

CONNECTED OR DISCONNECTED? ROMANTIC  
COUPLES' ADRENOCORTICAL ATTUNEMENT IN A  
"CONNECTED" WORLD

By

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ADRENOCORTICAL ATTUNEMENT IN A "CONNECTED" WORLD

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Abstract: The purpose of this research is to investigate how media usage impacts adrenocortical attunement in romantic couples. Prior research has shown that adrenocortical attunement within the stress response system provides information about the connections between individuals within dyadic relationships (Middlemiss, et al., 2012; Papp, Pendry, & Adam, 2009; Ruttle, et al., 2011); however, literature has not examined the influence of modern society on attunement. The present study tests the hypothesis that the amount of time couples spend using media together will moderate the relationship between media usage and cortisol attunement. Adrenocortical attunement was assessed in romantic partners attending a couples' communication workshop. Media usage, communication styles, and adult attachment were also assessed. Results found that couples with high amounts of media usage (regardless of the amount of time they spend using media together) have less synchronized baseline cortisol responses than couples that spend less time using media. In addition increase in media usage was associated with increases in demand/withdraw communication patterns. Exploratory analysis also found that different attachment styles were associated with communication styles. These results assess an evolutionarily novel circumstance that could be impacting connection and satisfaction within relationships.

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## CHAPTER I

### INTRODUCTION

#### General Introduction

The hypothalamic pituitary adrenal axis (HPA axis) is an endocrine system that essentially for body functioning and maintaining homeostasis. The HPA axis releases cortisol which is a biomarker that is indicative of stress and arousal (Hellhammer, Wüst, & Kudielka, 2009) especially in uncontrollable and/or social-evaluative threat contexts (Dickerson & Kemeny, 2004; Huether, et al., 1999). Recently, researchers have begun to assess cortisol reactivity and synchronization in dyads including marital couples (Saxbe & Repetti, 2010; Papp, Pendry, Simon, & Adam, 2013), romantically involved couples (Laurent, et al., 2013), and mother-child relationships (Laurent, Albow, & Measelle, 2012; Ruttle, et al., 2011). Results indicate that adrenocortical attunement within dyads is indicative of connectedness within married couples during conflict (Liu, et al., 2013) and within mother-child dyads during separation (Ruttle, et al., 2011). One aspect that has not been examined within a romantic couple dyad is the impact that a “connected” or technology based atmosphere has on the synchronization of cortisol within dyads.

The mechanisms underlying stress response systems have been widely studied (Hellhammer, Wüst, & Kudielka, 2009; McEwen, 2000; Laurent, et al., 2013); however, the impact media usage on stress response system and adrenocortical attunement are not well understood. Evaluation of the current literature on HPA axis stress response system, adrenocortical attunement, and technology usage and impacts within couples led to this study. It evaluated the associations between romantic couple dyads' stress response system to conflict discussion and reported media usage.

## CHAPTER II

### REVIEW OF LITERATURE

#### Hypothalamic Pituitary Adrenal Axis and Cortisol

Cortisol is a glucocorticoid that is produced as the result of a cascade of endocrine events in response to an emotional and stressful event that involves activation of the hypothalamic-pituitary-adrenal axis. When the hypothalamus is activated, the paraventricular nucleus of the hypothalamus releases corticotrophin releasing hormone (CRH) that aims for the anterior pituitary gland that stimulates the releases of adrenocorticotrophic hormone (ACTH). ACTH travels to the adrenal cortex and leads to the release of glucocorticoids including cortisol (Gunnar & Quevedo, 2007). Cortisol follows a diurnal rhythm, meaning that cortisol levels are highest when awakening and then decrease throughout the day. When a stressful event occurs, cortisol increases during the stressor and typically slowly recovers to baseline 20 minutes after the stressor. Glucocorticoids can influence the stress response by both mediating and suppressing affects depending on the physiological endpoint associated with the context of the situation (Sapolsky, Romero, & Munck, 2000), which can result in varying effects from cortisol.

Many human and animal studies have shown mixed results in relations to cortisol responses to both acute and chronic stressors and psychosocial factors that has warrant meta-analytical reviews of studies conducted in this area (Dickerson & Kemeny, 2004; Miller, Chen, & Zhou, 2007; Chida & Steptoe, 2009). A meta-analysis review over acute psychological stressors capable of eliciting cortisol responses has shown that motivated performances that were characterized by uncontrollability or contained a social-evaluative threat, were most likely to elicit a cortisol response in an acute stressor situation after controlling for methodological and stress characteristic factors (Dickerson & Kemeny, 2004). A meta-analysis examining chronic stress implications on the HPA axis function showed that HPA reactivity is variable in accordance to the characteristics of the stressor including controllability, the developmental timing in which the stressor occurs, and the characteristics of person themselves including the individual's response and evaluation of the stressor (Miller, Chen, & Zhou, 2007). A general meta-analysis over the relationship between psychosocial factors and cortisol awakening response showed that awakening cortisol levels increased with increases in general life stress and job related stress but decreased in relation to exhaustion, fatigue, or burnout (Chida & Steptoe, 2009).

It is important to note that individual's cortisol response can vary given their general stress responsivity (Del Giudice, Ellis, & Shirtcliff, 2011) and stress responsivity to chronic stress (McEwen, 2000). The adaptive calibration model of stress responsivity proposes four different patterns of relationship between adversity and stress reactivity in which an individual can express an exaggerated stress response to low amount of adversity, a slight stress response to a moderate amount of adversity, an exaggerated

stress response to a high amount of adversity, or a low or blunted stress response to a high amount high adversity (Del Giudice, Ellis, & Shirtcliff, 2011). Individuals that experience chronic stress can also develop stress reactivity patterns that are over reactive, suffer from repeated increases, lack a stress recovery period, or lack an adequate stress response (McEwen, 2000).

While adverse stimuli can impact individual's stress reactivity differently, it is clear that HPA axis helps maintain homeostasis within the body especially during stressful times. While on the surface the stress response may be associated with negative events and outcomes, it serves as a coping mechanism to increase survival during situations that require defense or action (Nesse & Young, 2000). These studies demonstrate the various events, adversity, and relationships with other individuals that can impact the stress response and indicate how some stimuli have periods within the developmental lifespan in which they can have a bigger influence on the acute stress response and an impact on the long-term chronic stress response.

The HPA axis is adaptively calibrated to manage relationships at different parts of the lifespan. Early stages of development are adapted to respond to parent-child relationships and attachment relationships with the main caregiver of varying quality (Del Giudice, 2009). Secure infant-mother relationships have been shown to decrease cortisol response in infants during stressful situations (Ahnert, Gunnar, Lamb, & Barthel, 2004). On the other hand, insecure avoidant, anxious, and ambivalent parental attachments and early psychosocial stress can become cues that the environment is high risk and promote alterations in the stress response system and in reproductive strategies, typically hastening physical maturation. Later in adolescence, relationship with peers can also

influence stress reactivity in that navigating the complex social structures can activate the HPA system (Flinn, et al., 2011).

Adult attachment styles also influence cortisol responses in romantic relationships later in adulthood. Particularly high avoidant women have been shown to have high cortisol response but fast cortisol recovery whereas high avoidant and high anxious men have been shown to have high cortisol response and slow cortisol recovery to conflict which suggest that there may be sex differences in relationship between attachment styles and stress response (Powers, et al., 2006). Males have also been characterized as having a blunted stress response during chronic high psychosocial stress (Del Giudice, Ellis, & Shirtcliff, 2011).

#### Adrenocortical Attunement

Beyond cortisol response to individual activity and events, biological synchronization or attunement in cortisol levels has been a focus of recent research. Adrenocortical attunement is the connection or the individuals' influences on the biological stress response of another individual. Most of the studies that have examined adrenocortical attunement are with marital dyads (Saxbe & Repetti, 2010; Papp, Pendry, Simon, & Adam, 2013; Liu, et al., 2013; Beck, et al., 2013; Hefner, et al., 2006), romantic couples (Laurent et al., 2013; Laurent, Powers, & Granger, 2013) and parent-child relationships (Papp, Pendry, & Adam, 2009; Middlemiss, Granger, Goldberg, & Nathans, 2012). One study conducted using friendship dyads during a co-rumination task found that after the discussion of a problem that lead to co-rumination, speculating about problems and focusing on negative affectivity predicted increases in adrenocortical attunement (Swearingen, Byrd-Craven, & Granger, under review).

A naturalistic study of marital dyads showed that husband and wife's cortisol levels during an average/normal week were positively correlated with each other and showed increased adrenocortical attunement during time spent with each other (Saxbe & Repetti, 2010). Adrenocortical attunement in marital relationships has been shown to be stronger between husbands and wives when more time was spent with each other (Papp, et al., 2013) and during disagreements or high levels of marital conflict (Liu, et al., 2013; Beck, et al, 2013). However, research has also shown that cortisol asynchrony occurs in relationships of older adults between ages 55 and 77, in which husbands are characterized as being withdrawn. Specifically, cortisol levels were significantly higher in wives than husbands in couples characterized as wife demand/husband withdraw (Hefner, et al., 2006).

Demand/withdraw has also shown to result in asynchrony in dating couples. Laurent et al. (2013) found that negative patterns of behavior including female demand/male withdraw and reciprocity of negativity were associated with lower cortisol and slower cortisol recovery in women only and low partner supportiveness was related to higher cortisol for men only. However, synchronization of cortisol levels has also been shown in dating couples. Both men and women had similar alignment between cortisol levels and salivary alpha-amylase (sAA) throughout a study's entire sampling period that lasted a total of 75 minutes; however, only women showed an association between overall cortisol and sAA levels in response to conflict (Laurent, Powers, & Granger, 2013).

Similar synchrony and asynchrony findings have been shown in parent-child relationships. During a challenging situation of researcher arrival, cortisol attunement

was prominent in mother-young child dyad (Ruttle, et al., 2011). Cortisol attunement was also found in mother-young child dyads when children were first initiated to sleeping alone at night when they had previously shared a bed with parent following a shared day of activities; however, during a third episode of sleep transition, the children continued to display elevated cortisol but they no longer expressed distress and the mothers' cortisol levels had decreased which resulted in asynchrony (Middlemiss, et al., 2012). This demonstrates that attunement characterizes interactional synchrony between the dyad, and asynchrony is an index of discordance, even in the absence of behavioral indicators. In addition, another study conducted between mother and young child attunement found that mothers' sensitivity and children's emotional reaction to tasks moderate cortisol attunement in which greater mothers' sensitivity and lower children's reaction stabilize attunement (Hibel, et al., 2015). In terms of older children, a study conducted with mother-adolescent dyads found that increased negative affectivity and increased time spent with each other were associated with stronger cortisol attunement (Papp, Pendry, & Adam, 2009)

While literature on cortisol attunement is still in its developing stages, it is clear that synchronization in stress response systems are able to provide information about the connections between individuals within dyadic relationships and the impacts that their relationship may have regarding trade-offs in adjustment. These studies also show that attunement can be associated with negative and positive aspects of the dyadic relationship and that asynchrony between dyads can occur when behavior cues are withdrawn. These complex interactions make simple associations between attunement and dyadic interactions unfeasible. One area that has not been examined within couple dyads both



married and dating is the impact that a technological “connected” atmosphere has on cortisol synchronization.

### Relationships, Technology, and Adrenocortical Attunement

Today’s society has been characterized as being “connected” to the media (Hevern, 2013). “Connected” refers to the use and availability of different media outputs that allows for faster responses and information passage and also allows for more entertainment opportunities. Many studies have examined the relational impacts of being connected to different media outputs including internet (Nice & Katzen, 1998), social networking sites (Fox & Weber, 2013), video games (Padilla-Walker, Nelson, Carroll, & Jensen, 2010), and cell phones (Morey, et al., 2013). Studies show that phone use including calling and texting and internet use including social networking sites and email have been used to establish (Nice & Katzen, 1998; Fox & Weber, 2013) and maintain relationships (Mesch, Talmud, & Quan-Haase, 2012; Morey, et al, 2013). Social networking sites usage has been shown to produce positive (happiness) and negative (jealousy) consequences for romantic relationships (Utz & Beukeboom, 2011) and has been associated with greater intimacy and support (Morey, et al., 2013). Increases in text messages have also been associated with higher relationship satisfaction, intimacy, and support (Morey, et al., 2013). Video game usage has been negatively associated with both peer and family relationships (Padilla-Walker, Nelson, Carroll, & Jensen, 2010). In romantic couples, video game usage has also been shown to be related to conflict. Specifically, the amount of time that a male spent playing video games was positively correlated with the couples’ conflicts (Coyne, et al., 2012) and conflicts increased when couples did not play video games together (Ahlstrom, et al., 2012).

Current research indicates that there are increases in technology and media usage that are having an impact on the initiation (Nice & Katzen, 1998; Fox & Weber, 2013), maintenance (Mesch, Talmud, & Quan-Haase, 2012; Morey, et al., 2013), conflict within (Coyne, et al., 2012) and quality (Padilla-Walker, Nelson, Carroll, & Jensen, 2010; Morey, et al., 2013) of relationships. It is not clear how media usage such as Facebook, cell phones, and video games are impacting the biological connectedness within couples or how this media usage is impacting individual and couples' communication patterns.

### The Present Study

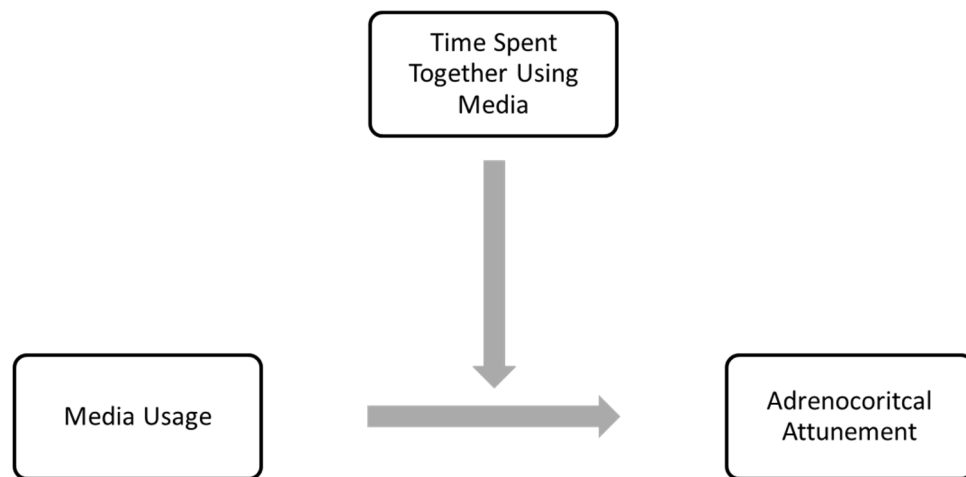
The present study investigated associations between romantic dyads' stress response system attunement and media usage. An exploration of communication behaviors in relation to media usage was also conducted. Specifically, engaged heterosexual couples completed communication patterns, relationship satisfaction, and individual and couples media usage questionnaires and provided saliva samples throughout couple communication workshops.

Several hypotheses are presented. The first hypothesis is that couples' cortisol attunement will be associated with their amount of media usage. Based on previous work showing increased conflict when males spent more time playing video games (Coyne, et al., 2012), high media usage by one partner in a dyad is predicted to result in asynchrony of couples' cortisol levels.

The second hypothesis is that couples' cortisol attunement will be associated with the amount of time spent with each other. Time spent together is predicted to increase cortisol synchronization (Saxbe & Repetti, 2010; Papp, Pendry, & Adam, 2009; Papp, et al., 2013).

The third hypothesis is that the amount of time couples spend using media together will moderate the relationship between media usage and cortisol attunement (See Figure 1). It is predicted that high levels of time spent together using media will result in a positive association between media usage and adrenocortical attunement and that low levels of time spent together using media will result in a negative association between media usage and adrenocortical attunement (Saxbe & Repetti, 2010; Papp, Pendry, & Adam, 2009; Papp, et al., 2013).

Figure 1: Moderation Model



The fourth hypothesis is that different communication behavior patterns will be associated with cortisol attunement. It is expected that increase in demand/withdraw communication will be associated with asynchronization; however, it is unclear how the pattern of communications might be associated with cortisol response due to limited research in the area.

The fifth and final hypothesis is that communication patterns will be associated with media usage. Although research is still unclear as to how media usage impacts

communication patterns, it is predicted that increase in media usage will be associated with increases in demand/withdraw communication.

## CHAPTER III

### METHODOLOGY

#### Method

##### Participants

Participants were 39 couples attending communication workshops located within Oklahoma City, Oklahoma. Of the 39 couples, 35 were engaged and 4 were married. Married couples' data were removed from analyses; analyses were only conducted on the 35 engaged couple sample, leaving 70 individuals in the study. The age ranged from 18 to 61 with an average age of 30. The majority of couples reported having an annual household income between \$30,000-\$60,000 (36%) and \$60,000-\$100,000 (29%) with 29% falling below \$30,000. In addition 67% of individuals reported Protestant religious affiliations.

##### Materials

Six questionnaires were used in order to establish qualities of the couples communication pattern, couples relationship satisfaction, adult attachment, media and technology usage, demographic, and health and general information.

In order to determine the couples communication pattern the Communication Patterns Questionnaire-Short Form (CPQ-SF) (Christensen & Heavey, 1990) developed as a short form of Christensen and Sullaway (1984) Communication Patterns Questionnaire that establishes couples interaction and communications was used (See Appendix A). The CPQ-SF is an 11 item inventory that asks couples to identify their typical communication patterns “When issues or problems arise” and “During a discussion of issues or problems” on a 9-point Likert scale ranging from “very unlikely” to “very likely.” CPQ-SF contains four subscales that characterizes the couples female demand/male withdraw, male demand/female withdraw, total demand/withdraw, and overall positive interaction between the couple. The CPQ-SF also assesses complementary and symmetrical communication patterns (Christensen & Heavey, 1990; Futris, Campbell, Nielsen, & Burwell, 2010).

In order to determine the relationship satisfaction within the couple, the Couples Satisfaction Index (CSI) (Funk & Rogge, 2007) was used (See Appendix B). The CSI is a 32 item self-report questionnaire that measures an individual’s satisfaction within a relationship. However, due to limited amount of time, the CSI was shortened to 5 items which has been shown to be as effect as the 32 item scale. The items are on various Likert scales that are continuously scored and added together to produce an overall total relationship satisfaction score.

Adult attachment was assessed through Adult Attachment Scale (AAS) (Collins & Read, 1990) (See Appendix C). The AAS is an 18 item self-report questionnaire that measures adult attachment style with consideration to both current and past romantic relationships. The three subscales, “Close”, “Depend”, and “Anxiety”, measures the

extent that an individual is “comfortable with closeness and intimacy”, “feels he/she can depend on others to be available when needed”, and “worried about being abandoned or unloved.” The scale can also be divided into anxiety attachment that refers to a model of the self and avoidance attachment that refers to a model of others.

In order to determine the couples media usage, the Media and Technology Usage and Attitudes Scale (MTUAS) (Rosen, et al., 2013) was used (See Appendix D). The MTUAS is a 60 item self-report inventory divided into usage and attitude subscales. The usage subscale consists of 44 items on a 10-point Likert scale ranging from “never use” to “all the time” use. The usage subscale can be further divided into specific media outputs of video game usage, Facebook friendships, online friendships, smartphone media usage, general social media usage, internet searching, emailing, text messaging, media sharing, phone calling, and television viewing to get specific usage on a particular source. The attitude subscale consists of 16 items on a 5-point Likert scale ranging from “strongly agree” to “strongly disagree.” The attitude subscale can also further be divided into four subscales that include positive and negative attitudes toward technology, preference for task switching, and anxiety about being without technology or dependence on technology. Six questions concerning the amount of media usage together within couples would be added to assess couples time spent together emailing, text messaging, and calling, watching television, playing video games, and using social networks.

A standard demographic questionnaire was also administered in order to determine demographic information that applies to the sample that could limit the interpretation of the results (See Appendix E). A standard health and general inventory

questionnaire will also be used to assess any potential confounds with the cortisol measurements (See Appendix F).

### Procedures

Couples entered the room where the workshop was held and were presented with consent form describing the study including the risks and benefits involving the study. Once agreeing to participate, couples provided their first cortisol sample (morning cortisol). They were then asked to fill out the communication pattern, couples relationship satisfaction, adult attachment, media and technology usage, demographic, and health and general inventory questionnaires. Seven couples were recruited in the afternoon and did not provide morning cortisol samples. These seven couples were included in all analyses except for any analysis that were used to predict morning cortisol. After lunch, the couples were then asked to provide their second saliva sample (baseline cortisol) before a discussion and worksheet on areas of conflict in the relationship. A third sample was taken immediately after the conflict discussion (cortisol response rise) and fifteen minutes after the conflict discussion (cortisol response peak). Participants were entered into a drawing for \$50 gift card to local restaurants that were drawn at the end of data collection.

### Plan of Analysis

Actor-Partner Interdependence Model, a method that has been previously used in naturalistic studies to estimate interdependence between close relationships (Cook & Kenny, 2005) was used to test predict relationship attunement. In order to get cortisol synchrony scores, synchrony variables were created by subtracting one individual's cortisol levels from the other dyad member's cortisol levels at each time point. Values



closer to 0 indicated greater attunement. Because the interest of the research is focused on the dyadic response, within-dyads regressions were conducted where dyads were treated as though the individuals are not distinguishable. The differences in the direction of the cortisol are arbitrary and accounted for by conducting regressions without intercept estimates (Kenny, Kashy, & Cook, 2006). In addition, individual cortisol data were transformed via a natural log transformation to adjust for positive skew. All individual cortisol data were reported based on log transformed scores.

To test the first hypothesis, that couples' cortisol attunement was associated with the amount of media usage, the synchrony variables across collection period were examined by separate multiple regression equations using each of the subscale components of the media usage (general social media usage, video game usage, etc.) and total media usage to predict cortisol synchrony within dyad. Because saliva samples were only compared within each time collection period day, time of day for cortisol samples was not statistically controlled for in the analyses. In addition, medication (including birth control), caffeine and meal intake, psychosocial problems, and sleep were also controlled for in the analyses but did not predict a significant amount of variance in cortisol response.

In order to test the second hypothesis that couple's cortisol attunement was associated with the amount of time spent with each other using media, a correlation between attunement and time spent together using media together was conducted.

In order to test the third hypothesis that couple's cortisol attunement were moderated by the amount of time couples spend using media together and media usage, the synchrony variables across collection period were examined by standardizing the time

spent together using media and time spent using media in general and multiplying the two independent variables together to create a moderator variable (see Figure 1) (Aiken & West, 1991). The moderator variable, the time spent using media together and the time spent using media in general, was then entered into a regression analysis to predict cortisol synchrony within dyad.

To test the fourth hypothesis that different communication behavior patterns were associated with cortisol attunement, the synchrony variables across collection period were examined by separate multiple regression equations using each of the subscale components (Male demand/Female withdraw, Female demand/Female withdraw, etc.) of communication patterns to predict cortisol synchrony within dyad.

In order to test the fifth and final hypothesis that the communication patterns were associated with media usage, correlations between media usage and each of the subscale components (Male demand/Female withdraw, Female demand/Female withdraw, etc.) of communication patterns were conducted.

Additional exploratory analyses were conducted on media usage, adult attachment, and communication patterns. Using Multi-Level Modeling (MLM), the predictors of couples' relationship satisfaction were examined in relations to dyads (MacCallum, Kim, Malarkey, & Kiecolt-Glaser, 1997). MLM is beneficial to the dyadic design because it adjusts for between and within individual variation levels of satisfaction with dyads and allows for increased statistical power.

## CHAPTER IV

### FINDINGS

#### Results

To examine the first, second and fourth hypotheses, a series of regressions were conducted examining all cortisol collection time points with aspects of media usage, time spent together using media, and various communication styles. Only overall media by males and females predicted attunement at baseline. Results show that higher amounts of total media usage of both males and females was predictive of increased separation in couples' cortisol response at time 2,  $\beta = .41$ ,  $F(1,27) = 4.95$ ,  $p < .05$ . Therefore, higher amounts of overall media usage was positively predictive of attunement, meaning that as overall media usage increased the difference between the couples' cortisol responses increased which results in asynchrony or less attunement at baseline cortisol responses for couples. Scores closer to 0 are an indication of synchrony whereas higher differences indicate less synchrony.

To examine the third hypothesis, a series of regression equations were used to determine if overall total media usage by males and females and time spent using media together could predict attunement at time 2. The first step in the moderation analysis was previously examined for the first hypothesis: that overall total media usage by males and females predicted increase in separation of cortisol response between couples ( $\beta = .41$ ,  $F(1,27) = 4.95$ ,  $p < .05$ ). The second step in the moderation analysis showed that increases in overall time spent using media together was predictive of increases in overall total media usage by males and females ( $\beta = .56$   $F(1,25) = 10.91$ ,  $p < .01$ ). However, the interaction between the two predictors did not predict attunement at time 2 after taking into account variance contributed by each predictor alone. Time spent using media together did not moderate the relationship between media usage and attunement.

To examine the fifth and final hypothesis, a series of correlations were conducted examining media usage by males and females and the total of media usage with various communication styles. Although no significant relations were found between media usage and communication styles, there were trends that suggest overall combined total media usage of males and females ( $r(31) = .33$   $p = .07$ ) and the media usage by males only ( $r(35) = .30$   $p = .08$ ) were positively related to males view of female demand/male withdraw communication style. In contrast media usage by females only was positively related to females view of communication being characterized as demand/withdraw by both individuals in the dyad ( $r(34) = .33$   $p = .06$ ).

Additional correlational analyses present interesting aspects for overall time spent using media together and for adult attachment styles. In terms of media usage, overall time spent using media together was positively correlated with males' individual media

usage ( $r(33) = .47, p < .01$ ) and females' ( $r(34) = .58, p < .01$ ) individual media usage and their overall total media usage ( $r(30) = .59, p < .01$ ). In terms of attachment styles, female anxious attachment is positively related to negative communication styles of both males ( $r(33) = .41, p < .05$ ) and females ( $r(32) = .44, p < .05$ ) perception of female demand/male withdraw and both males ( $r(33) = .34, p < .05$ ) and females ( $r(32) = .39, p < .05$ ) perception of the demand/withdraw communication in general. Female anxious attachment was also negatively correlated with positive communication ( $r(33) = -.34, p = .05$ ) and overall couples' satisfaction ( $r(33) = -.39, p < .05$ ). Both male and female dependent attachment styles were negatively related to negative communication styles and positively related overall couples' satisfaction and positive communication (See Table 1).

Table 1: Adult Attachment Correlations

	1	2	3	4	5	6	7	8	9	10
1. Female Anxiety	1									
2. Female Depend	-.52**	1								
3. Male Depend	-.31	.37*	1							
4. Male-Female Demand/ Male Withdraw	.41*	-.18	-.48**	1						
5. Male-Total Demand/ Withdraw	.34*	-.24	-.42*	.84**	1					
6. Male-Positive Communication	-.34*	.34*	.22	-.43*	-.38*	1				
7. Female-Female Demand/ Male withdraw	.44*	-.40*	-.44*	.59**	.48**	-.41*	1			
8. Female-Total Demand/ Withdraw	.39*	-.37*	-.37*	.44*	.63**	-.43*	.75**	1		
9. Female-Positive Communication	-.16	.15	.05	-.23	-.34	.57**	-.25	-.44*	1	
10. Overall Couples' Satisfaction	-.39*	.46**	.35*	-.37*	-.52**	.35*	-.32	-.42*	.28	1

Note: \* $p < .05$ , \*\* $p < .01$

In addition, Multi-level modeling examined predictors for couples' satisfaction between dyads. Results showed that males' report of their couple satisfaction was positively predicted by their overall media usage ( $\beta = .03$ ,  $F(1,31) = 3.29$ ,  $p < .01$ ) and their perception of positive communication style ( $\beta = .22$ ,  $F(1,31) = 3.29$ ,  $p < .01$ ). There was also evidence of communication and media impact on females' satisfaction. Results showed that females' report of their couple satisfaction was positively predicted by their overall media usage ( $\beta = .03$ ,  $F(1,30) = 3.72$ ,  $p < .05$ ) and negatively predicted by their perception of female demand/male withdraw communication style ( $\beta = -.24$ ,  $F(1,30) = 3.72$ ,  $p < .05$ ).

## CHAPTER V

### CONCLUSION

#### Discussion

The purpose of this research was to investigate how media usage impacts adrenocortical attunement in romantic couples. The first hypothesis, that couples' cortisol attunement was associated with the amount of media usage, was supported. Specifically, baseline attunement was lower in couples that reported high amounts of media usage for both males and females. This result is not surprising given that media usage has been associated with negative relationship impacts (Padilla-Walker, Nelson, Carroll, & Jensen, 2010). Given that media usage and availability is increasing (Pew Research Center, 2015; Duggan, et al., 2015), this finding raises awareness of current and future problems relationships face in a modern societies. If attunement is associated with positive aspects of relationships and outcomes (Ruttle, et al., 2011; Atkinson, et al., 2013) such as increased relationship sensitivity and positive developmental outcomes, then couples that are characterized by high amounts of media usage may be at higher risk for divorce.

The second hypothesis that couple's cortisol attunement was associated with the amount of time spent using media together and the third hypothesis that couple's cortisol attunement is moderated by the amount of time couples spend using media together and media usage were not supported. Although the amount of time couples spent using media together was related to the couples' overall total media usage, time spent using media usage alone did not impact attunement by itself and did not interact with overall media usage to predict attunement. It appears that overall media use plays a more significant role in lack of attunement regardless of the amount of time couples are using media with each other or as a shared activity. Although previous research has shown that increase time spent with another increases attunement (Papp, et al., 2013; Saxbe & Repetti, 2010; Papp, Pendry, & Adam, 2009), it appears that spending together using media does not increase attunement with another individual or that the usage of media is reducing the impact of spent time together might have on attunement.

Although to my knowledge, no research has examined the impact of different activities that couples do to spend time with each other on their relationship, a study regarding different modes of communication (internet versus face to face communication) has found that face to face communication positively predicts life satisfaction whereas communication through the internet did not predict life satisfaction (Lee et al., 2011). Similar to the previous literature, there could be a difference between activities that involve face-to-face communication and interaction such as a board game and media activities such as watching a movie together that limits interaction between individuals that could be influencing this study findings.



Interesting findings were observed that relate to communication behaviors. Although the fourth hypothesis, that different communication behavior patterns would be associated with cortisol attunement, was not supported, the fifth hypothesis, that the communication patterns were associated with media usage, was partially supported. The results were not significant; however, there were trends that support that media usage by both males and females were related to negative demand/ withdrawal communication styles. In addition, findings support that individuals' couple satisfaction was predicted by their perception of female demand/male withdraw communication styles, such that lower satisfaction was related to higher perception of female demand/male withdraw, and by their perception of positive communication, such that greater satisfaction was related to more positive communication. Findings also support that anxious adult attachments were positively related to negative communication styles and negatively related to couples' satisfaction. Dependent adult attachment styles were positively related to positive communication styles and to couples' satisfaction. These findings replicate a recent study that found that communication styles are related to adult attachment styles but conflicts with the study's finding that communication styles are not related to relationship satisfaction (Ebrahimi & Ali Kimiaei, 2014). While there are not direct connections between media usage, communication patterns, and attachment styles, the data support that each concept is indirectly or loosely impacting each other and their outcomes and should be further examined.

The most interesting finding is that media usage predicts attunement, but attunement is not related to overall couple satisfaction. In fact, results support that individual relationship satisfaction is positively predicted by their own increase in media

usage. It is interesting to note that individuals' media usage was a positively related to their own satisfaction and not related to their significant others relationship satisfaction. This difference in perception may be contributed by many factors, including a biased report of their own satisfaction. This could be exaggerated due to the setting and by biased opinions of the self-reported questionnaires in general. Due to the fact that couples were willing to spend an entire day with their partner to discuss and work on their communication and relationship, shows a sign of increased investment in the relationship. In general, there are discrepancies in reports that are biologically assessed, self-assessed, and/or observed by others, which could be impacting the conflicting biological and self-reported results. Future studies could examine various reports of couple's satisfaction to determine which assessments are most valid in assessing long-term commitment and satisfaction.

#### Limitations

The study contained several limitations in terms of demographics and assessment. The sample in the study was based on a heterosexual, adult population that had high protestant religious affiliations. While findings limit application to homosexual couples, the sample population also limits application to couples with different religious views that are influenced by different teachings and understanding about the roles in romantic relationships. The study results were also limited to only engaged couples. In terms of assessment limitations, couples were recruited at couple's workshops and engaged which leads to a population that maybe more invested and excited about their relationships than the general population. In addition, follow-up questions will be assessed every year for the next five years; however, biological data was only assessed on one day during an

event that is likely not typical of individual's daily routine. Although prior research has shown that attunement is relatively stable in couples across several days (Saxbe & Repetti, 2010) and between mother and infant/toddlers across a year time span (Hibel, et al.,2015), it is not clear how attunement may change throughout different stages of relationships. Future studies could address attunement and impacts of media in a different and more varied sample and consider relationships at various stages.

### Conclusion

Overall the study provides a naturalistic example of mate challenges occurring in modern societies that are characterized by increasing use of technology and social advances. With the advancements in society, there is a need to assess evolutionarily novel circumstances that could be impacting connection and satisfaction within relationships. Furthermore, there is a need to understand what it is about technology usage that could be leading to an increase in biological disconnection between partners. In general, these results are consistent with predictions that increased media usage impacts adrenocortical attunement and provides a perspective of the impacts modern contexts can have on adrenocortical attunement, relationships, and communication.

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## APPENDICES

### Appendix A

#### CPQ-SF

On a scale of 1-9 with a 1 indicating very unlikely and a 9 indicating very likely identify your typical communication.

When issues or problems arise, how likely is it that . . . .

	Very Unlikely								Very Likely
1. Both spouses avoid discussing the problem	1	2	3	4	5	6	7	8	9
2. Both spouses try to discuss the problem	1	2	3	4	5	6	7	8	9
3. Female tries to start a discussion while male tries to avoid a discussion	1	2	3	4	5	6	7	8	9
4. Male tries to start a discussion while female tries to avoid a discussion	1	2	3	4	5	6	7	8	9

During a discussion of issues or problems, how likely is it that . . . .

	Very Unlikely								Very Likely
5. Both spouses express feelings to each other	1	2	3	4	5	6	7	8	9

6. Both spouses blame, accuse, or criticize each other	1	2	3	4	5	6	7	8	9
7. Both spouses suggest possible solutions and compromises	1	2	3	4	5	6	7	8	9
8. Female pressures, nags, or demands while male withdraws, becomes silent, or refuses to discuss the matter further	1	2	3	4	5	6	7	8	9
9. Male pressures, nags, or demands while female withdraws, becomes silent, or refuses to discuss the matter further	1	2	3	4	5	6	7	8	9
10. Female criticizes while male defends himself	1	2	3	4	5	6	7	8	9
11. Male criticizes while female defends herself	1	2	3	4	5	6	7	8	9

## Appendix B

### Couples Satisfaction Index

1. Please indicate the degree of happiness, all things considered, of your relationship.

Extremely Unhappy	Fairly Unhappy	A Little Unhappy	Happy	Very Happy	Extremely Happy	Perfect
0	1	2	3	4	5	6

Most people have disagreements in their relationships. Please indicate below the approximate extent of agreement or disagreement between you and your partner for each item on the following list.

	Almost Always Agree	Always Agree	Occasionally Disagree	Frequently Disagree	Always Disagree	Almost Always Disagree
2. Amount of time spent together	5	4	3	2	1	0

Please indicate below the approximate extent of truth between you and your partner for each item on the following list.

	Not at all True	A little True	Somewhat True	Mostly True	Completely True	Almost Completely True
3. I have a warm and comfortable						

relationship with my partner	0	1	2	3	4	5
	Not at all	A little	Somewhat	Mostly	Completely	Almost Completely
4. How rewarding is your relationship with your partner?	0	1	2	3	4	5
5. In general, how satisfied are you with your relationship?	0	1	2	3	4	5

## Appendix C

### Adult Attachment Scale

Please read each of the following statements and rate the extent to which it describes your feelings about romantic relationships. Please think about all your relationships (past and present) and respond in terms of how you generally feel in these relationships. If you have never been involved in a romantic relationship, answer in terms of how you think you would feel.

Please use the scale below by placing a number between 1 and 5 in the space provided to the right of each statement.

1-----2-----3-----4-----5

Not at all characteristic of me

Very characteristic of me

(1) I find it relatively easy to get close to others.	1	2	3	4	5
(2) I do not worry about being abandoned.	1	2	3	4	5
(3) I find it difficult to allow myself to depend on others.	1	2	3	4	5
(4) In relationships, I often worry that my partner does not really love me.	1	2	3	4	5
(5) I find that others are reluctant to get as close as I would like.	1	2	3	4	5



(6) I am comfortable depending on others.	1	2	3	4	5
(7) I do not worry about someone getting too close to me.	1	2	3	4	5
(8) I find that people are never there when you need them.	1	2	3	4	5
(9) I am somewhat uncomfortable being close to others.	1	2	3	4	5
(10) In relationships, I often worry that my partner will not want to stay with me.	1	2	3	4	5
(11) I want to merge completely with another person.	1	2	3	4	5
(12) My desire to merge sometimes scares people away.	1	2	3	4	5
(13) I am comfortable having others depend on me.	1	2	3	4	5
(14) I know that people will be there when I need them.	1	2	3	4	5
(15) I am nervous when anyone gets too close.	1	2	3	4	5
(16) I find it difficult to trust others completely.	1	2	3	4	5
(17) Often, partners want me to be closer than I feel comfortable being.	1	2	3	4	5

(18) I am not sure that I can always depend on others to be there when I need them.	1	2	3	4	5
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## Appendix D

### The Media and Technology Usage and Attitudes Scale

Please indicate how often you do each of the following e-mail activities on **any device** (mobile phone, laptop, desktop, etc.)

1. Send, receive and read e-mails (not including spam or junk mail).	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
2. Check your personal e-mail.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
3. Check your work or school e-mail.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time

Please indicate how often you do each of the following activities on your **mobile phone**.

4. Send and receive text messages on a mobile phone.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
5. Make and receive mobile phone calls.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
6. Check for text messages on a mobile phone.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
7. Check for voice calls on a mobile phone.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
8. Read e-mail on a mobile phone.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
9. Get directions or use GPS on a mobile phone.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
10. Browse the web on a mobile phone.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
11. Listen to music on a mobile phone.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time

12. Take pictures using a mobile phone.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
13. Check the news on a mobile phone.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
14. Record video on a mobile phone.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
15. Use apps (for any purpose) on a mobile phone.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
16. Search for information with a mobile phone.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
17. Use your mobile phone during class or work time.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time

How often do you do each of the following **activities**?

18. Watch TV shows, movies, etc.	Never	Once a	Several times a	Once a	Several times a	Once a day	Several times a	Once an	Several times an	All the
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		month	month	week	week		day	hour	hour	time
19. Watch video clips	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
20. Play games on a computer, video game console or smartphone BY YOURSELF.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
21. Play games on a computer, video game console or smartphone WITH OTHER PEOPLE IN THE SAME ROOM.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
22. Play games on a computer, video game console or smartphone WITH OTHER PEOPLE ONLINE.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time

Do you have a Facebook or social media account? If the answer is “yes,” continue with item 23; if “no”, skip to “activities with your partner”.

How often do you do each of the following activities on **social networking sites** such as Facebook?

23. Check your Facebook page or other	Never	Once a	Several times a	Once a	Several times a	Once	Several times a	Once an	Several times an	All the
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social networks.		month	month	week	week	a day	day	hour	hour	time
24. Check your Facebook page or social media from your smartphone.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
25. Check Facebook or social media at work or school.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time

26. Post status updates.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
27. Post photos.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
28. Browse profiles and photos.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
29. Read postings.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time

30. Comment on postings, status updates, photos, etc.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
31. Click "Like" to a posting, photo, etc.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time

Please indicate how often you do each of the following **activities with your partner**:

1. Send, receive and read e-mails.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
2. Send and receive text messages.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
3. Make and receive mobile phone calls.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
4. Watch TV shows, movies, etc. on a TV set.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
5. Play games on a computer, video game console or smartphone.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time



6. Do activities on social networking sites such as Facebook.	Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time
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**Attitude**

1. I get anxious when I don't have my cell phone.	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
2. I get anxious when I don't have the Internet available to me.	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
3. I am dependent on my technology.	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree



## Appendix E

### Demographic Questionnaire

The purpose of the questionnaire is to help us get general information about you and your family.

Please answer each question carefully.

1. Which describes you?

Female

Male

2. What is your age in years? \_\_\_\_\_

3. What was your family's annual income?

Under \$20,000      \$20,001- \$30,000      \$30,001- \$60,000      \$60,001-  
\$100,000

\$100,000- \$200,000      Over \$200,000

4. What is your religious affiliation?

Catholic      Agnostic      Atheist      Other

Protestant (includes Baptist/Methodist/Wesleyan, Lutheran, Presbyterian, Pentecostal, Christian nondenominational, Episcopalian/Anglican, Mormon, Churches of Christ, Church of God, Jehovah's Witness, Seventh day Adventist, Assemblies of God)

NonChristian (Includes Jewish, Muslim, Buddhist, Humanist, Hindu, Unitarian Universalist, Pagan, Wiccan, Spiritualist, Native American, Baha'i, New Age, Sikh, Scientologist, Taoist, Deity, Druid, Rastafarian)

5. What is your marital status?

First marriage      Second marriage (or more)      Engaged      Dating

6 . How long have you been with your significant other? \_\_\_\_\_years and \_\_\_\_\_months

7. Can we contact you in the future to follow up on relationship status?

Yes

No

If Yes please provide the best contact information (phone number, email address, etc.).

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Appendix F

**Daily Health Screen**

Please circle the appropriate response for each question.

1) What is your overall health today? **(circle one)**

1      2      3      4      5      6      7      8      9      10  
*Poor-----Excellent*

2) Do you feel flushed?    1.) Yes                    2.) No

3) Have you had any of the following symptoms in the past 24 hours? (circle all that apply)

1.) Runny nose            2.) Cough            3.) Congestion            4.) None of these

4) Are you currently taken any medication?    1.)Yes      2.) No

5) Please list current medication: -

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6) Describe your level of physical activity for the past hour:

1	2	3	4	5
Very Low (sitting still)	Low-level activity	Moderate (walking across campus)	Somewhat Active	Very Active (full work-out)

7) Have you consumed caffeine in the past hour?    1.) No                    2.) Yes

8) Have you had a meal in the past hour?      1.) No      2.) Yes

If yes, what was the size of your meal?

0	1	2	3	4
Not applicable	Snack	Small Meal	Medium Meal	Large Meal

9) Have you slept in the past 2 hours?      1.) No      2.) Yes

If yes, for how long?

0	1	2	3	4	5
½-1 hour	1-2 hours	2-3 hours	3-4 hours	4-5 hours	Over 5 hours

1)

## Appendix G

### Follow-up Questionnaire

1. Are you currently with your partner? Yes    No
  - a. If no, what was the total length of your relationship? \_\_\_\_years \_\_\_\_ months
2. Are you currently married to your partner? Yes                      No
  - a. If yes, how long have you been married? \_\_\_\_\_ years \_\_\_\_\_ months

If together reassess Couples Satisfaction Index

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VITA

Type CaSandra L. Swearingen-Stanbrough

Candidate for the Degree of

Doctor of Philosophy

Thesis: CONNECTED OR DISCONNECTED? ROMANTIC COUPLES'  
ADRENOCORTICAL ATTUNEMENT IN A "CONNECTED" WORLD

Major Field: Psychology

Biographical:

Education:

Completed the requirements for the Doctor of Philosophy in Psychology at Oklahoma State University, Stillwater, Oklahoma in July, 2015.

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