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Affect Regulation Mediators of Associations between Attachment, Cortisol, and Psychological Symptoms

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To the Graduate Council:

I am submitting herewith a thesis written by Ji-Sun Jeong entitled "Affect Regulation Mediators of Associations between Attachment, Cortisol, and Psychological Symptoms." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Psychology.

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Abstract

This study investigated affect regulation as a mediator of the relationship between insecure attachment and (a) psychological symptoms of distress, and (b) cortisol levels, in a sample of first year undergraduate students. Participants (N = 125) attended group data collection sessions on campus where they completed both salivary collection and a paper and pencil survey. Survey measures included the Experiences in Close Relationship Scale to assess adult attachment, the Trait Meta-Mood Scale to assess emotional intelligence as a positive coping resource, the Difficulties in Emotion Regulation Scale to assess affect regulation problems, and the Outcome Questionnaire 30.2 to assess psychological symptoms of distress. The results indicated that emotion intelligence (Clarity and Repair) and affect regulation deficits (Strategies) mediated the relations between insecure attachment and psychological distress and level of cortisol.

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Chapter 1

Introduction and Review of Literature

The transition to the first year of college presents a considerable coping challenge for many students (Lopez, Mauricio, Gormley, Simko, & Berger, 2001). First year students tend to experience stress because they need to build new relationships, adjust to a new environment, and adapt to a higher level of academic demands. At large public universities, from 10%-20% of freshman do not return to the same institution the next year. Although there are various reasons freshmen drop out, research suggests that reported emotional problems are a significant reason (Rickinson & Rutherford, 1995). A basic assumption of the current study is that the transition to the first year of college is a stressful life change. Further, the ability to regulate negative emotions plays a significant role for psychological and physical health of first year college students.

Affect regulation and coping resilience are developed from security in attachment bonds with caregivers. According to Bowlby (1998), childhood attachment style continues to function as a template in adult intimate relationships. Adults with insecure attachment are likely to have difficulties regulating their negative emotions. Insecure adult attachment is believed to result from a person's underlying negative working models of self and others. Insecure attachment through the childhood years also leads to deficits in affect regulation capabilities for children and adults. Because of the unique affective dynamics of attachment anxiety in contrast to attachment avoidance, we investigated the possibility that a different set of coping resources and deficits would mediate each attachment dimension: positive coping recourses in the form of emotional intelligence, and coping deficits in the form of difficulties in affect regulation.

Affect Regulation

People live with various emotions from positive to negative. To survive with emotional distress, people try to regulate their emotions by using the best strategies they have learned (Koole, 2009). From this perspective, affect regulation refers to the abilities, strategies, or skills to become aware of and manage emotion (Gross, 1998; Salovey, Stroud, Woolery, & Epel, 2002). "Emotional Intelligence" (EQ) is one of the most well-known theories of affect regulation. EQ is believed to include three abilities: *repair*, *clarity*, and *attention*. Individuals with high EQ pay attention to their emotions and those of others, clearly perceive these emotions, and are capable of effective strategies for coping with their negative affect (Salovey et al., 2002). This goal directed ability is important because it is negatively related to psychological difficulties (Gratz & Roemer, 2004). Gratz and Roemer suggested the Difficulties in Emotion Regulation Scales (DERS) for capturing goal directed ability as well as other regulatory skills. In the same way that healthy physical functioning is something different than merely the absence of all illness, a basic assumption of this study is that the positive capabilities of EQ are qualitatively different than merely the absence of all affect regulation problems. Therefore, we assessed both EQ and difficulties in affect regulation.

Psychological Symptoms and Affect Regulation. Meta-analyses suggest a strong relationship between psychological symptoms and affect regulation difficulties (Aldao, Nolen-Hoeksema, & Schweizer, 2010). Avoidance and suppression of affect have been positively related with symptoms of anxiety, depression, and eating disorders. General deficits in affect regulation capability have been associated with depression and anxiety (Lopez et al., 2001), anxiety and negative mood (Mennin & Farach, 2007), major depressive disorder (Nolen-

Hoeksema, Wisco, & Lyubomirsky, 2008; Rottenberg, Gross, & Gotlib, 2005), and generalized anxiety disorder (Mennin & Farach, 2007).

Physiological Change and Affect Regulation. Affect regulation influences not only psychological distress but also biological response to stress. Individuals with high affect regulation skills show lower levels of cortisol in response to both acute and chronic stress stimuli (Salovey et al., 2002). In this study researchers used a public speech task in the experiment as an acute stress stimulus. Subjects were 59 college students who provided salivary cortisol samples. Individuals who had high affect regulation skills exhibited significantly lower levels of cortisol compared to those who were low in affect regulation skills (Mikolajczak, Roy, Luminet, Fillee, & de Timary, 2007). Other researchers examined racial discrimination as a cumulative stressor for African American youth (Kliewer, Reid-Quinones, Shields, & Foutz, 2009). They hypothesized that affect regulation skills would serve as a buffer of the racial stress. Participants were 69 African American youth from 8 to 13 years in age. As expected, participants who were low on affect regulation skills showed increased levels of cortisol compared to those high in affect regulation skills.

Salovey et al. (2002) examined the relationship between affect regulation skills and cortisol level. There were 60 women participants with age ranging from 30 to 45 years old. Salivary cortisol samples were collected during baseline, stress, and recovery periods. For the stress period, participants solved challenging tasks with unrealistic time constraints. Researchers found people who pay attention to their mood show a narrow variation in releasing cortisol, which they labeled *cortical habituation*. Clarity and repair dimensions of EQ were negatively associated with baseline cortisol levels. Second, the researchers used a slightly different experiment with 49 undergraduates. Salivary samples were collected at baseline, stress, and recovery. For the

stress period, participant solved challenging tasks or participated in conversations with two others. Only the attention dimension of EQ was significantly negatively associated with cortisol level. Other research with different affect regulation skills reported inhibiting emotion or dealing emotion cognitively was not helpful to reduce the stress response (Lam, Dickerson, Zoccola, & Zaldivar, 2009). In this study suppression (inhibition of emotion expression) and reappraisal (reframing or thinking about a stressful situation in a different way) were linked to increased cortisol responses with an emotionally provocative stressor task.

Neurological Substrates of Affect Regulation

During stress, the nervous system shifts from parasympathetic homeostasis to sympathetic arousal. Within seconds the sympathetic nervous system prepares the human body to use energy for the fight or flight response by increasing respiration, blood pressure, heart rate and decreasing digestive activity (Charmandari, Tsigos, & Chrousos, 2005). Not only the peripheral nervous system, but also the central nervous system reacts with Hypothalamic-pituitary-adrenal (HPA) axis response. The Hypothalamus integrates information and generates appropriate responses that send by hormones signals to pituitary. The Hypothalamus releases various hormones in response to stress, including Corticotropin-Releasing Hormone (CRH). CRH from the hypothalamus acts on the anterior pituitary and stimulates ACTH (Adrenocorticopin Hormone) release. The adrenal gland releases cortisol, which is known as a stress hormone. The effect of cortisol is to provide energy to muscle, vascular reactivity, immune system, and inflammatory responses (Lambert & Kinsley, 2011).

Activation of the stress system is beneficial with acute stressful stimuli (Tsigos & Chrousos, 2002). However, chronic activation of the stress system can result in psychological and physical disorders. Previously adaptive functions of the stress system are maladaptive with

chronic stress stimuli (Sapolsky, Romero, & Munck, 2000). For example, during stress, the HPA axis inhibits the immune or inflammatory responses. However, prolonged inhibition of those responses weakens immune response and increases susceptibility of disease (Charmandari et al., 2005).

Prolonged activation of the HPA axis can cause either increased or decreased level of cortisol (Charmandari et al., 2005; Yehuda, 1997). Both directions of the HPA axis are associated with psychological disorders (Miller, Chen, & Zhou, 2007). First, hyperactivity of the HPA has been correlated with depression (Pariante & Lightman, 2008; Pitchot, Herrera, & Ansseau, 2001). Hyperactivity of the HPA axis in major depression is one of the most consistent findings in stress research. Altered feedback inhibition by endogenous glucocorticoids is one possible explanation. Endogenous glucocorticoids serve as potent negative regulators of HPA axis activity (Pariante, 2006). Second, decreased HPA axis activity is characterized by chronically reduced level of cortisol. The increased sensitivity of the HPA axis due to chronic stress provides feedback inhibition by cortisol (Yehuda, 1997). Although there are inconsistent results of hypocortisolism, deficient cortisol is related with chronic stress related disorders (Charmandari et al., 2005). Third, considering the high comorbidity rates among mental disorders, inconsistent results are understandable. For example, persons with panic disorder may have heightened sensitivity to environmental cues that leads to elevation of cortisol (Abelson, Khan, Liberzon, & Young, 2007). Persons with Obsessive Compulsive Disorder and comorbid major depression have exhibited higher levels of cortisol compared to controls (Kluge, Schüssler, Künzel, Dresler, Yassouridis, & Steiger, 2007).

Study Aims

The purpose of this study was to test the general model shown in Figure 1. We investigated mediators of the relationship between the two fundamental dimensions of Adult Attachment (Anxiety and Avoidance) and two selected outcomes of chronic stress, namely, psychological distress symptoms and salivary cortisol levels. This study investigated the following hypotheses:

1: Emotional intelligence, as an affect regulation coping resource will negatively mediate the association between insecure attachment (Anxiety and Avoidance) and psychological or physiological distress among first year student undergraduates. Note that because the direct relationship of insecure attachment on symptoms and cortisol is expected to be positive, a mediator with a negative sign in this relationship indicates a beneficial resource. (That is, a negative mediator of a harmful direct effect is a good thing.)

2: Affect regulation deficits will positively mediate the association between insecure attachment (Anxiety and Avoidance) and physiological or physiological distress among first year student undergraduates. As the mirror opposite to the relationship in hypothesis 1, a positive mediator of a harmful relationship is not a good thing.

Chapter 2

Method

Participants

A convenience sample of 130 undergraduate students from our psychology department human subjects' research pool provided survey data and salivary cortisol samples. Four validity items were included to screen for random or inattentive responding on the paper and pencil survey (e.g. "Please code a five for this item," "Please leave this item blank"). Data from four students were excluded based on answers to one or more of these items. Data from one student who left more than 30% of the adult attachment items blank were also excluded. The remaining 125 students included 72 (58%) women and 53 (42%) men. Their mean age was 18.81 years (*SD* = 2.24, range = 18-37). With regard to ethnic identification, 104 (83%) reported "Caucasian European American", 8 (6.4%) "African American," 6 (4.8%) "Asian American," 4 (3.2%) "more than one," 2 (1.6%) "other not listed," and 1 (0.8%) "Hispanic." Prospective participants were told the purpose of the study was to investigate "perceived current stress, the ability to cope with negative emotions, and quality of close relationship attachments . . . and levels of the hormone cortisol, which has been associated with the human body's response to continuing stress." Students received course credit toward their grade and a $10 Amazon.com gift certificate as a participation incentive.

Instruments

Adult Attachment. The *Experiences in Close Relationships Scale* (ECRS; Brennan, Clark, & Shaver, 1998) was developed from a factor analysis of more than 300 items taken from the most frequently used self-report adult attachment instruments identified two orthogonal factors: *Anxiety* and *Avoidance*. Each subscale contains 18 items, which subjects complete using

a 7-point, partially anchored Likert-type scale (1 = *Disagree Strongly*, 4 = *Neutral/Mixed*, 7 = *Agree Strongly*). Higher scores indicate greater Anxiety or Avoidance. In a sample of college students, Brennan et al. (1998) reported internal consistency reliabilities (coefficient alpha) of .94 and .91 for the Avoidance and Anxiety subscales, respectively; and evidence of validity through correlations in expected directions with other measures of adult attachment and sexual feelings. In the current study internal reliability (coefficient alpha) was .82 and .89, for the Avoidance and Anxiety subscales, respectively.

Emotional Intelligence. The Trait Meta-Mood Scale (TMMS, Salovey, Mayer, Goldman, Turvey, & Palfai, 1995) is a 31-item scale designed to measure individual differences in the ability to reflect upon and manage one's emotions. Items are rated on a 5-point scale ranging from *strongly disagree* (1) *to neither agree nor disagree* (3) to *strongly agree* (5). The three subscales of the TMMS are Repair of Emotions, referring to the ability to repair negative emotions or maintain positive affects; Attention to Emotions, or the degree to which individuals cognitively focus on their emotions; and Clarity of Emotions, referring to how accurately individuals can identify the emotions they are feeling. The authors report that the subscales demonstrate both convergent and discriminant validity, and internal consistency for the Repair, Attention, and Clarity subscales as $\alpha = .82$, $\alpha = .86$, and $\alpha = .87$, respectively. Cronbach's alpha for the present study for these subscales was .81, .80, .85, respectively.

Affect Regulation Deficits. The Difficulties in Affect Regulation Scale (DERS, Gratz & Roemer, 2004) is a 36 item self-report measure developed to assess clinically relevant difficulties in affect regulation. Items are scored on six subscales: Nonacceptance of Emotional Responses (Nonacceptance); Difficulties Engaging in Goal-Directed Behavior (Goals); Impulse Control Difficulties (Impulse); Lack of Emotional Awareness (Awareness); Limited Access to Affect

Regulation Strategies (Strategies); and Lack of Emotional Clarity (Clarity). Participants are asked to indicate how often each of the 36 items applied to them on a 5-point Likert-type scale ranging from 1 (almost never) to 5 (almost always). Subscale scores are obtained by summating corresponding items. Gratz and Roemer (2004) reported an internal consistency of .93 DERS Nonacceptance, Goals, Impulse, Awareness, Strategies, Clarity subscales as $\alpha = .85$, $\alpha = .89$, $\alpha = .86$, $\alpha = .80$, $\alpha = .88$, and $\alpha = .84$. Cronbach's alpha for the present study for these subscales was .88, .87, .86, .80, .84, .85, respectively.

Psychological Symptoms. The Outcome Questionnaire 30.2 (Lambert, et al., 1996) is a 30-item standardized measure of symptom severity and overall functioning appropriate for counseling center clients. The measure is designed to be sensitive to change over a brief period, and as such it is administered weekly, or multiple times over the course of treatment. The dimensions of functioning measured by the OQ-30 include social role functioning, interpersonal functioning and subjective discomfort. Only the total scale score was used in this study. Clients use a 5-point response scale 0 (*never*), 1 (*rarely*), 2 (*sometimes*), 3 (*frequently*), 4 (*almost always*). The OQ-30 has demonstrated high internal consistency ($\alpha = .93$). In the current study, internal reliability was .93.

Salivary Cortisol. Participants were instructed to rinse their mouth with water prior to the collection of saliva. This was done to avoid possible contamination from food or drink. While sitting comfortably, all participants expectorated into a sanitized 50 ml test tube once per minute over a 3-minute period (Navazesh, 1993). The samples were placed on ice, centrifuged (10 minutes), and alloquated into microtubes for storing in an ultra freezer (-70 C). Saliva samples were thawed and centrifuged at 3,000 rpm for 10 minutes at room temperature. The clear supernatant was used for cortisol analysis. The enzyme-linked immunoabsorbent assay kit

(EIA) developed for use in saliva (Salimetrics, Inc., State College, PA) was used to determine cortisol levels. This assay can detect cortisol levels from 0.003 µg/dl to 3.0 µg/dl. The samples were run in duplicate, and cortisol concentrations were read from a standard curve generated by the Ascent Software program (Thermo Labsystems, Vantaa, Finland) for microplate readers.

Procedure

Participants were solicited through the online announcement of research opportunities used for the HPR system. The online solicitation stated, "This project involves completing a 40 minute survey about stress, coping, and symptoms of distress. You will also be asked to provide a sample of your saliva in a test tube. The sample will be tested for levels of the hormone cortisol, which is associated with levels of stress. In addition to extra course credit, you will receive a $10 Amazon.com gift certificate for participation in this study."

Because there is regular 24-hour variation in cortisol levels, data collection for this study occurred at 8:30 each morning for eight mornings. Students came to classrooms reserved on the UT campus, announced to them through the HPR system. Upon arrival participants were given two copies of the consent form and a survey packet. The survey enclosed in each packet was pre-labeled with a four digit number that has also been used to label a 50 ml. test tube enclosed with each packet. Participants were directed to read the consent document, and then given an opportunity to ask any questions. After signing the consent, participants were directed to come forward and take an empty 3 oz. "Dixie cup" from a table at the front of the classroom. The table contained 10-12, 16 oz. containers of bottled water. Participants were directed to pour 1-2 ounces of water and proceed to the nearest restroom outside the classroom, where they rinsed their mouths and discarded the cup.

After returning to the room, participants were asked to wear a pair of latex gloves (also included in their survey packet), sit quietly and let the saliva pool in their mouth for one minute. At the end of the minute, they were asked to expectorate into a sanitized 50 ml test tube. They repeated this procedure for 2 more minutes, thus providing a timed 3 minute salivary collection sample (Navazesh, 1993). Participants sealed the test tube themselves. One research assistant then collected sample tubes while another collects discarded gloves. Saliva samples were immediately placed on ice and transported to our laboratory by one of the research assistants, while the other remains to distribute the paper-and-pencil survey. In the laboratory, samples were centrifuged for 10 minutes and then alloquated into microtubes. These microtubes were labeled and frozen for subsequent analysis.

Paper and pencil surveys did not contain any personally identifying information, but instead were labeled only with a pre-selected four digit identifier that was used to match saliva samples with survey results. In addition to demographic items, surveys contained measures of the following constructs. The consent form also contained a brief paragraph informing participants that we intend to track their enrollment status by checking for their name in the public UT student directory each semester for the next six years. The consent form was pre-labeled with the four digit identification code used for the survey and test tube. Students were asked to print their name and provide their UT email address on the consent form. Thus, the consent form provides the basis for a code name / real name key sheet that we constructed after the initial data collection. Finally, in order not to disturb others, students were asked to remain quietly in their seats if they finish the survey before 50 minutes have elapsed. Surveys and consent forms were collected separately.

Chapter 3

Results

Descriptive Statistics

Table 1 shows means, standard deviations, and correlations between the variables in this study. Attachment Anxiety was negatively associated with EQ repair and clarity and positively related with difficulties in acceptance of emotions, engaging in goal-directed behavior, impulse control, accessing effective strategies, and clarity. Attachment Avoidance was negatively associated with EQ clarity and positively related with difficulties in acceptance of emotions, awareness of emotions, accessing effective strategies, and clarity. These two insecure adult attachment subscales were positively correlated with psychological symptoms; however, only Attachment Avoidance was positively correlated with cortisol levels. In addition, there were only two significantly positive relationships between cortisol and emotional skills and deficits: EQ Repair and Attention. However, psychological symptoms of distress were significantly negatively related to EQ Repair and Clarity, and positively correlated with each of the DERS subscales.

Mediation Model

The path model shown in Figure 1 involves what Hayes (2012) has called "multiple parallel mediators." His *Process* macro for SPSS Version 20 was used to estimate path coefficients for four mediation models. The bootstrap estimates presented here are based on 1,000 bootstrap samples. In Analysis 1 and 2, the outcome variable was OQ-30.2 scores. In Analysis 3 and 4, the outcome variable was cortisol level. The independent variable in Analysis 1 and 3 was attachment Anxiety, whereas the independent variable in Analysis 2 and 4 was attachment Avoidance. Each of the four analyses tested a set of nine mediator variables, the

three TMMS subscales to assess coping resources (e.g. emotional intelligence) and the six DERS subscales to assess affect regulation deficits.

Table 2 shows results of these analyses, organized by the generic paths shown in Figure 1. The first hypothesis held that the three subscales of the TMMS, as indicators of emotional intelligence, would be significant negative mediators (which indicates their value as coping resources) for the direct effect of attachment on symptoms and cortisol. Table 2 shows that of the 12 statistical tests related to this hypothesis (first three rows of each section), six were significant. Attention was not a significant mediator in any analysis, but six of the eight tests involving Repair and Clarity were significant. The second hypothesis held that the six aspects of affect regulation deficits would serve as positive mediators (which indicates their maladaptive nature) for the direct effect of attachment on symptoms and cortisol. There were 24 tests relevant to this hypothesis (the last six rows in each of the four analyses). Table 2 shows that this hypothesis received very little support. Only two of the 24 tests were significant.

Chapter 4

Discussion

This study sought to test whether affect regulation mediated the relation between insecure attachment on psychological symptoms, as well as cortisol level for a first year student sample. Although there are studies about affect regulation and both psychological and physiological distress, fewer studies have examined adult attachment, affect regulation, and psychophysiological responses. The results of this study indicate that emotion intelligence (Clarity and Repair) and emotional deficit (Strategies) mediated the relationship between insecure attachment and psychological distress and level of cortisol.

There were significant direct paths for both attachment anxiety and avoidance on psychological symptoms. The results suggest that insecure attachments are associated with psychological distress. These results are similar to those reported by Wei, Heppner, and Mallinckrodt (2003) who reported that both attachment anxiety and avoidance uniquely predicted psychological distress. However, in the current study there was no direct causal path of insecure attachment on cortisol level. EQ-clarity, EQ-repair, and DERS Limited Access to Strategies, out of nine mediators tested were significant mediators on psychological symptoms in the current study. It is important to note that Repair subscale of TMMS and the "Strategies" subscale of DERS may represent positively and negatively worded aspects of the same basic construct.

The first hypothesis that emotional intelligence would mediate insecure attachment on psychological or physiological distress and was supported for both psychological symptoms and cortisol. These findings are in line with Salovey et al., (1995, 2002) who reported that individuals who can clearly perceive their feelings (Clarify) and believe they can repair their

negative mood states (Repair) have less psychological symptoms and lower levels of depression. Specifically, clarity and repair also mediated between Attachment Anxiety and cortisol level. Salovey et al., (2002) reported similar findings about negative relationships between emotion intelligence and cortisol level. Clarity was related to lower cortisol release at baseline across the stress experiments. Although participants in their experiments reported more negative moods during the experiment, their level of the hormone was not increased due to the ability to clearly aware their moods. Those abilities are negatively related to ruminative thoughts (Salovey et al., 2002). Similar results were reported after statistically controlling for personality factors, alexithymia, and resilience (Mikolajczak, Petrides, Coumans & Luminet, 2009). Previous research suggested that perceived coping mediated the relationship between insecure attachment and psychological distress (Wei et al., 2003). This suggests that people with insecure attachment exhibited more psychological distress if they reported fewer stress management skills.

The second hypothesis that affect regulation deficits would mediate between insecure attachment and psychological symptoms or cortisol level was not supported, only Strategies of the DERS subscale mediated between insecure attachment and psychological symptom. According to Dickerson and Kemeny (2004), activation of the hypothalamic-pituitary-adrenal (HPA) axis results from chronic stress, but components of emotional response seem to be only weakly correlated to cortisol level (Mauss, Cook, & Gross, 2007). These findings are consistent with observation that persons with attachment avoidance may be less likely to be aware of their distress. Stalder, Evans, Hucklebridges and Clow (2010) also found no significant association between emotion deficit (DERS) and cortisol level.

Taken in total, the results of this study do suggest that insecure attachment may dispose individuals to problems in affect regulation, which in turn are related to higher psychological

distress. If the same patterns are observed in clients, this suggests that their counselors could help them to develop the emotional intelligence capacities to clearly perceive their emotion and believe they can repair their emotions. Findings of this study suggest that first year students with insecure attachment are not only struggling with lack of ability to handle their emotional problems, but also a perception of limited coping strategies.

There are a few limitations to the study that are important to note. First, the saliva samples were collected at one time point. Although data collection for the current study occurred at 8:30 each morning during the same academic week. For more validate results, future studies should collect saliva sample multiple time at same time with same individuals. Second, there are a number of factors associated with regulation of HPA that were not currently controlled for in the current investigation such as history of chronic trauma or current mental disorders. Third, this sample was over 83% Caucasian and had a mean age of 18.81 years, which is not representative of the general population, but is representative of a large university in the Southeast region of the United States. Generalization of these findings to other populations remains to be established. Finally, this study did not examine a sample of exclusively clients. Future research is needed with clinical samples.

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Appendices

Table 1. Bivariate Correlations between attachments, affect regulation, psychophysiological response

	M	*SD*	2	3	4	5	6	7	8	9	10	11	12	13
1. Anxiety	3.48	1.11	.22*	-.25**	.10	-.33***	.52***	.30***	.42***	.01	.56***	.28***	.62***	.09
2. Avoidance	2.97	1.08	--	-.05	-.16	-.41***	.19*	.16	.08	.31***	.20*	.41***	.34***	.19*
3. TMMS Repair	3.86	.74		--	.22*	.33***	-.21*	-.21*	-.32***	-.30***	-.50***	-.33***	-.48***	.20*
4. TMMS Attention	3.81	.50			--	.24**	-.15	-.05	-.07	-.71***	-.04	-.28**	-.09	.20*
5. TMMS Clarity	3.43	.67				--	-.43***	-.27**	-.32***	-.36***	-.36***	-.83***	-.58***	-.12
6. DERS Nonacceptance	2.05	.86					--	.38***	.47***	.24**	.57***	.37***	.54***	.01
7. DERS Goal	2.63	.95						--	.47***	.11	.41***	.20*	.40***	.10
8. DERS Impulse	1.63	.66							--	.10	.60***	.24**	.57***	-.03
9. DERS Awareness	2.35	.67								--	.16	.36***	.22*	-.13
10. DERS Limited Access	1.82	.66									--	.32***	.70***	-.08
11. DERS Emotional	2.21	.71										--	.51***	.03
12. OQ total	1.13	.53											--	.02
13. Cortisol	.62	.42												--

Table 2. Direct and Indirect Effects as Mediator

Mediator	a_1	b_1	Indirect Effect	CI low	CI high
Analysis 1: Anxiety → OQ30, path c = .12*** (*n* = 123)					
EQ-Repair	-.17**	-.08^{+}	.0139*	.0012	.0373
EQ-Attention	.05	.04	.0018	-.0034	.0197
EQ-Clarity	-.20**	-.20**	.0400*	.0106	.0877
DERS-NA	.41***	.00	.0001	-.0407	.0366
DERS-G	.26**	.02	.0048	-.0169	.0299
DERS-IC	.25***	.11	.0272*	.0012	.0606
DERS-A	.00	.03	.0001	-.0073	.0108
DERS-LE	.34***	.24***	.0793*	.0360	.1350
DERS-C	.18**	.04	.0072	-.0141	.0365
Analysis 2: Avoidance → OQ30, path c = .06^{+} (*n* = 123)					
EQ-Repair	-.03	-.11*	.0036	-.0094	.0228
EQ-Attention	-.08	.07	-.0054	-.0324	.0039
EQ-Clarity	-.26***	-.20*	.0507*	.0111	.0978
DERS-NA	.15*	.05	.0082	-.0067	.0292
DERS-G	.15	.01	.0020	-.0101	.0180
DERS-IC	.05	.13	.0065	-.0031	.0262
DERS-A	.19***	-.01	-.0017	-.0297	.0269
DERS-LE	.12*	.28***	.0339*	.0073	.0731
DERS-C	.27***	.03	.0079	-.0274	.0518

(table continues)

(Table 2 continued)

Mediator	a_2	b_2	Indirect Effect	CI low	CI high
Analysis 3: Anxiety → cortisol, path c = .04 (*n* = 113)					
EQ-Repair	-.18**	.13*	-.0243*	-.0770	-.0047
EQ-Attention	.05	.16	.0079	-.0050	.0419
EQ-Clarity	-.19***	-.23^{+}	.0427*	.0046	.1028
DERS-NA	.37***	-.02	-.0061	-.0542	.0336
DERS-G	.23**	.06	.0145	-.0084	.0688
DERS-IC	.21***	-.02	-.0045	-.0400	.0289
DERS-A	.01	.01	.0001	-.0081	.0122
DERS-LE	.30***	-.06	-.0167	-.0713	.0294
DERS-C	.18**	-.08	-.0142	-.0518	.0158
Analysis 4: Avoidance → cortisol, path c = .07 (*n* = 113)					
EQ-Repair	-.06	.11	-.0069	-.0364	.0047
EQ-Attention	-.07	.17	-.0112	-.0502	.0034
EQ-Clarity	-.24***	-.22^{+}	.0528*	.0043	.1161
DERS-NA	.14*	.00	.0005	-.0155	.0200
DERS-G	.16	.05	.0088	-.0051	.0574
DERS-IC	.05	-.01	-.0003	-.0134	.0089
DERS-A	.18**	-.02	-.0034	-.0368	.0242
DERS-LE	.13*	-.06	-.0081	-.0538	.0101
DERS-C	.27***	-.11	-.0294	-.0901	.0113

Note. N = DERS = Difficulties in Affect Regulation Scale, NA = Nonacceptance of Emotional Responses, G = Difficulties Engaging in Goal-Directed Behavior, IC = Impulse Control, LE = Lack of Emotional Awareness, LE = Limited Access to Affect Regulation Strategies, C = Lack of Emotional Clarity.

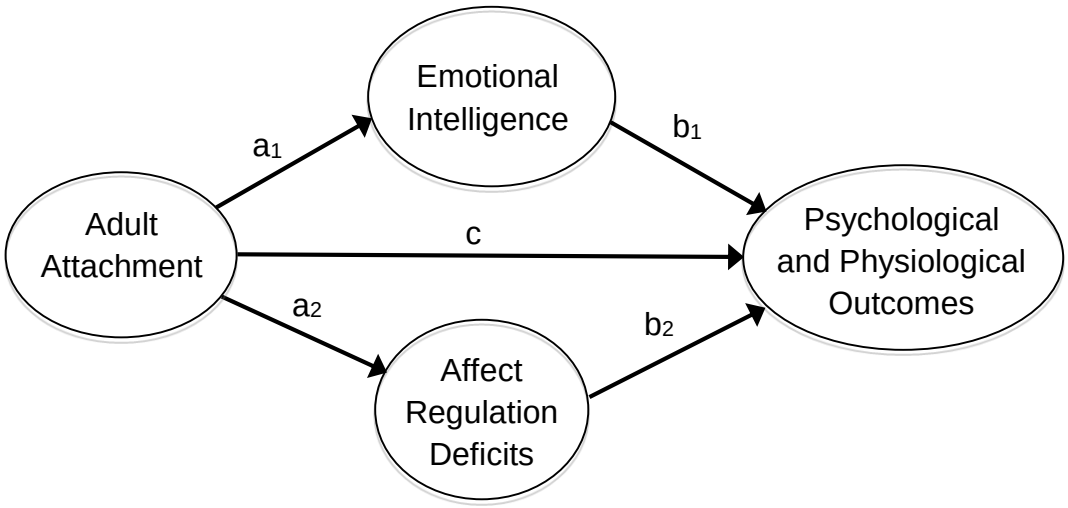

Figure 1. Hypothesized Model

Vita

Ji-Sun Jeong received a Bachelor of the Arts in Psychology from the Duksung Women's University, South Korea in 2005 and received a Master of the Arts in Psychology from the Ewha Women's University, South Korea in 2008. She began her studies in Counseling Psychology at the University of Tennessee, Knoxville in 2010 under the mentorship of Brent Mallinckrodt. After receiving a Masters of the Arts in Psychology she plans to obtain a Ph.D. from the same program.