2006-07-12

Marital Harmony and Conflict: Linkages to Infants' Emotional Regulation, Cardiac Vagal Tone, and Developmental Status at Six- and Nine-Months of Age

Staci Shizuko Ohmine
Brigham Young University - Provo

MARITAL HARMONY AND CONFLICT: LINKAGES TO INFANTS' EMOTIONAL REGULATION, CARDIAC VAGAL TONE, AND DEVELOPMENTAL STATUS AT SIX- AND NINE-MONTHS OF AGE

by

Staci Shizuko Ohmine

A thesis submitted to the faculty of

Brigham Young University

in partial fulfillment of the requirement for the degree of

Master of Science

Marriage Family and Human Development Program

School of Family Life

Brigham Young University

August 2006

BRIGHAM YOUNG UNIVERSITY

GRADUATE COMMITTEE APPROVAL

of a thesis submitted by

Staci Shizuko Ohmine

This thesis has been read by each member of the following graduate committee and by majority vote has been found to be satisfactory.

Date	Chris L. Porter, Chair
Date	Larry J. Nelson
Date	David A. Nelson

BRIGHAM YOUNG UNIVERSITY

As chair of the candidate's graduate committee, I have read the thesis of Staci Shizuko Ohmine in its final form and have found that (1) its format, citations, and bibliographical style are consistent and acceptable and fulfill university and department style requirements; (2) its illustrative materials including figures, tables, and charts are in place; and (3) the final manuscript is satisfactory to the graduate committee and is ready for submission to the university library.

_____ _____

Date

Chris L. Porter
Chair, Graduate Committee

Accepted for the Program

_____

Thomas Draper
Graduate Coordinator,
Marriage, Family, and Human Development

Accepted for the School

_____

James M. Harper
Director, School of Family Life

ABSTRACT

MARITAL HARMONY AND CONFLICT: LINKAGES TO INFANTS' EMOTIONAL REGULATION, CARDIAC VAGAL TONE, AND DEVELOPMENTAL STATUS AT SIX- AND NINE-MONTHS OF AGE

Staci Shizuko Ohmine

Marriage, Family, and Human Development Program

School of Family Life

Master of Science

This study examined the linkages between marital harmony and conflict and infants' emotional and physiological regulation abilities and developmental status at six- and nine-months of age. Participants included 93 first-time mothers and their infants (43 males, 50 females) from a Mountain West community. Mothers were asked to complete a battery of questionnaires, including a demographic measure and Braiker and Kelly's (1979) marital quality questionnaire. The revised Bayley Scales of Infant Development (BSID II) and Behavior Rating Scales (BRS) 2nd Edition were administered at six- and nine-months to measure infants' mental and motor development status and emotional regulation abilities. Infants' heart rate was also measured at six- and nine-months to

measure their physiological regulation abilities. While correlations were found between high levels of marital conflict and infants' emotional regulation abilities at six-months, these correlations were not found at nine-months. However, this study was able to tease apart the direction of affect between marital conflict and infants' emotional and physiological regulation. Based on previous literature, it was hypothesized that marital conflict at six-months would predict infants' regulatory abilities at nine-months. However, the results from this study suggest that infant variables at six-months predict marital quality at nine-months. Specifically, infants' low emotional and physiological regulation abilities at six-months predicts higher levels of marital conflict at nine-months.

Overall, these findings present a new perspective and offer new insights into the relationship between marital conflict and infants' regulation abilities. These findings have important implications for understanding the impact that infants' poorer regulation abilities can have on a marriage. Additional research is needed to further investigate the long-term consequences of infants' regulatory abilities on marital functioning and vice versa.

TABLE OF CONTENTS

Marital harmony and conflict: Linkages to infants' emotional regulation, cardiac vagal tone, and developmental status at six- and nine-months of age

INTRODUCTION

An important developmental task for infants is learning to cope with stimulation and how to regulate their own physiological and emotional states. During the early neonatal period, infants are increasingly susceptible to external stimulation and must learn how to cope with that stimulation, whether it be through internal or external methods (e.g. finger or thumb sucking, hair, feet, or hand tugging, closing their eyes, turning away from the stimulation, or orienting) (Gable & Isabella, 1992). Stifter, Spinrad, and Braungart-Rieker (1999) suggest that experiencing frustration in infancy may be integral to the development of regulatory skills. However, not all infants are able to regulate their emotions equally. Much of this individual variance is thought to be due to a number of exogenous variables (e.g., Braungart-Rieker & Stifter, 1996; De Wolff & van Ijzendoorn, 1997; Volker, Keller, Lohaus, Cappenberg, & Chasiotis, 1999). One exogenous factor linked to infants' emotional regulatory abilities that is garnering increased attention is the quality of parents' marital relationships (e.g., Gottman & Katz, 1989). Specifically, recent research has demonstrated that high levels of marital discord negatively impacts children's emotional regulatory abilities and is linked to more internalizing behavioral problems (e.g., Katz & Gottman, 1991; Porter, Wouden-Miller, Silva, & Porter, 2003). However, what is not clear from this research is the impact that marital discord has on infants' emotional regulation longitudinally. Therefore, this study was designed to address this gap in the literature by examining potential linkages between marital conflict and infants' emotional and physiological regulation from six- to

nine-months of age. Specifically, this study will address the following research questions. First, when infants are six-months of age is marital functioning, either conflicted or harmonious, linked to infants' emerging behavioral and physiological regulation and developmental status? Second, if relationships are found at six-months between marital factors and infant outcomes, do they continue at nine-months? Third, to what extent is there stability in the measures both for marital functioning and infant emotional and physiological regulation and developmental status over the later part of the first year? Finally, does marital functioning at six-months predict infant outcomes at nine-months?

Previous research has indicated that biological maturation coupled with sensitive caregiving interacts to provide an infant the means to effectively regulate his/her emotions (e.g., Fox & Calkins, 1989). As the infant's central nervous system develops, perceptual, motoric, and cognitive skills emerge that can be used to reduce or maintain arousal (Rothbart, 1989). However, some infants are emotionally reactive and may not have the skills to self-regulate their arousal until their parents have modeled the appropriate behavior for them (Porges, Doussard-Roosevelt, Portales, & Suess, 1994; Rothbart, 1996). Conversely, infants who are not easily frustrated may not experience levels of emotional arousal that require regulation and consequently may not develop, refine, or have the opportunity to practice the skills needed to control behavior. The parents of infants with low reactivity may also have fewer opportunities to intervene and support the development of regulation (Stifter, et al., 1999).

The parent-child relationship is also affected by the parents' marital quality. Marital discord has been found to have a negative effect on parenting behaviors (Gottman & Katz, 1989) which in turn may be the cause for the relations found between high levels

of family discord and psychopathology in children (Egeland, Jacobvitz, & Sroufe, 1988; Emery, 1989; Gottman & Katz, 1989; Grych & Fincham, 1990). Parents from more discordant marriages tend to engage in less sensitive and more negative parenting behaviors (Crockenberg & Covey, 1991; Gottman & Katz, 1989) as well as express more negative affect during conflict resolution (Cummings, 1987; Cummings, Iannotti, & Zahn-Waxler, 1985; Cummings, Zahn-Waxler, & Radke-Yarrow, 1981). On the other hand, couples with greater marital harmony are more likely to display more positive nonverbal cues, have more agreement and approval, and be less coercive and attacking than discordant couples (Katz & Gottman, 1993).

In a recent study, Porter et al. (2003) demonstrated a link between marital discord and harmony and the infant's emotional and physiological regulation as well as developmental status. They suggest that infants as young as six-months of age are negatively affected by conflict in their parents' marital relationship, as evidenced through the infant's lower cardiac vagal tone, poorer emotional regulation, and lower scores on the Bayley scales, used to assess infants' developmental status. This suggests that marital discord may be associated with infants' poorer physiological and emotional regulation abilities and may interfere with parents' abilities/opportunities to support infants' cognitive and motor growth. However, what is not clear from this research is the direction of effect given the concurrent nature of the research design in the study (Porter et al., 2003). Additional research is needed to further tease apart the direction of effect to better determine whether infants' poor regulatory skills are influenced by marital discord or vice versa.

This project is therefore designed to address this gap in the literature by examining linkages between marital conflict and harmony and infants' physiological and emotional regulation as well as infants' developmental status at six- and nine-months of age. While there is limited research in this area, particularly in the early infancy period, it is anticipated that high levels of marital conflict will be linked both concurrently and prospectively to lower levels of infants' emotional and physiological regulation and to lower developmental status at both six- and nine-months of age. Alternatively, it is anticipated that marital harmony or love will also be linked concurrently and prospectively but positively to better emotional and physiological regulation and greater developmental status.

REVIEW OF LITERATURE

Emotional Regulation

Some have argued that learning to regulate emotions is the first developmental task of infancy (Lamb, Bornstein, & Teti, 2002). Emotional regulation abilities learned early in life are thought to be beneficial for a child's development and aide in preventing later social behaviors as early behavioral reactivity has been shown to be a precursor of later social behavioral problems (Calkins & Fox, 1997; Cicchetti et al., 1991; Fox & Stifter, 1989). Researchers have demonstrated the long-term effects of a child's inability to regulate emotions. For example, Stifter, Spinrad, and Braungart-Rieker (1999) suggest that children who are easily frustrated and who cannot regulate their emotions may respond with more noncompliance to parental demands and thus be at risk for behavioral problems. Others suggest that infants with low levels of vagal tone (a heart rate measure

associated with physiological regulation abilities) are associated with high-risk populations who have behavioral and regulatory problems (Porges, 1995).

There are many factors that affect an infant's ability to regulate his/her own emotions. Some examples include the parents' marital quality, parents' level of responsiveness or involvement, and the infant's physiological responses to stimuli. For instance, some researchers have found that attentive, warm, stimulating, responsive, and nonrestrictive caregiving plays a positive role in the healthy development of the infant's regulatory abilities (Belsky, Goode, & Most, 1980; Tronick, 1989). More specifically, Belsky et al. (1980) found that maternal stimulation teaches the infants how to regulate their own attention and enhance their exploratory competence, which not only influences early parent-infant interaction but also later development.

There are also variances in parenting styles that affect how a child develops his/her emotional regulation abilities. For instance, a parent who tries to prevent his/her infant from being exposed to frustrations, a daily experience for many infants, will have a child who may have limited opportunities to learn appropriate regulatory strategies. If a child is reacted to consistently with what Tronick (1989) identifies as "other directed regulatory" behaviors (regulation strategies that are initiated by others rather than the self) then the child will have fewer opportunities to learn self-soothing behaviors. However, a combination of other and self-directed regulatory behaviors can help the child learn to more appropriately cope with frustrations and learn to self-soothe.

Although a parent may try to prevent his/her infant from being exposed to negative and stressful situations, an infant can be over-stimulated and get overly aroused especially when exposed to marital discord in the home, either directly or perhaps even

indirectly. Fortunately, the infant has been born with natural defense mechanisms, such as turning away or closing their eyes, which help them calm down or withdraw from over-stimulating situations (Field, 1981). In such cases where the infant is over-stimulated, researchers (e.g., Stifter and Braungart,1995; Braungart-Rieker & Stifter 1996; Rothbart & Derryberry, 1981) have found that self-comforting behaviors (e.g. finger and thumb sucking and pulling on hands, feet, or hair) and orienting (e.g. looking at or away from caregivers) are effective strategies for helping the infant calm during times of distress.

When discussing infant temperament, there are variations in reactivity and regulation. Fox (1989) states that infants will be able to develop strategies needed to control their physiological reactivity. He has found that highly reactive infants at five-months of age develop into sociable toddlers at 14-months of age. This could be explained by a finding from Porges et al. (1994), which demonstrates that high behavioral reactivity in an infant evokes behavioral interactions where the parent provides the guidance for the infant to build strategies of self-regulation.

It is important to note the differences in behaviors between highly reactive infants versus those with good parenting processes in place. For instance, some infants may be less capable of organizing self-comforting behaviors because they are predisposed towards high reactivity. At the same time, parents may also be insensitive to infants' cues indicating over-stimulation and may contribute to dysregulated responses as opposed to regulated responses.

Occasionally, an infant may be over-simulated past the point of being able to comfort him/herself. Stifter and Braungart (1995) and Braungart-Rieker and Stifter

(1996) found that when infants were highly distressed they appeared to be inhibited in recruiting their orienting skills to calm themselves down. It is at these times that external intervention becomes necessary and infants depend on their parents and other care givers to help calm and soothe them. The infant with a highly reactive temperament may require greater help from his/her parents in regulating his/her emotions, resulting in a child who may become more dependent upon external sources of regulation as opposed to internally derived regulation (Hubbard & van Ijzendoorn, 1991). However, when a parent is unavailable or perhaps distracted, as may be the case with parents who experience higher levels of marital conflict (e.g., Gottman & Katz, 1989), these infants may have fewer opportunities to effectively engage psychosocial supports to adequately regulate their emotions. Under such conditions, it seems likely that infants from homes with greater levels of marital conflict may be more prone to poor emotional and developmental outcomes.

Unfortunately, parents may often times not be in tune with their infants' signals and cues, and may not recognize when their infant is over-stimulated or frightened. Gable and Isabella (1992) found that mothers who had a tendency to provide either too much or too little stimulation led to infants who were less able to regulate their own emotions. This could be the case with mothers from discordant marriages. These mothers may be too distracted with their marital problems to be in tune with their infants' emotional and physiological signals and cues and at the same time, less available to optimally support infants' attempts at cognitive or motor development. Once again, it seems likely that infants from homes with more conflict (marital discord) may be more prone to poorer emotional and developmental outcomes.

In summary, emotional regulation is an important developmental outcome often achieved early in life. An infants' ability to properly regulate emotions is dependent on many factors including the infant's individual responses to the environment and parents' level of responsiveness and involvement with the infant. Parents' responsiveness is likewise influenced by several factors and a growing area of research suggests that marital functioning may be a key variable in shaping parenting behaviors and subsequently, influencing infants' developmental outcomes.

Marital Functioning

Marital conflict has been identified as a risk factor that increases the probability of many adjustment problems in children, including both internalizing and externalizing disorders (e.g., Gottman & Katz, 1989). Research has demonstrated the mental health of children to be related to marital disruption and the level of conflict in the family (Peterson & Zill, 1986). Davies and Cummings (1994) found that exposure to angry, discordant marital interactions affects the organization of young children's emotional response to stressful situations. Some negative child outcomes associated with marital distress and conflict include, but are not limited to, noncompliance, aggression, poorer emotional regulation abilities, depression, withdrawal, poor social competence, health problems, and many conduct-related problems (Cowan & Cowan, 1990; Emery & O'Leary, 1982; Forehand, Brody, Long, Slotkin, & Fauber, 1986; Gottman & Katz, 1989; Hetherington, Cox, & Cox, 1982; Owen & Cox, 1997; Peterson & Zill, 1986; Porter & O'Leary, 1980).

Jenkins (2000) has further found that anger-based conflict between parents has been singled out as the element of marital conflict most likely to predict externalizing

disorders in children four- to eight-years of age. These children showed more frequent anger expressions, more deviant anger expressions, and more frequent taunting than did children who were not exposed to anger-based conflict between parents. It could be that externalizing behaviors are also an outward manifestation of poorer internal regulation.

Other studies (e.g., Gottman & Katz, 1989) linking marital distress and children's later emotional functioning support this notion that marital conflict may be an important factor in the development of children's emotional regulation. Among four- and five-year old children, Gottman and Katz (1989) found evidence for a path from marital distress to high levels of chronic stress (as indexed by a high level of urinary catacholamines) and difficulties with emotional regulation in peer interaction. The findings of Cummings and his colleagues (Cummings, Cummings, & El-Sheikh, 1989; Davies and Cummings, 1994) similarly reflect that exposure to angry, discordant marital interactions affects the organization of young children's (12-months and older) emotional responses.

Despite the growing body of evidence of the linkages between marital conflict and negative outcomes with preschoolers and older school age children (see Davies & Cummings, 1994 for review) there is little evidence on the effects of marital functioning on infants' development, whether it be emotionally, physiologically, or cognitively. However, some hypotheses can be derived based on the present literature. The first main hypothesis that explains why marital conflict affects infants is that during marital conflict, infants can be exposed to frightening and distressing behaviors. This presents the infant with the paradoxical problem of an attachment figure who is both the source of and the solution to their alarm. Owen and Cox (1997) speculated that infants exposed to marital conflict do not have good behavioral options to decrease the resulting emotional arousal

in such situations. This could be attributed to the fact that, as mentioned earlier, orienting (e.g. looking at the mother) is a self-comforting behavior infants utilize when distressed. Therefore, if the infant sees his/her parent as frightening or frightened, he/she is unable to receive the comfort he/she normally would by orienting him/herself towards mother.

A second explanation as to why marital conflict affects an infant's ability to regulate his/her emotions is that chronic marital conflict also interferes with the sensitivity, warmth, and involvement of parents with their children, thereby predicting insecurity in the infant-parent relationship. This is often called the "spill-over" hypothesis (e.g., Katz & Gottman, 1991). That is, the marital conflict spills over and then influences other relationships including parent-child relationships. Some studies report a positive association between quality of the marital relationship and quality of parenting with mothers who experienced more conflict in their relationships. For instance, Donovan, Leavitt, and Walsh (1998) report that mothers who have higher levels of marital conflict feel as if they have less attentional capacity available for processing infant signals. Subsequently, if the mother is distracted by marital concerns, she is less likely to respond appropriately to her infant's signals and help fulfill her infant's emotional needs. Mothers who are not in tune with their infants' emotional needs may also leave them in environments that may be frightening for the infant. For example, it could be that parents are less likely to shield their infants from exposure to their arguments and conflicts than they are their older children, assuming that their young infant is too immature to comprehend or to be affected by the arguments and conflicts. However, several studies suggest that the observation of others' naturally occurring anger often upsets children, including infants as young as 12-months of age (Davies & Cummings, 1994).

Interestingly, in classic studies by Simner (1971) and Sagi and Hoffman (1976) they found that infants as young as one day old cry in response to the crying of other infants. The nature of the responsive crying was indistinguishable from an infant's spontaneous crying, leading the authors to suggest that infants respond to a cue of distress in others by experiencing distress themselves.

By approximately one year of age, children are not only aware of other's angry and affectionate interactions (Cummings et al., 1981) but they are also quite likely to display an emotional reaction to them, and, the addition of a physical attack, which may serve as an indicator of high-intensity conflicts, increases the likelihood of a distress reaction. Cummings et al. (1981) also suggests that marital conflict and observed instances of anger, particularly if they involve individuals important to the child, can affect a child's sense of security. Jenkins (2000) also noted that as children observe conflict happening between their parents, they are likely to be more confused about their own emotions. Also, the more frequently children were reported to observe interparent anger episodes, the more insecure and disturbed they acted when presented with these conflicts at 10-, 15-, and 20-months of age (Cummings, et al. 1981). There are also variations in the infant's responses to marital conflict. For example, some infants may cry immediately after facing a negative situation while others may take awhile to respond. Others may fuss a little while still others will cry loudly and severely when upset, other infants may focus their attention elsewhere to distract themselves from the negative situation (Braungart-Rieker & Stifter, 1996). The possibility exists that these differences in reactivity and regulation may also make some infants more prone to the effects of marital discord in the home. Therefore, through this distress and confusion, marital

conflict may play a detrimental role in the infant's developing emotional and physiological regulation.

Despite the fact that a majority of the research suggests that marital discord is responsible for the infant's poorer regulation abilities, some research suggests the opposite. For example, some researchers have demonstrated that having a "difficult" child can put a strain on the marital relationship (e.g. Emery, 1982). In other words, an infant with poor regulatory abilities may be a source of marital discord. Given these previous findings, another goal for this study was to examine specifically the direction of affect among the variables of interest to determine whether infants' poor regulatory abilities likewise strain marriages, resulting in greater marital conflict.

While marital conflict has been linked to poor child outcomes, good marital functioning, or high levels of harmony and love, have been demonstrated to have positive effects on infants. For example, Howes and Markman (1989) note that the ability of parents to handle differences in their relationships through appropriate conflict management and communication skills contributes to their child's emotional well-being. Other researchers have also found positive marital relationships to be related with greater security of attachment between parent and child (Owen & Cox, 1997).

In summary, marital conflict can have detrimental effects on an infant's ability to learn to regulate his/her own emotions and reduce opportunities for parents to support infants' cognitive and motor development. Conversely, low marital conflict and greater marital harmony may be linked to more positive child outcomes, including greater regulatory abilities and developmental outcomes.

In sum, one of the main explanations for linkages between marital conflict and poor emotional outcomes is that infants can be exposed to frightening or distressing behaviors during conflict. This presents the infant with a parent who is the source of the alarm as well as the solution to the alarm. The second main explanation is that marital conflict interferes with the parent's ability to provide sensitive and warm caregiving to the infant. The marital conflict can distract the parent and prevent him/her from being in tune with his/her infant's emotional, physical and cognitive needs, leaving the infant left to soothe him/herself when distressed and unsupported in attempts to advance cognitively and motorically. However, some research suggests that it is the infants' lack of regulation abilities that may be the cause of marital discord. Therefore, this study is designed specifically to examine the direction of effect among these variables.

Physiological Regulation

Researchers have begun to couple psychological and physiological measures to gain a better understanding of an infant's regulatory abilities (e.g., Porges, 1995; Porges et al., 1994). One physiological measure that has gained increased attention recently is that of cardiac vagal tone. Cardiac vagal tone is a measure associated with the parasympathetic function of the vagus nerve, the tenth cranial nerve. The neural pathways within the vagus allow direct communication between the brain and various organs of the body, most importantly the heart and lungs, to maintain physiological homeostasis and to prepare the body to react to stressful situations (Porges, 1995).

Vagal tone can be quantified by measuring alterations in heart period, the time interval between heart beats associated with inhalation and exhalation, and extracting the variance believed to be linked to the parasympathetic component of the autonomic

nervous system. In contrast, heart rate appears to be influenced more by sympathetic or the more reactive components of the autonomic nervous system. Thus, it is believed that vagal tone may be a good indicator of an individual's ability to regulate physiological reactions and to apply appropriate braking mechanisms to physiological reactions during times of distress. Porges (1995) has argued that the vagal system is responsive to the changing needs of the individual, and assists in homeostasis through increasing or decreasing vagal control as needed. Importantly, cardiac vagal tone has been shown to be a fairly stable psychophysiological index, particularly past the first three months of infancy (Porges et al., 1994; Porter, Bryan, & Hsu, 1995).

Interestingly, cardiac vagal tone has been linked to differing measures of behavioral reactivity and has been found to be correlated with infants' temperamental difficultness (Porges, et al., 1994). Individual differences in cardiac vagal tone, therefore, may reflect individual differences in reactivity and regulation in infancy. Specifically, low vagal tone has been linked to infants' greater behavioral reactivity during stressful situations, as well as more fearful responses and wariness (Fox, 1989; Richards & Cameron, 1989; Stifter & Fox, 1990; Stifter, Fox, & Porges, 1989).

Several studies (e.g., Kagan, Reznick, & Snidman, 1987; Porges, et al., 1994; Porges, 1995; Porter, et al. 2003; Stifter, et al., 1989) have likewise demonstrated the correlation between cardiac vagal tone and infants' regulatory abilities. For instance, Stifter et al. (1989) found that high cardiac vagal tone is related to approach emotions such as anger and joy (Stifter, et al., 1989) while low cardiac vagal tone is related to withdrawal emotions such as fear and wariness (Stifter, Spinrad; & Braugart-Rieker, 1999). Additionally, Stifter and Jain (1996) demonstrated that infants who exhibited

greater negative reactivity to frustration and exhibited more regulatory behaviors had higher baseline levels of cardiac vagal tone across infancy.

Vagal tone may be influenced by different factors throughout infancy. For example, Porter et al. (2003) found that higher levels of marital conflict were linked to lower levels of vagal tone (physiological regulation) for six-month-old infants. These findings may be indicative of the infant's increasing susceptibility to family stressors at an early stage of life.

Also of note, past research has indicated that the development of baseline heart rate activity is marked by developmental discontinuity, often characterized by significant increases in heart period (slower heart rate over time) as well as moderate stability during the first year (e.g., Fracasso, Porges, Lamb, & Rosenberg, 1994; Lewis, Wilson, Ban, & Baumel, 1970; Lipton, Steinschneider, & Richmond, 1966). The developmental picture for cardiac vagal tone is less clear (Bornstein & Seuss, 2000). While some studies found increases in vagal measures during the first year, particularly during the first six-months (e.g, Hsu & Porter, 2004; Izard et al., 1991; Porter et al., 1995), others have not (e.g., Fracasso et al., 1994). However, past research has shown that cardiac vagal tone appears to increase in stability as a measure of individual differences between three- and six-months of age (Porter et al., 1995) and into early childhood (Bornstein & Seuss, 2000).

In summary, cardiac vagal tone is a measure associated with the vagus nerve, allowing direct communication between the brain and the heart. It has been found to be linked to the "braking" mechanisms associated with respiratory sinus arrhythmia (alternations in heart period associated with breathing) such that higher vagal tone is linked to higher levels of physiological regulation, and, conversely, lower vagal tone is

associated with lower levels of physiological regulation. Vagal tone has been shown to be a relatively stable physiological regulatory index during the later part of the first year that has been consistently linked to children's reactivity levels and regulatory abilities.

Developmental Status

In addition to links to infants' emotional regulation and physiological regulation, it is also likely that marital quality may be linked to infants' developmental status. As mentioned previously, higher levels of marital discord may lead to some mothers becoming less emotionally available (Field, 1994) and as a result, infants in these circumstances may have fewer opportunities for more synchronous dyadic interactions and less opportunity to engage in cognitively stimulating social exchanges. Whereas infants who are in families comprised of greater levels of marital harmony may have mothers who are more emotionally available and as a result experience greater synchronous interactions. These greater synchronous exchanges may then lead to more opportunities for supportive social exchanges that enhance infants' cognitive development. Such notions appear to be line with past research that has found links between maternal responsiveness during enface episodes with infants and later developmental status (Crockenberg, 1983).

Summary

Infants must learn to regulate their physiological and emotional states. Many factors can influence an infant's regulation abilities but the parents' marital relationship is an influencing factor that has gained increased attention. Research demonstrates a link between high levels of marital discord and children's inabilities to regulate their physiological and emotional states.

The relations between marital functioning and child outcomes is likely attributed to the parents' level of responsiveness or involvement in helping children manage and remedy stress responses. Researchers have demonstrated that warm, attentive, stimulating, responsive, and nonrestrictive caregiving positively influences an infant's regulatory abilities (Belsky, Goode, & Most, 1980; Tronick, 1989). Also, parents who are in tune with their infant's cues are better able to support their infant's development and regulation abilities.

However, discord in the parents' marital relationship could leave a mother distracted and prevent her from being in tune with her infant's cues, resulting in the child being left to cope with the stress on his/her own. Marital conflict could also negatively influence an infant's regulatory abilities due to the fact that infants can often be exposed to frightening and distressing behaviors during times of conflict. The infant is then presented with a parent who is both the source of and the solution to his/her fear. If the infant sees his/her parent as frightening, he/she will be unable to receive the comfort he/she would normally receive from his/her attachment figure. Conversely, positive marital relationships have been found to be related to greater security of attachment between parent and child and may be a source of support for children's emerging emotional and physiological regulation as well as developmental status (e.g., Owen & Cox, 1997).

While a majority of the research suggests that marital discord causes infants' difficulties in regulating their emotions, there is some research which suggests the opposite direction of effect (Emery, 1982). Infants who are unable to regulate their

physiological and emotional states may be a source of discord in the parents' marital relationship.

From the research available, it is unclear how marital discord affects an infant's regulatory abilities during the later half of the first year of life. The direction of effect between the parents' marital relationship and the infant's physiological and emotional regulation abilities is also unclear. This study was designed to address this gap in the literature by examining linkages between marital conflict and harmony and infants' physiological and emotional regulation as well as infants' developmental status at six- and nine-months of age.

Hypotheses

Much of the research done on the effects of marital conflict on children has focused on preschool aged children and older. There has been little research regarding the effects of marital conflict on infants, especially longitudinally. Researchers have demonstrated that marital conflict is negatively correlated with an infant's emotional and physiological regulation abilities at six-months of age (Porter et al., 2003). The purpose of this study is to explore the relations between marital functioning and the infant's emotional and physiological regulation abilities. This study will also explore a possible direction of effect between marital conflict and infant's emotional and physiological regulation abilities. Based on the literature reviewed, the specific research questions of the current study are: (1) Are there concurrent relationships at six-months between marital functioning and infant's emotional and physiological regulation and developmental status? (2) Similarly, are there concurrent relationships also at nine-months between marital functioning and infant's emotional and physiological regulation

and developmental status? (3) To what extent are marital functioning as well as infant emotional/physiological regulation and developmental status stable and/or changing from six- to nine-months of infant age? (4) What are the directions of effect between the marital relationship and the child outcomes? More specifically, does the marital relationship at six-months predict the infant's emotional and physiological regulation abilities and the infant's developmental status at nine-months? Or alternatively, does the infant's emotional and physiological regulation abilities and the infant's developmental status at six-months predict the quality of marital functioning at nine-months?

Based on the research questions, the hypotheses for the current study include the following.

Hypothesis 1: It is expected that mothers who rate their marriages as having higher levels of conflict at six-months will have infants also at six-months with lower levels of emotional and physiological regulation (e.g., low cardiac vagal tone) and poorer development status. Additionally, higher levels of marital harmony are also expected to be concurrently linked to greater emotional and physiological regulation as well as higher developmental status.

Hypothesis 2: Similar to concurrent relationships anticipated at six-months, concurrent relationships between marital functioning (conflict and harmony) and infant outcomes (emotional/physiological regulation and developmental status) are also anticipated when infants are nine-months of age.

Hypothesis 3: It is anticipated that marital harmony and conflict will remain fairly stable and continuous from six- to nine-months of age. However, since infancy is a period of dramatic change, it expected that some changes may occur for infants on measures of

emotionality, physiology, and developmental status. Specifically, it is anticipated that there will be mean level changes, marked by an increases in both emotional and physiological regulation from six- to nine-months of age (Bornstein & Seuss, 2000; Hsu & Porter, 2004; Porter, Bryant, & Hsu, 1995). However, since emotional and physiological regulation also reflects to some degree individual differences among infants, it is expected that infant's emotional and physiological regulation will remain somewhat stable in terms of relative ranking within the overall group. In other words, while means are expected to increase for infants on variables of interest as a group, individual infants are expected to maintain their relative ranking within a changing group (e.g., infants with lower levels of emotional and physiological regulation scores at six-months of age will have lower levels of emotional and physiological regulation scores at nine-months of age even though means for the entire group may have increased from Time 1 to Time 2).

Hypothesis 4: Finally, it is expected that marital quality factors at six-months will be predictive of infants' emotional and physiological regulation abilities and developmental status at nine-months. Specifically, a high level of marital conflict at six-months is believed to predict low emotional and physiological regulation and poorer development at nine-months.

METHODS

Sample

Participants included 93 first-time mothers between 18 and 40 years of age and their infants (43 males, 50 females). Infants were born at or near term, were healthy, and experienced no major pregnancy or perinatal complications. Subjects were predominantly Caucasian (93.5%) and from middle class, well-educated (49.5% of

mothers completed at least a Bachelor's degree), intact two parent families. Additionally, 33% of the mothers worked outside of the home and 21% of the infants were cared for by someone other than their parents.

Infants were assessed at six- and nine-months of age. Participants were recruited from local birth announcements, local pediatric and other well-baby practices, local advertisements on and off the Brigham Young University campus, by flyers or publicly approved posters, and finally, by word of mouth and participant networking.

Procedures

At approximately six- and nine-months of age, infants and their mothers were invited to attend a one-hour laboratory session as part of an on-going longitudinal study. Mothers were given a consent form outlining the procedures to take place during the experiment. The mothers read through the consent form prior to arriving at the laboratory and were given the opportunity to go over the consent form at the laboratory with a trained experimenter, who answered any questions the mother may have had. The mother was able to keep one copy for herself to refer to if she had any questions, and another copy was kept in the participant's file in a secure locked location.

The mothers and infants participated in several procedures, which included the collection of infant's baseline heart rate, an assessment of the infant's mental and motor development status, a peek-a-boo session, an arm restraint session, a free play session, and a strange situation episode. The mother was also asked to fill out a battery of questionnaires including demographic information, the parental marital relationship, the Beck inventory for measuring depression, and an infant's characteristics questionnaire. The heart rate data, the infant's mental and motor development status, and the parental

marital relationship information collected at the six- and nine-month visits were used in this study.

Infant's Physiological Regulation. The infant's resting heart rate was measured at the beginning of the laboratory visit. A three-minute baseline electrocardiogram (EKG) recording was gathered by applying three disposable electrode patches in a triangular fashion on the infant's chest and connecting electrodes to the patches. Mothers were asked to hold their infants quietly on their lap while the infant was in a quiet alert state. Baseline heart rate data was captured using a preamplifier connected directly to the infants with these three EKG leads. The data was transmitted simultaneously to an oscilloscope (Hitachi V212) outside the observation area for a visual display to ensure proper recording. Additionally, the data were digitized on-line via a Delta-Biometrics Vagal Tone Monitor (Model VTM-1) to detect the peak of the R-wave of the EKG and time sequential heart periods to the nearest millisecond. The data were then stored off-line on a lap-top computer for later coding. Porges' (1985) vagal tone index was used to analyze the raw data.

To derive the measures of infants' baseline heart rate, MXedit software (Delta Biometrics, Bethesda, MD) developed by Porges (1985) was utilized to edit heart rate data and perform statistical analysis. The heart rate data were first transformed into time-based series. Time sampled data were then filtered within a standardized .30-1.30 Hz range band-pass to remove aperiodic trends and periodic heart patterns slower than the respiratory frequency band. This range is proportional to infant respiration that occurs at a rate of 18 to 78 breaths per minute (Fox & Porges, 1985).

Five EKG measures were extracted from the baseline EKG measure for use in subsequent analyses. These included, heart period (the average interbeat period per 30-second epochs measured in milliseconds—an indicator of heart rate where higher heart period scores reflect slower heart rate), heart period range (the average value between the highest and lowest interbeat interval across each 30-second epoch and a crude measure of heart rate variability), biased variance (the amount of extracted variance in the heart period averaged across each epoch—often used as an estimate of heart rate variability), the mean standard deviation of biased variance (a normalized estimate of the biased variance within a single standard deviation of the mean variance, commonly used in traditional measures of respiratory sinus arrhythmia), and finally, cardiac vagal tone (the natural logarithm of the heart period variance within the frequency band expressed in log ms^2 units). Cardiac vagal tone derived by using Porges' quantitative method has been suggested as a sensitive index of vagal activity (Porter, 2001) and an accurate estimate of the respiratory component in heart rate variability with infants (e.g., Fox & Fitzgerald, 1990). Mean values across epochs were used in the subsequent analyses.

Infant's Emotional Regulation and Mental and Motor Development Status. Following the baseline EKG, trained research assistants used the Bayley Scales of Infant Development (BSID II), and Behavior Rating Scales (BRS) 2nd Edition to assess the infant's mental and motor development status. The BSID II yields two standardized indices, including the Psychomotor Development Index (PDI) and the Mental Development Index (MDI). The BRS contains five factors including a factor that assesses infants' emotional regulation as observed during the administration of the BSID

II. The emotional regulation factor is comprised of eight items rated on a five-point scale for the six- to twelve-month assessment period. Higher scores on this factor reflect greater levels of emotional regulation (i.e., positive emotional tone, adaptability), while lower (non-optimal) scores reflect negative and irritable emotional tone, and irregular or unstable bio-behavioral self-regulation (Bayley, 1993).

Marital Functioning. Following the laboratory visit mothers were asked to complete a battery of questionnaires, including a demographic measure and Braiker and Kelly's (1979) marital quality questionnaire. The marital quality questionnaire includes 25-items that are scored on nine-point scores to reflect perceptions of marital functioning and satisfaction over the past two months. This measure yields four factors. The first two factors reflect marital activities (i.e., maintenance and conflict) and the remaining two, marital sentiments (i.e., love and ambivalence). The conflict factor is comprised of items such as frequency and intensity of arguments, feelings of anger or resentment, and frequency of anger or frustration displays. The internal consistency for these factors is reported as ranging from .61 to .95 (Belsky, Rovine, & Fish, 1989). These marital factors have been shown to be sensitive to changes in marital quality during the transition to parenting (Belsky, et al., 1989).

RESULTS

Preliminary Analyses

Preliminary analyses were conducted using variables of interest (i.e. marital quality and infant variables) and demographic variables. Some demographic variables of interest include: infant's gender differences, mother's education levels, household income, and mother's employment outside of the home. A *t*-test was computed to examine

potential relationships among the demographic and independent variables. There were no significant gender associations on any of the variables of interest but preliminary analyses did show that maternal employment outside of the home was modestly correlated with less marital conflict (r = -.25, p < .05). Perhaps this is due to the fact that the couple has less time to argue or maybe it is because the mother has interests outside of the home, giving her more to focus on and giving her on outlet from the household.

Maternal educational attainment (last year of education completed) was negatively correlated with marital ambivalence (r = -.30, p < .01), with higher levels of education linked to less ambivalence in marriage. Furthermore, mother's last year of education completed was positively correlated with the reported levels of marital quality factor of love (r = .30, p < .01). Finally, higher household income was correlated with lower marital maintenance scores (r = .21, p < .05). These three correlations could all be due to the fact that the mothers feel a higher sense of satisfaction when they have completed their educations and when the household income levels are higher. That education and income were linked to marital quality is not surprising and appears consistent with past research on socio-economic status and marital functioning (e.g., Cowan & Cowan, 1990). Given the relatively modest nature of these correlations these variables were not included in the main analyses, especially since none of the demographic measures here were found to be related to infant outcome variables of interest.

Six-Month Concurrent Analyses – Hypothesis 1

The main analyses centered on testing concurrent, predictive and potential mean level differences. Concurrent analyses were conducted at both time points (six- and nine-

months) using Pearson's *r* to examine the relationships among variables of interest (i.e., parental marital factors, infant's emotional regulation, infant's physiological regulation, and infant's developmental status).

First, concurrent six-month analyses were conducted between marital factors and infants' emotional regulation scores from the Behavioral Rating Scales (see Table 1). These findings demonstrated a trend approaching significance between marital love and infants' emotional regulation ($r = .20$, $p < .10$) and a negative correlation between infants' emotional regulation and marital conflict scores ($r = -.24$, $p < .05$), with the lower emotional regulation scores being linked to greater marital conflict. Marital ambivalence and maintenance were not correlated with infants' emotional regulation scores.

Analyses were also conducted to examine linkages between marital factors and infants' physiological indices. These findings demonstrated that marital love was linked only to higher cardiac vagal tone ($r = .21$, $p < .05$), and heart period scores ($r = .27$, $p < .05$). Marital conflict ($r = -.27$, $p < .05$) as well as marital ambivalence ($r = -.26$, $p < .05$) were linked to lower heart period scores while marital maintenance was not found to be correlated to any cardiac indices.

Analyses then examined linkages between marital factors and infants' developmental status. These findings revealed that couples with higher levels of marital love had infants with higher indices of mental development (MDI) ($r = .23$, $p < .05$). These analyses also revealed a positive correlation between marital harmony scores and infants' mental development index (MDI) scores ($r = .22$, $p < .05$). None of the marital factors were correlated to the infants' psychomotor development index (PDI) scores.

Additional six-month analyses further demonstrated that infant heart period was negatively correlated with infant PDI scores from the Bayley (r = -.22, p < .05) suggesting that lower heart rate is linked to higher psychomotor developmental scores.

Nine-Month Concurrent Analyses – Hypothesis 2

The nine-month concurrent analyses were carried out in a similar fashion to six-month analyses, by examining linkages between marital factors and infants' emotional regulation scores, physiological regulation scores, and developmental status (see Table 2). Based on these findings, no significant correlations were found between marital factors and infants' emotional or physiological regulation. However nine-month concurrent analyses did reveal a positive link between marital love and infants' MDI scores (r = .26, p < .05). Interestingly, a negative link between infants' MDI scores and emotional regulation (r = -.36, p < .01) was found at nine-months.

Stability and Mean Level Changes – Hypothesis 3

To test potential mean level changes and stability in measures of interest (e.g. marital quality indices, emotional regulation scores, physiological regulation indices) from six- to nine-months of age, independent *t*-tests and Pearson's *r* respectively, were conducted. As shown in Table 3, only marital ambivalence, among the marital factors, was found to differ significantly over time. Specifically, marital ambivalence was found to increase from six- to nine-months (t = 13.99, p < .001), while marital love, marital conflict and negativity, and marital maintenance did not significantly change from six- to nine-months. Correlation analyses, however, did demonstrate moderate to high stability of the marital factors from six- to nine-months (r's range from .42 to .78, see Table 3). Among the physiological regulation indices, heart period (t = -4.08, p < .001), biased

variance (t = -3.45, p < .001), and heart period range (t = -3.02, p < .01) were all found to significantly increase from six- to nine-months, while cardiac vagal tone and the mean standard deviation indices did not increase significantly. Infant emotionality scores (t = 6.76, p < .001) likewise increased significantly slightly from six- to nine-months. Additionally, psychomotor scores (t = 3.48, p < .001) from the Bayley also increased significantly from six- to nine- months while mental development index scores did not (see Table 3).

In addition to testing for mean level difference, correlation analyses also demonstrated modest stability for some of the physiological indices. Specifically, heart period (r = .38, p < .001) and biased variance (r = .22, p < .05) were found to be moderately to modestly stable from six- to nine-months. However, cardiac vagal tone only approached significance (r = .19, p < .10) while the heart period range and the mean standard deviation of heart period were not significant (see Table 3). Finally, infant emotionality scores (r = .13, p > .20) were not stable from six- to nine-months. However, MDI and PDI scores were moderately stable from six- to nine-months (see Table 3).

Predictive Analyses – Hypothesis 4

The last set of analyses focused on predictive analyses. Specifically, these analyses examined whether infant and marital outcomes at nine-months were predicted by antecedent measures at six-months on both marital factors and infant variables. This was examined again using Pearson's correlations.

In the first set of analyses, six-month marital variables were correlated with nine-month infant outcome variables (see Table 4). The results showed that higher marital love at six-months predicted higher infant MDI scores at nine-months (r = .22, p < .05),

however, marital variables at six-months did not predict any additional infant outcomes on measures of emotionality or physiological regulation at nine-months.

The second set of analyses tested to see if six-month infant variables were predictive of nine-month marital quality variables (see Table 5). Since marital quality at six-months did not predict infant regulation abilities at nine-months, the reverse direction of effect was tested to see if infant characteristics at six-months predicted marital quality at nine-months. These analyses demonstrated that low six-month infant emotional regulation scores predicted higher levels of marital conflict at nine-months (r = -.28, p < .05) as well as higher levels of marital ambivalence at nine-months (r = -.29, p < .05).

Infant six-month physiological regulation indices also predicted nine-month marital outcomes. The findings show that low vagal tone scores at six-months predicted higher marital conflict (r = -.23, p < .05) and higher marital ambivalence (r = -.23, p < .05) at nine-months. Furthermore, low six-month heart period predicted higher marital conflict (r = -.24, p < .05) and higher marital ambivalence (r = -.26, p < .05) at nine-months. Lower biased variance at six-months predicted higher nine-month marital conflict and negativity levels (r = -.29, p < .05) and higher nine-month marital ambivalence (r = -.24, p < .05). Additionally, lower six-month infant heart period range predicted higher nine-month marital conflict (r = -.25, p < .05). The mean standard deviation of heart period at six-months, however, was not found to significantly predict any marital quality factors at nine-months.

Finally, infant developmental status indices at six-months were analyzed with nine-month marital quality factors. Lower six-month MDI scores predicted higher nine-month marital conflict (r = -.25, p < .05) as well as higher nine-month marital

ambivalence (r = -.27, p < .05) levels. Low infant PDI scores at six-months likewise predicted greater marital ambivalence at nine-months (r = -.23, p < .05).

DISCUSSION

This study examined the linkages between marital conflict and infants' emotional and physiological regulation at six- and nine-months of age. Previous research has demonstrated a linkage between greater marital conflict and infants' poorer emotional and physiological regulatory abilities at six-months of age (e.g. Porter et al., 2003). However, there is a lack of research demonstrating short-term linkages between marital conflict and infant developmental outcomes over the first year of life. Therefore, this study was designed to fill this gap in the literature. This study was also designed to examine the direction of effect between marital quality and infants' regulatory abilities. Specifically, it was expected that infants' exposure to marital conflict at six-months would predict lower infant emotional and physiological regulation at nine-months.

Six-Month Concurrent

There were four specific research questions that were addressed in this study. The first research question asked if the marital relationship at six-months was associated with the infant's emotional and physiological regulation abilities and the infant's developmental status at six-months of age. The hypothesis was that concurrent linkages were expected at six-months between marital functioning (harmony and conflict) and infants' emotional and physiological regulation and developmental status. Specifically, mothers who rated their marriages as having high levels of conflict at six-months were expected to have infants with low levels of emotional and physiological regulation and low developmental scores at six-months of age.

This study found that at six-months, positive marital relationships were linked with better infant emotional and physiological regulation as well as higher infant motor development status. Employing a larger sample in the current study, findings were found to replicate results from an earlier study conducted by Porter et al. (2003). In each instance, marital conflict was found to be linked to poorer emotional and physiological regulation and slightly lower developmental status while marital harmony was found to be associated with greater physiological regulation developmental status. Porter et al. (2003) concluded that these linkages may have "important implications for understanding the potential impact of the early marital relational context for infants' emerging regulatory ability, with marital conflict predisposing infants towards poorer emotional and physiological regulation" (p. 305). However, given the concurrent nature of the research design, it was not all together clear whether this conclusion is wholly supported. Porter et al., went on to suggest that additional prospective research was needed to further tease apart the long-term consequences of marital quality on infants' emotional and physiological development. Therefore, this study was designed in part to address this need for a cross-time examination of the linkages between marital functioning and child outcomes during the first year of life.

Nine-Month Concurrent

In addition to examining concurrent relationships at six-months, the second major goal of this study was to examine whether these concurrent relationships between marital factors were similarly associated with the infant's emotional and physiological regulation and developmental status at nine-months of age. It was anticipated that a similar pattern of linkages would be found between marital and infant variables at nine-months as at six-

months. Specifically, it was predicted that mothers who rated their marriages as having high levels of conflict at nine-months would have infants with low levels of emotional and physiological regulation and low developmental scores at nine-months of age.

Contrary to expectations, concurrent findings at nine-months did not support a similar pattern of correlations found at six-months. Specifically, no significant correlations were found between nine-months marital factors of conflict, ambivalence, maintenance, or love and infants' emotional regulation scores or physiological indices. However, similar to previous findings at six-months marital love at nine-months was again found to be associated with infants' MDI scores. This finding would seem to suggest that infants whose parents experience greater marital harmony may have mothers who are more emotionally available and in tune with their infants' cues, providing greater synchronous interactions. These greater synchronous interactions would provide more opportunities for social interaction between mother and child to encourage better infant cognitive outcomes. This notion is consistent with prior findings from Crockenberg and Covey (1991) who reported that marital functioning influenced the quality of enface interactions between mothers and their young children, which in turn was found to be linked to infants' developmental status. Specifically, poorer quality mother-infant interactions were found to be linked to lower developmental status on the Bayley Scale.

Despite the similarity in findings for MDI and marital love at both six- and nine-months, it is not altogether clear why there was a dearth of concurrent findings at nine-months. One possibility is that the time period between six- and nine- months may be marked by dramatic changes or even reorganizations in infants' physiology and behavioral repertoire (e.g., Bornstein & Seuss, 2000; Emde & Robinson, 1979; Hsu &

Porter, 2004). These dynamic reorganizations are thought to be linked to dramatic changes in brain functioning during several transition points in the first two years of life, including the time between six- and nine-months of age (see Emde & Robinson, 1979 and Hsu & Porter, 2004). This possibility was examined in part by examining both relative and rank-order stability and potential mean level changes in marital factors and infants' emotional and physiological regulation and developmental status between six- and nine-months.

Stability and Potential Mean Level Differences

The third research question that was examined in this study focused on the stability and continuity of the variables of interests. It was predicted that the marital variables, infant emotional regulation scores from the Behavior Rating Scale, the infant physiological regulation scores as measured through the heart rate indices, and the infant developmental scores would be relatively stable from six- to nine-months. This prediction was based on previous research (e.g. Belsky, Rovine, & Fish, 1989; Bornstenin & Seuss, 2000; Braungart-Rieker & Stifter, 1996; Fox, 1989; Hsu & Porter, 2004; Porges, 1985; Porges et al., 1994) that has demonstrated a fair amount of stability in measures of marital functioning (Belsky et al., 1989) and mixed findings on the stability of physiological indices (Bornstein & Seuss, 2000; Hsu & Porter, 2004). Specifically, marriages rated as having high levels of conflict at six-months were expected to have high levels of conflict at nine-months (Gottman & Katz, 1989; Katz & Gottman, 1993). It was also expected that infant emotional and physiological regulation scores and infant development scores would remain fairly stable (in terms of rank-order) from six- to nine-months but may undergo significant changes in mean level scores as would be expected

by on-going dynamic reorganizations during the latter part of the first year of life (Hsu & Porter, 2004).

Results from this study do demonstrate low rank order stability as indicated by a non-significant correlation across time for infant emotional regulation scores. While emotional regulation demonstrated low rank-order stability, results also indicate significant increases, suggesting the infants are gaining greater emotional regulatory capacity during this time frame. These changes in emotional regulation are also mirrored by increases in heart period, heart period range, and biased variance EKG indices, which suggests that heart rate is slowing and increasing in variability from six- to nine-months of age. While vagal tone also increased, the change in mean levels did not reach significance. Additionally, while MDI and PDI scores demonstrated moderate stability, PDI scores also were found to increase significantly over time. Combined, these data seem to point towards an on-going physiological and behavioral reorganization of behavior. Prior literature (e.g., Emede & Robinson, 1979; Porter, Bryan, & Hsu, 1995) argues this increase is due to the fact that physiological and behavioral regulatory abilities may undergo dramatic reorganization in the first few months of life. It seems likely that these physiological and behavioral substrates measured by these indices continue to dramatically reorganize into the second half of the first year of life as well (see Hsu & Porter, 2004). As a result, these developmental changes may render the physiological and behavioral measures somewhat unstable, accounting for in part, the changing pattern of concurrent findings with the marital functioning scores from six- to nine-months of age. In other words, the lack of stability may be due to the changing child who is undergoing dynamic reorganizations at the time.

While infant characteristics underwent several changes, marital functioning was found to be moderately to highly stable over time. Only marital ambivalence was found to increase significantly from six- to nine-months of infant age. This suggests that as the year progressed following the birth of a first-born child, women had become increasingly less certain about their commitment to their marriage partner. Interestingly, marital ambivalence along with conflict at nine-months were both predicted by six-month infant characteristics (see discussion below).

Additionally, researchers suggest that the transition to parenthood may be responsible for changes in marital relationships, as many studies have documented the negative correlation between the presence of children and marital satisfaction (e.g., Cowan & Cowan, 1990; Cox, Paley, Burchinal, & Payne, 1999). However, it is important to note that neither infant nor marital variables are static entities. Both variables are somewhat dynamic, with the infant constantly undergoing emotional and physiological changes while parents undergo alterations in sentiments regarding their marriage (Cowan et al., 1985). It seems likely that these alterations may be bound to each other in meaningful ways as would be suggested by Sameroff's transactional model of development (see Sameroff, 1975). Additional research in the future is needed to further tease apart these potential developmental transactions, primarily by means of adding a third time interval to more carefully track the direction of effects and potential alternating antecedent between marital and infant characteristics to subsequent outcomes.

Direction of Effect

The final research question examined in this study focused on cross-time relationships between marital quality and infants' developing emotional and

physiological regulation abilities. It was predicted that high levels of marital conflict at six-months would predict low levels of emotional and physiological regulation, and low infant development scores at nine-months. This expectation was built on previous research demonstrating the negative effects of marital conflict on infant and children's later development (e.g. Cowan & Cowan, 1990; Davies & Cummings, 1994; Emery & O'Leary, 1982; Forehand at al., 1986; Gottman & Katz, 1989; Hetherington, Cox, & Cox, 1982; Owen & Cox, 1997; Peterson & Zill, 1986; Porter & O'Leary, 1980). Contrary to expectations, marital factors at six-months did not demonstrate a predictive relationship with infants' emotional or physiological regulation at nine-months. However, findings did show that marital quality at six-months was linked to infants' developmental status (MDI and PDI scores) at nine-months. Similar to concurrent findings, marital love at six-months did predict infants' mental developmental status at nine-months. Again, this could be attributed to the fact that infants whose parents experience greater marital harmony may have mothers who are more emotionally available and in tune with their infants. These infants would be given more opportunities that would encourage better infant cognitive development over time, resulting in better mental developmental status at nine-months (see Crockenberg & Covey, 1991).

Such notions appear to be in line with past research that found linkages between parental responsiveness and children's mental development. For example, the findings of Gottman and Katz (1989) found associations between health problems and marital discord. Therefore, if marital disruption and conflict are related to lower mental health development of children, marital love should be related to better mental health development in children. In other studies, parental warmth, parental scaffolding/praise

and inhibition of parental rejection served as a set of buffers to protect children in the face of marital conflict and dissolution (Katz & Gottman, 1997). These data provide further support for the importance of the relationship between marital quality and infants' developmental status.

While marital factors at six-months were not linked to nine-month infant regulatory measures, interestingly, findings did show that infant characteristics at six-months did predict marital quality at nine-months. More specifically, poor emotional regulation at six-months was found to predict greater marital conflict and ambivalence at nine-months. Additionally, lower cardiac vagal tone and heart period at six-months were also found to predict greater marital conflict at nine-months. These findings were somewhat surprising given that the past literature (e.g., Katz & Gottman, 1989) has speculated that the direction of effect flows primarily from marital conflict to poor child outcomes. However, these findings demonstrate a temporal linkage between infants' poorer regulatory functions with later conflict and ambivalence in marital relationships.

There are several explanations that could help explain these relationships that run contrary to the original hypothesis. While speculative, the first is that the infant's inability to regulate his/her own emotions may be causing undue stress in the home as he/she can be demanding of his/her mother's attention, setting into motion a series of transactional exchanges that may further exacerbate the infants' poor regulatory abilities (e.g., Sameroff, 1975). However, future research is needed with an additional point of data to better untangle the transactional quality of these relationships.

Additionally, since the infant is highly reactive and poor in regulation, he/she likely demands increased attention, efforts, and energy from his/her caregivers when

distressed, placing additional strain and reduced attention on the marital relationship and setting the stage for increased distressed marital interactions. These demands can also cause the mother to feel her infant is difficult to take care of, influencing her stress levels associated with parenting. Belsky (1984) noted that during infancy, child temperament and difficultness is particularly influential to parents and parenting when compared to other developmental stages. Many researchers have also demonstrated that children who exhibit more behavior problems and difficultness have mothers who report more parenting stress (Belsky, 1984; Dumas & Wekerle, 1995; Mash & Johnston, 1983; Suarez & Baker, 1997; Thomas, & Chess, 1977). It could be that these parenting stressors may have a reverse spill-over effect by placing increased strain on the caregiver, leaving him/her with less energy, time, and intimacy for his/her partner. So for instance, if mother is the primary caregiver and has a demanding, fussy, less soothable infant, this may increase her level of parenting stress which leaves her with fewer psychological and physical resources to put towards her partner, resulting in risk for greater marital ambivalence and/or discord. This notion appears supported in the work of Crnic and Acevedo (1995) who have found that parenting stress is a significant factor in the disruption of family systems. Therefore, the infants' inability to regulate his/her own emotions could affect the marital relationship through the course of parenting stress, which would lead caregivers to have less patience and energy for their partner.

A second explanation of the finding between low levels of emotional regulation at six-months and high levels of marital conflict at nine-months is that stress arising from many sources can burden mothers and affect their perceptions of parenthood, their views of their children, and their self-efficacy beliefs as parents. The infant's reactiveness and

inability to regulate his/her emotions may cause the mother to doubt her abilities as a parent, lowering her self-efficacy (Porter & Hsu, 2003). The role of mother is considered the primary source of stress for women (Pasley, Futris, & Skinner, 2002) and if a mother does not feel she is filling that role as she should, her self-efficacy can be affected. Research has demonstrated a link between low levels of maternal self-efficacy and higher levels of depression (Cutrona & Troutman, 1986; Teti & Gelfand, 1991). Other research has likewise demonstrated the link between maternal depression and marital discord (e.g. Gelfand, Teti, & Fox, 1992; Mulsow, Caldera, Pursley, Reifman, & Huston, 2002). Therefore, the infant's inability to regulate his/her emotions would affect the marital relationship through the course of maternal self-efficacy and depression.

Taken together, this study demonstrated important linkages and directions of affect between marital quality and infants' emotional and physiological regulatory abilities at six- and nine-months of age. However, there are some methodological limitations to this study. First of all, marital quality was assessed through self-reports and not through direct observation or other modalities such as conflict diaries. As a result, the frequency and intensity of the conflict or whether the marital conflict was displayed in front of the infant was not directly assessed in this study. Adding an observational component would also help to control for surveys that may have been answered according to social desirability. Second, this study relied only on maternal reports of marital quality. It is possible that fathers would rate their marriages differently from their wives. Future research might be benefited by gathering additional data from fathers on perceptions of marital functioning. Third, participants for this study were drawn from a relatively low-risk sample of mothers and infants. It could be that the results from this

study may vary and may be more pronounced in a high-risk sample of mothers and infants who might be at risk for even greater levels of marital discord.

CONCLUSION

This study examined the linkages between marital harmony and conflict and infants' emotional and physiological regulation abilities at six- and nine-months of age. While correlations were found between high levels of marital conflict and infants' emotional regulation abilities at six-months, these correlations were not found at nine-months. However, this study was able to tease apart the direction of affect between marital conflict and infants' emotional and physiological regulation. Based on previous literature, it was hypothesized that marital conflict at six-months would predict infants' regulatory abilities at nine-months. However, the results from this study suggest that infant variables at six-months predict marital quality at nine-months. Specifically, infants' low emotional and physiological regulation abilities at six-months predicts higher levels of marital conflict at nine-months.

Overall, these findings present a new perspective and offer new insights into the relationship between marital conflict and infants' regulation abilities. These findings have important implications for understanding the impact that infants' poorer regulation abilities can have on a marriage. Additional research is needed to further investigate the long-term consequences of infants' regulatory abilities on marital functioning and vice versa.

REFERENCES

Belsky, J., Goode, M.K., & Most, R.K. (1980). Maternal stimulation and infant exploratory competence: Cross-sectional, correlational, and experimental analyses. *Child Development, 51,* 1163-1178.

Belsky, J., Rovine, M., & Fish, M. (1989). The developing family system. In M.R. Gunnar & E. Thelen (eds.), *Systems and Development* (pp. 119-166). Hillsdale, NJ: Erlbaum.

Bornstein, M. H., & Suess, P. E. (2000). Child and mother cardiac vagal tone: Continuity, stability, and concordance across the first 5 years. *Developmental Psychology, 36,* 54-65.

Braungart-Rieker, J.M., & Stifter, C.A. (1996). Infants' responses to frustrating situations: Continuity and change in reactivity and regulation. *Child Development, 67,* 1767-1779.

Brody, G.H., Arias, I., & Fincham, F.D. (1996). Linking marital and child attributions to family processes and parent-child relationships. *Journal of Family Psychology, 10,* 408-421.

Brych, J.H. & Fincham, F.D. (1990). Marital conflict and children's adjustment: A cognitive-contextual framework. *Psychological Bulletin, 108,* 267-290.

Camras, L., Oster, H., Campos, J., Miyake, K., & Bradshaw, D. (1992). Japanese and American infants' responses to arm restraint. *Developmental Psychology, 28,* 578-583.

Cowan, C. P., Cowan, P.A., Hemin, G., Garrett, E., Coysh, W. S. Curtis-boles, H., & Boles, A. J. 3rd. (1985). Transitions to parenthood: his, hers, and theirs. *Journal of Family Issues, 6, 451-481.*

Cowan, P.A., & Cowan, C.P. (1990). Becoming a family: Research and intervention. In I. Sigel & A. Brody (eds.), *Family Research* (pp. 1-51). Hillsdale, NJ: Erlbaum.

Cox, M.J., Paley, B., Burchinal, M., & Payne, C.C. (1999). Marital perceptions and interactions across the transition to parenthood. *Journal of Marriage and the Family, 61,* 611-625.

Crockenberg, S., & Covey, S.L. (1991). Marital conflict and externalizing behaviors in children. In D. Cicchetti & S.L. Toth (eds.), *Rochester Symposium on Developmental Psychopatholgy, Vol. 3: Models and integrations* (pp. 235-260). Rochester, N.Y.: University of Rochester Press.

Crockenberg, S., & Forgays, D.K. (1996). The role of emotion in children's understanding and emotional reactions to marital conflict. *Merrill-Palmer Quarterly, 42,* 22-47.

Cummings, E.M. (1987). Coping with background anger in early childhood. *Child Development, 58,* 976-984.

Cummings, E.M., Ballard, M., El-Sheikh, & Lake, M. (1991). Resolution and children's responses to interadult anger. *Developmental Psychology, 27,* 462-470.

Cummings, E.M., Iannotti, R.J., & Zahn-Waxler, C. (1985). Influence of conflict between adults on the emotions and aggression of young children. *Developmental Psychology, 21,* 495-507.

Cummings, E.M., Zahn-Waxler, C., & Radke-Yarrow, M. (1981). Young children's responses to expressions of anger and affection by others in the family. *Child Development, 52,* 1274-1282.

Cutrona, C.E., & Troutman, B.R. (1986). Social support, infant temperament, and parenting self-efficacy: A mediational model of postpartum depression. *Child Development, 52,* 1274-1282.

Davies, P.T., & Cummings, E.M. (1994). Marital conflict and child adjustment: An emotional security hypothesis. *Psychological Bulletin, 116,* 387-411.

Davies, P.T., & Cummings, E.M. (1995). Children's emotions as organizers of their reactions to interadult anger: A functionalist's perspective. *Developmental Psychology, 31,* 677-684.

De Wolff, M.S. & van Ijzendoorn, M.H. (1997). Sensitivity and attachment: A meta-analysis on parental antecedents of infant attachment. *Child Development, 68,* 571-591.

Donovan, W.L., Leavitt, L.A., & Walsh, R.O. (1998). Conflict and depression predict maternal sensitivity to infant cries. *Infant Behavior and Development, 23,* 505-517.

Egeland, B., Jacobvitz, D. & Sroufe, L.A. (1988). Breaking the cycle of abuse. *Child Development, 59,* 1080-1088.

Emde, R. N., & Robinson, J. (1979). The first two months: Recent research in developmental psychobiolgy and the changing view of the newborn. In J. D. Call, J. D. Nosshpitz, R. L. Cohen, & I. N. Berlin (Eds.), *Basic handbook of child psychiatry, Vol. 1: Development.* New York: Basic.

Emery, R.E. (1982). Interparental conflict and the children of discord and divorce. *Psychological Bulletin*, *92*, 310-330.

Emery, R.E. (1989). Family violence. *American Psychologist*, *44*, 321-328.

Emery, R.E., & O'Leary, K.D. (1982). Children's perceptions of marital discord and behavior problems of boys and girls. *Journal of Abnormal Child Psychology*, *10*, 11-24.

Forehand, R., Brody, G., Long, N., Slotkin, J., & Fauber, R. (1986). Divorce/divorce potential and interparental conflict: The relationship to early adolescent social and cognitive functioning. *Journal of Adolescent Research*, *1*, 389-397.

Fox, N.A. (1989). Psychophysiological correlates of emotional reactivity during the first year of life. *Developmental Psychology*, *25*, 364-372.

Gable, S., & Isabella, R. (1992). Maternal contributions to infant regulation of arousal. *Infant Behavior and Development*, *15*, 95-107.

Gelfand, D.M., Teti, D.M., & Radin Fox, C.E. (1992). Sources of parenting stress for depressed and nondepressed mothers of infants. *Journal of Clinical Child Psychology*, *21*, 262-272.

Gottman, J.M. & Katz, L.F. (1989). Effects of marital discord on young children's peer interaction and health. *Developmental Psychology*, *25*, 373-381.

Hetherington, E.M., Cox, M., & Cox, R. (1982). Effects of divorce on parents and children. In M. Lamb (ed.), *Nontraditional families*, (pp. 233-288). Hillsdale, NJ: Erlbaum.

Hubbard, F.O., & van Ijzendoorn, M.H. (1991). Maternal unresponsiveness and infant crying across the first 9 months: A naturalistic longitudinal study. *Infant Behavior and Development, 14,* 299-312.

Jenkins, J.M. (2000). Marital conflict and children's emotions: The development of an anger organization. *Journal of Marriage and the Family, 62,* 723-736.

Kagan, J. (1999). The concept of behavioral inhibition. In L.A. Schmidt & J. Schulkin (eds.), *Extreme fear, shyness, and social phobia: Origins, biological mechanisms, and clinical outcomes,* (pp. 3-13). New York: Oxford University Press.

Katz, L.F. & Gottman, J.M. (1991). Development of emotion regulation and dysregulation. In J. Garber & K.A. Dodge (eds.), *Cambridge studies in social and emotional development,* (pp. 129-155). New York: Cambridge University Press.

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

Katz, L. F. & Gottman, J. M. (1997). Buffering children from marital conflict and dissolution. *Journal of Clinical Child Psychology, 26, 157-171.*

Lamb, M. E., Bornstein, M. H., & Teti, D. M. (2002). *Development in infancy*. Mahwah, NJ: Lawrence Erlbaum.

Mikulincer, M., Florian, V., Cowan, P. A., & Cowan, C. P. (2002). Attachment security in couple relationships: a systemic model and its implications for family dynamics. *Family Process, 41, 401-434.*

Mulsow, M., Caldera, Y.M., Pursley, M., Reifman, A., & Huston, A.C. (2002). Multilevel factors influencing maternal stress during the first three years. *Journal of Marriage and Family*, *64*, 944-956.

Owen, M.T. & Cox, M.J. (1997). Marital conflict and the development of infant-parent attachment relationships. *Journal of Family Psychology*, *11*, 152-164.

Peterson, J.L. & Zill, N. (1986). Marital disruption, parent-child relationships, and behavior problems in children. *Journal of Marriage and the Family*, *48*, 295-307.

Porges, S.W. (1995). Cardiac vagal tone: A physiological index of stress. *Neuroscience and Biobehavioral Review*, *19*, 225-233.

Porges, S.W., Doussard-Roosevelt, J.A., Portales, A.L., & Suess, P.E. (1994). Cardiac vagal tone: Stability and relation to difficultness in infants and 3-year olds. *Developmental Psychobiology*, *27*, 289-300.

Porter, B. & O'Leary, K.D. (1980). Marital discord and childhood behavioral problems. *Journal of Abnormal Child Psychology*, *8*, 287-295.

Porter, C.L., Wouden-Miller, M., Silva, S.S., & Porter, A.E. (2003). Marital harmony and conflict: Links to infants' emotional regulation and cardiac vagal tone. *Infancy*, *4*, 297-307.

Richards, J.E., & Cameron, D. (1989). Infant heart-rate variability and behavioral development status. *Infant Behavior and Development*, *12*, 45-58.

Rothbart, M.K., & Derryberry, D. (1981). Development of individual differences in infant temperament. In M. Lamb & A. Brown (eds.), *Advances in developmental psychology*, (Vol. 1, pp. 37-87). Hillsdale, NJ: Erlbaum.

Sagi, A., & Hoffman, M.L. (1976). Empathic distress in newborns. *Developmental Psychology*, *12*, 175-176.

Simner, M.L. (1971). Newborns' response to the cry of another infant. *Developmental Psychology*, *5*, 136-150.

Stifter, C.A. & Braungart, J.M. (1995). The regulation of negative reactivity in infancy: Function and development. *Developmental Psychology*, *31*, 448-455.

Stifter, C.A., & Fox, N.A. (1990). Infant reactivity: Physiological correlates of newborn and 5-month temperament. *Developmental Psychology, 26*, 582-589.

Stifter, C.A., Fox, N.A., & Porges, S.W. (1989). Facial expressivity and vagal tone in 5- and 10-month-old infants. *Infant Behavior and* Development, 12, 127-137.

Stifter, C.A., & Jain, A. (1996). Psychophysiological correlates of infant temperament: Stability of behavior and autonomic patterning from 5 to 18 months. *Developmental Psychobiology*, *29*, 379-391.

Stifter, C.A., Spinrad, T.L., & Braungart-Rieker, J.M. (1999). Toward a developmental model of child compliance: The role of emotional regulation in infancy. *Child Development, 70*, 21-32.

Teti, D.M., & Gelfand, D.M. (1991). Behavioral competence among mothers of infants in the first year: The mediational role of maternal self-efficacy. *Child Development, 62*, 918-929.

Volker, S., Keller, H., Lohaus, A., Cappenberg, M., & Chasiotis, A. (1999). Maternal interactive behaviour in early infancy and later attachment. *International Journal of Behavioral Development, 23*, 921-936.

Table 1

Six-Month Concurrent Analyses

		1	2	3	4	5	6	7	8	9	10	11
1	Marital Love	-										
2	Marital Ambivalence	-.72**	-									
3	Marital Conflict-Negativity	-.64**	.60**	-								
4	Marital Maintenance	.48**	-.28**	-.19	-							
5	Infant Vagal Tone	.21*	-.20	-.10	.05	-						
6	Infant Heart Period	.27*	-.26*	-.27*	.04	.39**	-					
7	Infant Biased Variance	.17	-.08	-.12	.01	.77**	.39**	-				
8	Infant Heart Period Range	.17	-.11	-.11	.04	.83**	.33**	.92**	-			
9	Infant Mean Standard Deviation	.09	-.12	.01	-.01	.89**	.25*	.65**	.74**	-		
10	Infant Emotionality	.20	-.13	-.24*	.10	.02	.20	.05	.06	.00	-	
11	Infant MDI	.23*	-.08	-.15	.13	-.08	-.04	-.02	-.07	-.06	.11	-
12	Infant PDI	.10	-.02	-.09	.03	-.08	-.22*	.04	.04	-.05	.04	.66**

*p<.05; **p<.01; ***p<.001

Table 2

Nine-Month Concurrent Analyses

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
1 Marital Love	-										
2 Marital Ambivalence	-.44**	-									
3 Marital Conflict-Negativity	-.36**	.91**	-								
4 Marital Maintenance	.22	-.19	-.13	-							
5 Infant Vagal Tone	.01	.08	.03	-.01	-						
6 Infant Heart Period	.11	-.11	-.15	.14	.43**	-					
7 Infant Biased Variance	.01	.03	-.01	.01	.86**	.45**	-				
8 Infant Heart Period Range	-.03	.04	.00	-.09	.89**	.39**	.96**	-			
9 Infant Mean Standard Deviation	.17	.13	.08	-.10	.92**	.37**	.77**	.84**	-		
10 Infant Emotionality	-.10	.10	.06	-.04	-.01	-.11	.02	.05	-.04	-	
11 Infant MDI	.26*	-.15	-.14	-.11	-.01	.13	-.04	-.04	.04	-.36**	-
12 Infant PDI	.19	-.17	-.12	.06	.17	.09	.18	.14	.15	-.03	.18

*p<.05; **p<.01; ***p<.001

Table 3

Correlations and Means and Mean Level Difference for Six- and Nine-Month Marital and Infant Variables

	6-Month Mean (SD)	***9-Month Mean (SD)***	***t***	***r***
Marital Variables				
Love	81.08 (7.74)	82.75 (11.81)	-1.34	.42***
Ambivalence	8.33 (4.65)	14.99 (6.69)	-13.99***	.78***
Conflict-Negativity	18.54 (7.28)	18.86 (7.03)	-0.53	.72***
Maintenance	33.57 (5.22)	33.42 (5.09)	0.25	.44**
Infant Heart Variables				
Vagal Tone	3.65 (0.97)	3.89 (0.93)	-1.36	.19
Heart Period	430.09 (28.83)	446.60 (30.11)	-4.08***	.38***
Biased Variance	5.80 (0.63)	6.15 (0.68)	-3.45***	.22*
Heart Period Range	87.41 (28.56)	103.23 (33.91)	-3.02**	.17
Mean Standard Deviation	9.89 (5.24)	10.88 (5.52)	-1.20	.00
Bayley and Behavior Rating Scores				
Emotionality Scores	32.15 (5.11)	37.84 (7.00)	6.76***	.13
MDI	94.14 (9.46)	95.80 (10.01)	-1.41	.31**
PDI	97.19 (15.03)	102.18 (10.38)	-3.48**	.45***

*** p < .001, **p < . 01, * p <.05

Table 4

Six-Month Marital Variables Predictive of Nine-Month Infant Variables

	9-Month Infant Characteristics							
6-Month Marital Factors	Vagal Tone	HP	BVar	HPR	MSD	ER	MDI	PDI
Love	.07	.08	.09	.11	.03	-.19	.22*	.08
Ambivalence	.07	-.02	.06	.05	.08	.12	.01	-.06
Conflict-Negativity	.01	-.12	-.01	-.03	.04	.11	-.15	.10
Maintenance	.08	.03	.14	.12	.03	-.06	.16	.10

*p<.05; **p<.01; ***p<.001

Table 5

Six-Month Infant Variables Predictive of Nine-Month Marital Variables

	9-Month Marital Factors			
6-Month Infant Variables	Love	Ambivalence	Conflict	Maintenance
Vagal Tone	.13	-.23*	-.23*	.14
Heart Period	.16	-.26*	-.24*	.04
Biased Variance	.07	-.24*	-.29*	.01
Heart Period Range	.05	-.22	-.25*	.02
Mean Standard Deviation of HP	.06	-.13	-.12	.01
Emotional Regulation	.10	-.29*	-.28*	-.15
MDI	.16	-.27*	-.25*	.02
PDI	.13	-.23*	-.20	.12

*p < .05