus arrhythmia. SPAFF = Specific Affect Coding System. HRSWB - SAT = helping-related subjective well-being, satisfaction component.

Hypothesis 1a), that mothers' and daughters' greater self-reported positive emotion and less self-reported negative emotion regarding the dyadic exchange would be related to greater HRSWB for both the self and partner, was partially supported. Specifically, in the model predicting HRSWB-PA, greater self-reported positivity and lower self-reported negativity for mothers following the dyadic discussion of a disagreement predicted greater mother HRSWB-PA. Contrary to this hypothesis, however, in this same model, daughters' self-reported feelings regarding the dyadic discussion were associated with the dependent measure in the opposite direction (i.e., daughters' greater feelings of positivity and lessened negativity regarding the dyadic discussion were associated with lower levels of mother HRSWB-PA). Furthermore, self-reported affect was not a significant predictor of any of the other outcome variables.

Hypothesis 1b), that dyads' greater positivity and less negativity on the SPAFF would be related to greater HRSWB for both mothers and daughters, was not supported: The SPAFF was not a significant predictor in any of the regression analyses.

Hypothesis 2, that higher baseline RSA will be related to greater positive and less negative affect expressed during the discussion of a disagreement for both mothers and daughters, was addressed by considering the bivariate correlations between mothers' and daughters' RSA scores and the dyadic SPAFF score. These correlations were not significant, indicating that hypothesis 2 was not supported.

Hypothesis 3, that higher baseline RSA for mothers and daughters was expected to be related to greater HRSWB for both the self and partner, was partially supported: Mothers' baseline RSA was positively associated with both mothers' HRSWB-PA and HRSWB- SAT as well as mothers' HRSWB composite scores, with higher baseline RSA among mothers related to greater mother HRSWB in each case. Contrary to expectations, daughter's baseline RSA was

negatively associated with mothers' HRSWB-SAT. Daughters' RSA was also negatively related to both mothers' HRSWB composite scores and HRSWB-PA scores, although these relationships were only marginally significant<sup>3</sup>.

Hypothesis 4, that the relationship between expressions of partner negative affect during the dyadic discussion and HRSWB for the self is expected to be moderated by baseline RSA, such that the association between less negativity on the SPAFF and greater HRSWB will be weaker among those with higher baseline RSA than those with lower baseline RSA, was not supported: In each regression model, the hypothesized interaction effects were non-significant.

Hypothesis 5, the relationship between higher baseline RSA and greater positivity (and less negativity) expressed during the discussion of a disagreement (as measured by the SPAFF) will be attenuated in mothers compared to daughters, was assessed by testing the relevant bivariate correlations for statistical difference. Specifically, the correlation between mothers' RSA and the dyadic SPAFF score was compared to the correlation between daughters' RSA and the dyadic SPAFF score according to the formula provided by Cohen, Cohen, Aiken, and West (2003). The difference between mothers' and daughters' RSA/SPAFF correlations was not significant ( $z = -0.32$   $p = 0.75$ ).

Hypothesis 6, that the relationship between higher baseline RSA and greater HRSWB will be attenuated in mothers compared to daughters was tested using the same method used to test hypothesis 5. Significant differences were found between mothers' and daughters' RSA/HRSWB composite correlations ( $z = 2.25$ ,  $p = .03$ ) and between mothers' and daughters' RSA/HRSWB-SAT correlations ( $z = 2.37$ ,  $p = .02$ ). Contrary to expectations, however, mothers' correlations were significantly larger than daughters'. In addition, no significant difference was

found between the mothers' and daughters' RSA/HRSWB-PA correlations ( $z = 0.72$ ,  $p = .47$ ) or mothers' and daughters' RSA/HRSWB-NA correlations ( $z = 1.61$ ,  $p = .11$ ).

### **Discussion**

Emotional responding has been found to be an important factor in determining relationship outcomes in close interpersonal relationships (Coan, 2008; Gottman, et al., 2003; Iv et al., 2010). The current study investigated various measures of emotional responding as predictors of the quality of the helping relationships among older mothers and their adult daughters. More specifically, mothers' and daughters' baseline RSA, their observed affect during the dyadic discussion of a recent disagreement, and their self-reported feelings regarding this discussion, were all considered as predictors of their own as well as their partners' HRSWB. HRSWB was considered in terms of a composite measure (which reflected all three components of HRSWB combined), as well as its individual components (satisfaction, positive affect, and negative affect).

Overall, these emotion-related variables were better predictors of mothers' HRSWB than daughters' HRSWB - Although it was expected that these emotion-related variables would predict both mothers' and daughters' HRSWB, none of the independent variables significantly predicted daughters' HRSWB. Furthermore, while these predictors as a group were able to explain a significant proportion of variance in mothers' HRSWB (SAT and PA components as well as their HRSWB composite) scores, analyses predicting mothers' HRSWB-NA scores were non-significant.

Implications of these findings are discussed in greater detail in the following sections. In the first two sections, findings concerning the relationship between the outcome (HRSWB) and the two types of predictors -- RSA and emotional responding (both self-reported and observed

affect) -- are considered. In the third section, results regarding the relationship between the two types of predictors are explored. Finally, limitations of this research are outlined and a brief summary and conclusion is provided.

### **RSA as a Predictor of Helping Relationship Quality**

With respect to mothers' HRSWB, the physiological measure of emotional responding (RSA) was the strongest predictor. It was expected that higher baseline RSA for mothers and daughters would be related to higher HRSWB for the self and the other (Hypothesis 3). This hypothesis was partially supported. Specifically, mothers' RSA was significantly positively related to their own HRSWB-PA, HRSWB-SAT and HRSWB composite scores. Daughters' RSA was not a significant predictor of their own HRSWB<sup>4</sup>; however, contrary to predictions daughters' RSA was negatively associated with mothers' HRSWB-SAT.

That mothers' RSA was positively related to their own HRSWB is not surprising, as RSA has been linked to adaptive emotional responding in a great deal of prior research (Beauchaine, 2001). It follows that if RSA is related to adaptive emotional responding, mothers with higher RSA may manage their emotions in close interpersonal relationships in such a way that promotes satisfaction in these relationships. This finding is consistent with research that has found an inverse relationship between interpersonal hostility and RSA (Sloan et al., 1994).

Given the extant literature, the finding that daughters' RSA was *not* significantly related to their own HRSWB is unexpected. Two reasons may explain the lack of association between these variables. First, it is possible that given their stage of life adult daughters are likely to have other commitments (e.g., larger social networks, romantic partners, ongoing careers, and children in their care; Charles & Carstensen, 2010) and these may outweigh the influence of RSA on daughters' satisfaction with the helping relationship. Second, it may be the case that

developmental differences in other emotion-related variables may be more important than RSA in predicting HRSWB. For example, Labouvie-Vief (2003) has proposed that adaptive emotional development should be considered in terms of one's ability to manage both positive and negative emotional experience (dynamic balance). According to Labouvie-Vief, middle-aged individuals are more likely than older adults to achieve *dynamic integration* (integrating the optimization of positive affect and tolerating negative affect). This may be a particularly important characteristic for middle-aged daughters (and potentially more importance than RSA), given that literature suggests that they are more prone than their mothers to experience negative emotions during helping exchanges and in the relationship more generally (Martini & Busseri, 2010; Rossi & Rossi, 1990).

In terms of explaining the counterintuitive finding that daughters' RSA was negatively associated with their mothers' HRSWB, it may be helpful to revisit Beauchaine's (2001) review of the RSA literature across the lifespan. Although resting RSA has been associated with differences in adaptive responding to the environment (including social relationships), conceptions of "adaptive" behaviour appear to change with time. For example, Beauchaine points out that early in life, high RSA is associated with interpersonal behaviours that might at first glance appear to be negative (e.g., intense crying). However, such behaviours may be construed as adaptive in the sense that they allow infants to have their needs met. Later in childhood, high RSA is typically associated with greater regulation of negative emotion.

It is possible that in intergenerational helping relationships, daughters with high RSA may engage in interpersonal behaviours that also appear at first glance to be negative, but that assist them in meeting their own personal or relationship goals. For example, there is evidence to suggest that compared to mothers, adult children are more likely to use suppression to regulate

negative emotion (Martini & Busseri, 2010), and that suppression decreases across the lifespan (John & Gross, 2004). While the literature supports the idea that suppression is an undesirable strategy for managing negative emotion, in the context of intergenerational helping, daughters with high RSA may find it adaptive in the sense that it allows them to meet their goals for the relationship (e.g., avoiding conflict; not hurting their mothers' feelings). Unfortunately, research has suggested that suppression can be detected by interaction patterns and may lead to negative interpersonal outcomes. In this context, older mothers tend to report exclusion from their adult daughters as a source of tension in the relationship (Fingerman, 1996). This suggests that mothers who sense that their daughter is suppressing are likely to feel dissatisfied regardless of whether the suppression is adaptive for the daughter.

An alternate possibility is that daughters' greater social obligations may mean that it is more adaptive for daughters to be assertive about their needs in helping interactions. Thus, daughters with strong regulatory capacity (i.e., high RSA) may deny mothers' requests for help when they feel too much has been asked of them and may distance themselves from their mothers to reduce the fatigue that comes from feeling overcommitted. Again, while such behaviours may be construed as adaptive from the daughters' point of view, they are likely to be associated with lessened HRSWB for mothers. The present study provides a starting point for understanding how RSA relates to functioning in close interpersonal relationships across generations based on the assumption that adaptive emotional responding may change across time and within particular relationships. Thus, further research is needed to understand what should be considered adaptive emotional responding in the RSA literature and in the context of interpersonal relationships. Future research may also benefit from controlling for the social obligations that differ in mothers' and daughters' social and personal lives in order to better

determine the extent to which the emotion-related variables measured in the current study actually contribute to daughters' HRSWB.

**Generation as a moderator.** It was predicted that the relationship between RSA and HRSWB would be weaker among mothers than daughters (Hypothesis 6). However, this hypothesis was not supported: While substantial effects of mother RSA values on their own HRSWB were found (i.e., mother RSA accounted for 18% of the variability in mother composite HRSWB), daughters' RSA did not predict their own HRSWB. Thus, while age did moderate the relationship between RSA and HRSWB, the moderation effect was in the opposite direction to the one proposed.

The lack of association between daughter's RSA and their self-reported HRSWB has been previously addressed, and the explanation offered may be relevant with regard to the unsupported moderation hypothesis as well. Specifically, RSA may be a stronger predictor of HRSWB for mothers than daughters simply because there may be many more factors that bear upon daughters' HRSWB, thus greatly diminishing the predictive power of RSA for daughters.

Alternately, the explanation for these findings may reside in the theoretical underpinnings of the hypothesis. This prediction was based on the idea that, while the lower RSA that characterizes older adulthood should be associated with poorer emotional control (Porges, 2009), extant literature suggests that older individuals are actually better able to modulate their emotional responses than younger generations (Charles & Carstensen, 2008). Three theories of older adult emotion regulation have addressed the improved emotion regulation demonstrated by older adults. First, *Socioemotional Selectivity Theory* posits that older adults tend to select behaviours and activities that enable them to experience more positive and less negative affect than younger individuals (Carstensen et al., 2003). Second, Wurm and colleagues (2004) have

suggested that older adults are better able to regulate due to their larger repertoire of schemas that have been formed from years of experience with emotional events. Finally, the *intergenerational stake* hypothesis states that older generations are likely to have a greater emotional investment in their relationships with their offspring than younger generations, leading them to put greater effort into experiencing satisfaction and positivity in these relationships (Rossi & Rossi, 1990).

Returning to the unsupported moderation hypothesis, these theories should be re-examined. Labouvie-Vief's *dynamic integration theory* (2003) offers an alternate view of emotionality in older adulthood, noting that emotional development involves a complex interaction between an individual's affect, cognition, and other individual difference variables. In contrast to *Socioemotional Selectivity Theory*, the former theory contends that older adults may actually have a compromised ability to regulate their emotions in some contexts because they may experience greater arousal in the face of emotional stimuli, as well as limitations in terms of their emotional resources (e.g., lower RSA or weaknesses in terms of cognitive abilities) compared to younger adults. Longitudinal research has found that older adulthood is associated with heightened cardiovascular reactivity to stress, an indication that older adults may actually experience difficulty in regulating their reactions to stressful events (Uchino, Holt-Lunstad, Bloor, & Campo, 2005).

Labouvie-Vief's ideas are compatible with the research cited in the introduction, which suggests that older adults may have difficulty with emotional tasks that do not allow them to use their emotional schemas, but instead require their cognitive and attentional resources (Wurm et al., 2004). The study requirements put mothers in a position where they were required to discuss a disagreement that they had had with their daughter in a laboratory setting. There was no option

for them to curtail the discussion (thus avoiding the negative topic) because they were asked to address several prompting questions about the incident if they concluded their discussion before the ten-minute time period was up. Thus, while the moderation hypothesis was put forward on the basis that the study protocol *would* allow mothers to make use of their emotional schemas, this might not have been the case. The unfamiliar lab setting and enforced parameters around the discussion may have made the situation unfamiliar enough that well-established schemas could not be employed. Further, *Socioemotional Selectivity Theory* may not have been as applicable in this situation as it would be in everyday life, because mothers were not in a position to avoid discussing the negative incident.

Uchino and colleagues (2005) have suggested that maintaining adaptive functioning in older age is a complex process, involving a number of different changes in cardiovascular functioning as well as compensatory factors. These authors argue that numerous autonomic processes should be simultaneously considered to understand the complex patterns of changes that may occur in autonomic and emotional process with aging. Clearly, in order to understand fully the role of RSA in emotion regulation and relationship-related outcomes, further research, which investigates cognitive and attentional processes and RSA together, is needed.

### **Emotional Responding to Intergenerational Conflict as Predictors of Helping Relationship Quality**

Given the importance of negative emotional events and conflict in determining relationship quality (Van Doorn et al., 2009), it was expected that mothers' and daughters' emotional responding during the discussion of recent disagreement would be related to their overall satisfaction and positive emotionality toward their helping relationship. Specifically, it was predicted that more positive affect and less negative affect (from both observational and

retrospective self-report measures) would be related to greater HRSWB for both the self and the partner.

**Observed affect.** Contrary to expectations, mothers' and daughters' observed affect scores (assessed using the SPAFF) were not significant predictors of HRSWB in any analyses (Hypothesis 1b). Consequently, the hypothesis that the relation between partner's observed negative affect and HRSWB for the self would be moderated by participants' baseline RSA, was also not supported (Hypothesis 4).

These results were based on the SPAFF scores that combined observational codes for mothers and daughters, and for positive and negative affect, given the high correlations among them. To address any concerns regarding the potential influence of collapsing mothers' and daughters' positive and negative affect scores on the SPAFF, an additional set of analyses was run with separate scores for mothers and daughters for both positive and negative affect (i.e., four SPAFF scores instead of the one dyadic SPAFF score that was included in the main analyses). These four SPAFF variables remained non-significant in all analyses, indicating that collapsing the SPAFF variables is not responsible for the non-significant findings reported.

It is possible that the particular conflict scenarios discussed between mothers and daughters in the current study were less important in determining HRSWB than originally expected. Because the sample consisted of mothers and daughters who were relatively satisfied with their helping relationships, these dyads may have been more likely to discuss disagreements regarding minor differences of opinion that are minimally important in determining the overall quality of their helping relationship. Concerns regarding self-presentation may have also contributed to dyads choosing relatively mild sources of disagreements.

Moreover, even discussions about important sources of disagreement may be less likely to result in lower relationship satisfaction among a sample of relatively satisfied mothers and daughters. It may be that these mothers and daughters attribute negativity in interactions with one another to sources other than their relationship partner. For instance, if a daughter is behaving erratically during a conflict scenario with her mother, a mother who is more satisfied with her relationship with that daughter may attribute these behaviours to external factors, such as sources of stress in the daughters' life, rather than to qualities inherent in her daughter. This external attribution may serve to maintain the mothers' positive view of her daughter, and consequently her good relationship with that daughter, in spite of relational conflict. Alternatively, a mother who is relatively dissatisfied with her relationship with her daughter may make dispositional attributions regarding her daughter's behaviour (i.e., believing that that behaviour is a result of her daughters' carelessness and irrationality) and may be less likely to maintain a positive view of her daughter following relational conflict, causing detriment to the dyad's relationship quality. It has been found that dispositional attributions about one's partner during conflict have a strong negative association with both self and partner reports of relationship satisfaction (Martini, et al., 2001). It is possible that the participants in the current study, given their high level of relationship satisfaction overall, made fewer dispositional attributions during discussions of conflict with their partners. Therefore, future research that investigates the relation between expressed emotion during conflict scenarios and relationship quality may benefit from measuring attributions of partners' behaviour as well, particularly when considering a sample with relatively high relationship quality.

**Self-reported affect.** Mothers' and daughters' self-reported affect (with higher scores indicating greater positive affect and less negative affect) regarding the discussion of a

disagreement were expected to be positively related to their own as well as their partners' HRSWB (Hypothesis 1a). This hypothesis was partially supported, in that self-reported affect among mothers was a significant predictor of mothers' HRSWB-PA (but not HRSWB-composite, HRSWB-LS, or HRSWB-NA). However, there was a significant negative association between daughters' self-reported affect and mothers' HRSWB-PA indicating that daughters' greater positive affect and less negative affect was associated with lower mother HRSWB-PA. Furthermore, self-reported affect did not significantly predict daughters' HRSWB (either the composite score or any of the three components). This latter finding may be a result of differences between the social and personal lives of these two groups, as previously discussed.

The finding that self-reported emotion was a significant predictor of HRSWB, while observed affect during the discussion of a disagreement was not, suggests that there is an important difference between the observed emotional responses of dyads during interactions and the feelings that the individuals are actually experiencing. This finding, along with the finding that mothers' and daughters' SPAFF scores were highly correlated, may be explained by prior theories stating that responses during social interactions are co-constructed and often differ from subjective emotional appraisals of the same event (Fischer & van Kleef, 2010). However, in light of the previous argument that the sources of conflict discussed were potentially of little consequence to HRSWB, one may wonder why mothers' and daughters' self-reported affect regarding these discussions would be significant predictors of HRSWB. To answer this question it is important to consider the issues described in the introduction regarding the use of self-report measures. For instance, the retrospective nature of self-report measures of emotion often results in these measures reflecting participants' recollection of peak emotional moments, which may neglect the duration of such emotions (Gray & Watson, 2001; Sato & Kawahara, 2011). This

may lead participants to report stronger feelings when recalling how they had felt during the conflict scenarios than they actually displayed during the duration of the interactions. Therefore, fundamental differences between self-report and observational measures may explain why self-report measures of emotion were significant predictors of mothers' HRSWB, while observational measures were not. Thus, future research may benefit from including both subjective measures and observations of co-constructed emotions in investigations of emotion.

An alternative explanation for these findings may be that self-report measures may be less likely to elicit emotional regulation in mothers and daughters, due to the nature of self-report measures being private and reflective. If mothers and daughters were regulating their emotion in the dyadic interactions in order to behave in a socially acceptable manner or minimize conflict, they may express less emotion than when reporting their feelings privately. Given the high correlation found between mothers' and daughters' SPAFF scores, it seems likely that observational measures of emotion (at least with regard to those measured in the current study) may capture outward emotional expressions that have been regulated according to the expressions of the other individual in the interaction. Returning to Fischer and van Kleef's (2010) idea that emotional responses during social interactions are co-constructed, it is possible that mothers and daughters were expressing emotions that were modulated to match their partner. These kinds of moderated emotional expressions may result in diminished expressions of authentic feelings compared to private reports of emotional experiences. Thus, it is possible that measures of self-reported affect following the discussion of a disagreement and SPAFF codes of behaviour within the same discussion may capture fundamentally different aspects of emotional responding to the interaction.

Interestingly, daughters' self-reported affect was associated with mothers' HRSWB-PA in a direction opposite to that which was expected, with greater negative and less positive affect associated with greater mother HRSWB. The unexpected direction of this relation is consistent with the previously discussed finding that daughters' greater RSA was associated with lower HRSWB for mothers. As mentioned, it is possible that mothers are less satisfied in relationships with high RSA daughters, as these daughters may be more assertive of their needs or may sometimes withdraw their care-giving in order to maintain life balance (behaviours which mothers may dislike). In a similar vein, it is also possible that those daughters who reported more positive affect and less negative affect in response to the discussion of a disagreement with their mothers tend toward more outspoken communication in general. While these women may feel more positively about their interactions because they are getting their own needs met, their mothers may find this behaviour upsetting or unsettling. Instead, it is possible that mothers may feel more positively about their helping relationships when their daughters are more subdued in expressing their opinions, and consequently feel less positive about their social interactions.

It is important to note that mothers' and daughters' self-reported affect was only a significant predictor of one component of mothers' HRSWB (i.e., PA), a result that may be explained by two factors. First, as mentioned, the dyads in this study were relatively satisfied with their helping relationships. Therefore, the variability in the negative affect dimension of mothers' HRSWB may be too low to detect any effects. It is also possible that self-reported affect did not predict the satisfaction component of HRSWB for mothers because self-reported affect is intended to measure emotions, rather than cognitions. As such, self-reported affect following a single brief discussion may be less proximally related to the satisfaction component of HRSWB than the affective components.

### **RSA as a Predictor of Emotional Responding During Intergenerational Conflict**

Higher RSA among mothers and daughters was expected to be related to greater observed positivity and less negativity in the dyadic discussion (Hypothesis 2). This expected association was not found. Although the associations between these variables were in the expected direction, they were not significant. Furthermore, the hypothesis that this relationship would be weaker for mothers than for daughters (Hypothesis 5) was also not supported, given that the association was small and non-significant among mothers and daughters.

One plausible reason for these null findings is that, as previously discussed, the conflict discussed by participants was mild in nature. According to *Polyvagal Theory* (2009), RSA is a measure of the organization of an individual's central nervous system, and this unique organization sets the foundation for emotional responses to arousing stimuli. It is possible that the conflict discussed by dyads in the present study failed to provide stimuli sufficiently arousing for the effects of RSA on observed emotional responding during conflict to be detected.

Furthermore, as aforementioned, while baseline RSA may capture individual differences in emotional responding, the SPAFF may capture more situation-specific emotional responding, which is subject to the influence of emotional reactions from participants' relationship partner. This difference may explain why these measures were not significantly correlated.

It is also possible that baseline RSA, because it measures individual differences in emotional responding in general, is a less important predictor of emotional responding during relational conflict than changes in RSA across the entire interaction. Change in RSA within individuals across contexts (i.e., delta RSA, which is measured by calculating the difference between baseline RSA and RSA during an emotional task) has been considered as a proxy for emotion regulatory efforts in previous research (Butler et al., 2006). Porges' theory explains the

role of vagal withdrawal (commonly assessed by delta RSA), stating that it allows a mammal to be highly flexible in the face of dynamic environmental demands (Porges, 2009). As Porges explains, the vagus nerve suppresses unnecessary heartbeats when at rest (i.e., vagal tone), but this parasympathetic control must cease when physiological, attentional or emotional demands increase (i.e., vagal withdrawal). Butler et al. (2006) found that women who were instructed to make an effort to regulate their emotions during a dyadic discussion of an emotion-inducing film (by means of either suppression or reappraisal) had greater increases in RSA from baseline to an emotion evoking task than those who did not try to regulate their emotions. Delta RSA may provide a measure of physiological emotional responding that is more proximal to, and therefore a more potent predictor of, emotional expressions during the dyadic discussions, particularly if participants were actively regulating their emotions during these interactions. Delta RSA has been studied relatively little, leaving many contradictions in the delta RSA literature (Butler et al., 2006). Therefore, studies which investigate the role of RSA and emotion regulation may benefit from including both baseline and delta RSA measures.

### **Limitations**

It is crucial that these results are considered in terms of the limitations of this study. First, it is important to consider the limitations of investigating a small sample of 81 dyads. Any of the null findings reported may be due to the analyses being underpowered. Additionally, the sample of this study was comprised mainly of Caucasian mothers and daughters. Given that emotional responding is likely to present differently and have different implications across ethnicities these results cannot be assumed to generalize to other racial groups (Roberts, Levenson, & Gross, 2008). In addition, given that the relationships between mothers and daughters share features unique to this dyad combination (i.e., mother-daughter relationships tend to involve more help

and more direct contact with one another than other familial dyads; Walker et al., 1992), one cannot assume that these findings would apply to other familial relationships. Therefore, results from samples comprised of other racial groups, males, or other familial dyads, may differ from those obtained in the current study.

Furthermore, as previously mentioned, the mothers and daughters investigated in the current study tended to report relatively high HRSWB. It may be that mothers and daughters in relationships of lower quality would show different patterns of results than those obtained from the current sample. Obtaining a sample with greater variability in terms of relationship quality may be a challenge, as dyads with poor relationship quality may be less likely to participate with one another than those who are relatively satisfied with their helping relationship. Nevertheless, it is important for future researchers to make every effort to include dyads with more variable levels of relationship satisfaction.

While the current study employed several measures of emotional responding, it included only self-report measures of relationship quality. Therefore, the measure of HRSWB used in this study is subject to the limitations of self-report measures of emotion highlighted in the introduction (Gray & Watson, 2001). Other reports (e.g., ratings from daughters' husbands) may provide a more comprehensive measurement of relationship quality. Furthermore, relationship quality was assessed in the current study by means of considering both the satisfaction as well as the emotions felt specifically regarding the helping relationship. More general measures of relationship quality which assess various aspects of the relationship (such as an adapted version of the *Quality Marriage Questionnaire*; Norton, 1983) be better predicted by the emotion-related variables that were considered (specifically those variables that capture global individual differences in emotional responding such as RSA).

Although it is commonly thought that emotional responding will impact the quality of close relationships, it cannot be ruled out that the associations investigated could go in either direction. Stated differently, findings from the current study cannot speak to causality in regards to any of the relationships found. Future research that investigates these variables longitudinally may address the direction of the associations between emotion-related variables on the quality of helping relationships.

Future research may also benefit from including a control for differences in breathing across participants. Respiration is known to have an influence on RSA, therefore any differences in participants' breathing at the time of measurement could threaten the validity of RSA as a proxy for vagal tone (Butler, et. al, 2006). It has been argued that having participants engage in a paced breathing task prior to taking baseline measures of RSA is necessary in order for RSA to be an accurate indicator (Butler et al., 2006). Implementing paced breathing tasks would enable future researchers to consider qualities of participants' breathing (i.e., respiration rate and volume) as well as their heart rate independently from one another as predictors of emotion-related variables. Additionally, including such measures would enable researchers to answer the question of whether RSA has predictive ability beyond what these other measures can provide (Butler, 2006).

Finally, it should be taken into account that the findings reported for the SPAFF may be different in cases where different researchers are assigned to coding the dyadic interactions. Although efforts to minimize concerns about reliability were made (i.e., both coders coded all observations and discussed disagreements until consensus was achieved), it cannot be ignored that this process may have contributed to one researcher having a greater influence on the final codes assigned than the other, thereby producing unreliable codes.

## Summary and Conclusion

The current study investigated emotion-related variables as predictors of helping relationship quality among older mothers and their adult-daughters. Specifically, physiological, observational and self-report measures of emotional responding were considered as predictors of mothers' and daughters' perceptions of the helping relationship. This multi-modal approach provides a unique contribution to the literature in this area, which has typically relied on self-report measures of emotion. Additionally, this study investigated the reciprocal helping relationships between healthy older mothers and their adult daughters. This fills a gap in the literature on intergenerational helping relationships, which tends to focus on care given to older adults by their offspring. Furthermore, only one other study has considered all three components of HRSWB from both the recipients' and caregivers' point of view (Martini & Busseri, 2010), making this research a valuable contribution to the body of research on helping satisfaction.

The results of this study indicate that the physiological dispositions of both mothers and daughters seem to be important predictors of helping relationship quality from the perspective of mothers. This finding may have implications for therapeutic interventions and applied psychology, as it emphasizes the role of physiological processes in relationship functioning. Furthermore, the emotions that mothers and daughters report regarding disagreements with one another also seem to be important in predicting the quality of their helping relationships. That mothers' RSA and self-reported affect regarding the dyadic discussion was positively associated with their own HRSWB, is consistent with previous research. However, daughters' baseline RSA and self-reported affect (more positive versus negative emotion) regarding the discussion of a disagreement was negatively associated with mother HRSWB, highlighting the need for future research in this domain. The finding that daughters' negative emotional responding was related to

mothers' greater perception of their helping relationship indicates that emotion-related variables may have differential effects on relationship outcomes for younger versus older generations. Further research may elucidate how RSA relates to emotional responding across different contexts as well as the role of physiological dispositions in determining relationship quality.

## Footnotes

<sup>1</sup> Due to concern that the total number of codes for mothers and daughters may be a confounder in the results (due to the computation of the dyadic SPAFF scores), final analyses were conducted with the total number of codes for mothers and daughters included as covariates. After controlling for the total number of codes for both mothers and daughters, the patterns of significance were identical to the analyses reported in the results.

<sup>2</sup> Maximum-Likelihood Estimation was chosen to impute missing data. Three strategies were undertaken to safeguard against any possible biases of imputing missing data. First, the previously described missing scores for each variable were included in a set of regressions that were identical to the final analyses in every other way. This procedure allowed the pattern of missing data on each variable to be modelled and controlled for. These analyses revealed a very similar pattern of findings to the final analyses, indicating that overall, controlling for any systematic relations between patterns of missing data and the study variables had relatively little influence on results. Second, an additional set of analyses were conducted with the aforementioned mother and daughter data count scores included as predictors. These analyses control for the number of missing values for each participant. Results of these analyses revealed an identical pattern of findings as the results of the findings in the final analyses. Overall, controlling for the number of missing variables for each participant had a relatively small influence on results. As a final precaution, results from the final analyses were compared to those run on the non-imputed data set. Analyses were conducted using both listwise and pairwise deletion. These analyses revealed, once again, a very similar pattern of results to those of the final analyses. This confirms that the results of our final analyses have not been biased due to

imputation, as alternative methods of handling missing data produce consistent results with the final analyses.

<sup>3</sup> Due to the relatively large number of predictors in the regression analyses, marginal effects were only discussed in cases where the effects were very close to being significant and the same pattern of results was actually significant in another analysis. This was done under the premise that the relationships reported are likely to be a true effect, given their recurrence across analyses as well as the relatively low  $p$ -values associated with them (all  $ps < .10$ ).

<sup>4</sup> Mothers' and daughters' RSA was not related to mothers' HRSWB-NA. It is possible that, because the dyads in this study were relatively satisfied with their helping relationships, the variability in mothers' HRSWB-NA scores was too low to detect any effects of RSA (mothers' average HRSWB-NA score was 6.57,  $SD = .70$ , on a scale from 1 to 7, with higher scores indicating less negative effect). The fact that RSA was a significant predictor of mothers' HRSWB composite scores in spite of mothers' HRSWB-NA being non-significant, suggests a robust effect of RSA on the other dimensions of mothers' HRSWB (which showed greater variability).

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## Appendix 1.

## Copy of Ethics Clearance




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 Brock University
 

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**DATE:** March 15, 2005  
**FROM:** Linda Rose-Krasnor, Chair  
 Research Ethics Board (REB)  
**TO:** Tanya MARTINI, Psychology  
**FILE:** 04-294 - MARTINI  
**TITLE:** Emotion Regulation in Older Mother-Adult Daughter Helping Relationships

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The Brock University Research Ethics Board has reviewed the above research proposal.

**DECISION:** Accepted as Clarified

This project has received ethics clearance for the period of March 15, 2005 to March 31, 2007 subject to full REB ratification at the Research Ethics Board's next scheduled meeting. The clearance may be extended upon request. *The study may now proceed.*

Please note that the Research Ethics Board (REB) requires that you adhere to the protocol as last reviewed and approved by the REB. During the course of research no deviations from, or changes to, the protocol, recruitment, or consent form may be initiated without prior written approval from the REB. The Board must approve any modifications before they can be implemented. If you wish to modify your research project, please refer to <http://www.brocku.ca/researchservices/forms> to complete the appropriate form **Revision or Modification to an Ongoing Application**.

Adverse or unexpected events must be reported to the REB as soon as possible with an indication of how these events affect, in the view of the Principal Investigator, the safety of the participants and the continuation of the protocol.

If research participants are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and approvals of those facilities or institutions are obtained and filed with the REB prior to the initiation of any research protocols.

The Tri-Council Policy Statement requires that ongoing research be monitored. A Final Report is required for all projects, with the exception of undergraduate projects, upon completion of the project. Researchers with projects lasting more than one year are required to submit a Continuing Review Report annually. The Office of Research Services will contact you when this form *Continuing Review/Final Report* is required.

Please quote your REB file number on all future correspondence.

## Appendix 2

## Demographics Questionnaire

I would like to get a bit of information about your background. The reason that we collect this information is so that when the project is complete, we'll be able to give an overall description of all of the women who took part.

Date of Interview (once scheduled):

Date of Birth:

Where were you born?

If not Canada, how long have you lived in this country?

What is your cultural or ethnic origin?

Education:

I just want to ask you about your education now. I have some choices in front of me, and if I read them to you, maybe you can just tell me which one best applies to you?

Completed Elementary School

Some High School

Completed High School

Some Trade School, College or University

Completed Trade School, College, or University

Other (please specify)

Marital Status:

The same applied to marital status - I'll just read you some choices, and I'd like you to tell me which one best applies:

Single

Married or Common Law (if yes, for how long?)

Divorced (if yes, for how long?)

Widowed (if yes, for how long?)

Type of Residence: Can you describe the type of residence you live in please.

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Children:

Name	Sex	Age	Residing Where?	See & Talk To How Often?

We would also like to ask your other children some questions by telephone.

Would you mind if we contacted all or some of your other children at some point in the future to ask some questions? This is a separate part of the student and you are under no obligation to take participate in this section and will not take place for a while yet.

Yes

No

Only contact some

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If could ask your other child(ren) if they would mind us calling I can take down their telephone numbers when you visit us here at Brock.

## Appendix 3

## Instrumental Activities of Daily Living Scale (Lawton &amp; Brody, 1969)

The next set of questions that I have relates to eight things that people have to do regularly - for each one, I'll read you a set of choices and you just tell me which one best applies to you. Again, feel free to say that you'd like me to skip any question that you don't want to answer and don't hesitate to ask if you have any questions as we go along.

**A. Ability to use telephone**

1. Operates telephone on own initiative – looks up and dials numbers, etc
2. Dials a few well-known numbers
3. Answers telephone but does not dial
4. Does not use telephone at all

**B. Shopping**

1. Takes care of all shopping needs independently
2. Shops independently for small purchases
3. Needs to be accompanied on any shopping trip
4. Completely unable to shop

**C. Food Preparation**

1. Plans, prepares and serves adequate meals, independently
2. Prepares adequate meals if supplied with ingredients
3. Heats and serves prepared meals, or prepares meals but does not maintain adequate diet
4. Needs to have meals prepared and served

**D. Housekeeping**

1. Maintains house alone or with occasional assistance (e.g., 'heavy work-domestic help)
2. Performs light daily tasks such as dishwashing, bedmaking.
3. Performs light daily tasks but cannot maintain acceptable level of cleanliness.
4. Needs help with all home maintenance tasks.
5. Does not participate in any housekeeping tasks.

**E. Laundry**

1. Does personal laundry completely.
2. Launders small items – rinses socks, stockings, etc..
3. All laundry must be done by others.

**F. Modes of Transportation**

1. Travels independently on public transportation or drives own car.
2. Arranges own travel via taxi, but does not otherwise use public transportation.
3. Travels on public transportation when assisted or accompanied by another.
4. Travel limited to taxi or automobile with assistance of another.
5. Does not travel at all.

**G. Responsibility for own Medications**

1. Is responsible for taking medication in correct dosages at correct time.

2. Takes responsibility if medication is prepared in advance in separate dosages.
3. Is not capable of dispensing own medication.

**H. Ability to Handle Finances**

1. Manages financial matters independently (budgets, writes checks, pays rent, bills, goes to bank), collects and keeps track of income.
2. Manages day-to-day purchases, but needs help with banking, major purchases, etc..
3. Incapable of handling money.

## Appendix 4

## Prompts for Recent Disagreement

**First 10 minutes****RECENT DISAGREEMENT OR DIFFERENCE OF OPINION**

**How did each of you feel about this situation and why did you feel that way?**

**At that time, what kinds of things were going through each of your minds?**

**Looking back, what parts of our thoughts and feelings seem reasonable and unreasonable?**

**In the end, were things resolved, left unresolved or did you agree to disagree?**

**If things were resolved, how did they get resolved?**

## Appendix 5

## Experienced Emotion Questionnaire

Please rate the degree to which you experienced the following feelings during the prior discussion with your daughter regarding a recent difference of opinion or disagreement.

Happy or Pleased

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_  
Not at all Very much so

Sad or Disappointed

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_  
Not at all Very much so

Angry or Frustrated

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_  
Not at all Very much so

Guilty

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7 \_\_\_\_\_  
Not at all Very much so

## Appendix 6

## Helping Satisfaction Questionnaire (HRSWB-SAT)

I am happy to help my daughter because there are things that she/he is unable to do on her own (e.g., due to a lack of time).

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

I hesitate to help or advise my daughter because she doesn't need help or advice and it's important for her/him to be independent and do things on her own.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

I hesitate to help my daughter because, physically, it puts a strain on me.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

Providing help or advice to my daughter disrupts or does not leave me with enough time for myself or other things that I enjoy.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

Providing help or advice makes me feel closer to my daughter.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

Providing help or advice to my daughter/son makes me feel upset because I realize that she is struggling.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

I hesitate to help or advise my daughter because it often leaves me feeling angry or frustrated.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

Providing my daughter with advice or assistance makes her feel loved or cared for.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

I hesitate to help or advise my daughter because it makes her upset that she is not managing things as well as she should.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

I hesitate to help or advise my daughter because she seems to take offense (e.g., because she is suspicious of my motives, or sees it is an invasion of her privacy).

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

My daughter is grateful/appreciative of the advice and assistance that I give her.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

I hesitate to help or advise my daughter because we have different ways of doing things or a different set of standards from one another.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

I am sensitive to my daughter's feelings and circumstances when I give her help or advice.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

Sometimes my daughter feels that I am a bit pushy because I try to help or advise her when she doesn't really feel that I should.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

My daughter would like more help or advice from me.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

I feel that I should be doing more for my daughter.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

My daughter makes me feel as though I should be doing more for her.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

I am happy to receive help from my daughter because there are things that I am unable to do on my own (e.g., because of physical limitations or a lack of time).

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

I don't like to receive help from my daughter because I don't need help or advice and I think it's important for me to do things on my own.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

I'm not comfortable with my daughter helping me because, physically, I think that it puts a strain on her.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

I'm not comfortable with my daughter helping me because it does not leave her with enough time for herself, her work, her family, or other things that she enjoys.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

Receiving help from my daughter makes me feel closer to her.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

Receiving help from my daughter makes me feel loved or cared for.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

I'm uncomfortable receiving help from my daughter because it makes me feel upset that I'm not managing things as well as I should.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

I'm not comfortable receiving help from my daughter because I may take offense, (e.g., feel offended, suspicious of her motives, or as though it is an invasion of my privacy).

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

Receiving help from my daughter makes me feel guilty because I feel as though I am being a burden to her.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

I am grateful/appreciative of the advice and assistance that my daughter gives me.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

I'm not comfortable receiving help from my daughter because it makes me feel guilty.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

I'm not comfortable with my daughter helping or advising me because it would make her feel upset that I am struggling.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

I do not like to receive help or advice from my daughter because we have different ways of doing things or a different set of standards from one another.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

I sometimes feel that my daughter is a bit pushy in helping or advice giving when I don't really think she should.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

My daughter is sensitive to my feelings and circumstances when she gives me help or advice.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

I would like more help or advice from my daughter.

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
 not at all true of me very true of me

## Appendix 7

## Helping Emotions Questionnaire (HRSWB - PA, HRSWB - NA)

To what extent is giving help to your daughter likely to make you feel . . .

nervous/cautious

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
not at all very much

jittery/worried

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
not at all very much

agitated

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
not at all very much

angry/irritable at yourself

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
not at all very much

angry/irritable at your daughter

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
not at all very much

disgusted with yourself

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
not at all very much

disgusted with your daughter

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
not at all very much

sad

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
not at all very much

disappointed with yourself

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7

not at all

very much

disappointed with your daughter

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7

not at all

very much

guilty

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7

not at all

very much

happy/cheerful

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7

not at all

very much

calm/relaxed

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7

not at all

very much

grateful

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7

not at all

very much

sympathetic toward daughter

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7

not at all

very much

To what extent is receiving help to your daughter likely to make you feel . . .

nervous/cautious

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
not at all very much

jittery/worried

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
not at all very much

agitated

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
not at all very much

angry/irritable at yourself

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
not at all very much

angry/irritable at your daughter

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
not at all very much

disgusted with yourself

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
not at all very much

disgusted with your daughter

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
not at all very much

sad

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
not at all very much

disappointed with yourself

1 \_\_\_\_\_ 2 \_\_\_\_\_ 3 \_\_\_\_\_ 4 \_\_\_\_\_ 5 \_\_\_\_\_ 6 \_\_\_\_\_ 7  
not at all very much

disappointed with your daughter

1\_\_\_\_2\_\_\_\_3\_\_\_\_4\_\_\_\_5\_\_\_\_6\_\_\_\_7

not at all

very much

guilty

1\_\_\_\_2\_\_\_\_3\_\_\_\_4\_\_\_\_5\_\_\_\_6\_\_\_\_7

not at all

very much

happy/cheerful

1\_\_\_\_2\_\_\_\_3\_\_\_\_4\_\_\_\_5\_\_\_\_6\_\_\_\_7

not at all

very much

calm/relaxed

1\_\_\_\_2\_\_\_\_3\_\_\_\_4\_\_\_\_5\_\_\_\_6\_\_\_\_7

not at all

very much

grateful

1\_\_\_\_2\_\_\_\_3\_\_\_\_4\_\_\_\_5\_\_\_\_6\_\_\_\_7

not at all

very much

sympathetic toward daughter

1\_\_\_\_2\_\_\_\_3\_\_\_\_4\_\_\_\_5\_\_\_\_6\_\_\_\_7

not at all

very much