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EFFECT OF PARENT MODELED COPING AND SOCIALIZATION OF COPING ON PREADOLESCENT STRESS REACTIVITY

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ABSTRACT

Effective coping behaviors can diminish the negative effects of stress. Children learn how to cope with stress from their parents' modeled and socialized coping styles. This study aims to understand the links between parent modeling of coping and socialization of coping, both engagement and disengagement, and child physiological reactivity during a stressful encounter. We hypothesize that child coping, as learned from his or her parent, will mediate the relationship between parent modeled and suggested coping and child physiological reactivity to stress. A sample of 92 preadolescents and one of their parents participated in the study. Data from parent (P) and child (C) Responses to Stress Questionnaire and parent (P) Socialization of Coping Questionnaire were collected to evaluate modeled engagement (RSQ_E) and disengagement (RSQ_D) and socialized engagement (SOC_E) and disengagement (SOC_D). Child salivary cortisol responses (AUCg) to the Trier Social Stress Test were measured. Initial results show that parent modeled and suggested coping are not related to child physiological stress reactivity. Therefore, because the first step for mediation as outlined by Barron & Kenny (1986) failed to be confirmed, mediation tests were not conducted. Despite this, trending p-values suggested that children with parents who modeled higher levels of engagement had higher cortisol levels (M=.058, SD=.089) than children of parents who modeled lower levels of engagement (M=.025, SD=.074); t (82)= -1.85, p<.068. This same trend was observed for cortisol levels in children with parents who modeled lower levels of disengagement (M=.056, SD=.093) as compared to parents who modeled higher levels of disengagement (M=.023, SD=.065); t (82)=1.84, p<.069. Additionally, parent-reports of socialization of engagement were related to child use of engagement strategies ($P\text{-}SOC_E$ – $C\text{-}RSQ_E$, r=.209, p<.046) and inversely related to their child's use of disengagement strategies ($P\text{-}SOC_E$ – $C\text{-}RSQ_D$, r=-.284, p<.006), but parent socialization of

disengagement did not predict similar behaviors in children. Findings highlight the importance of parental modeled and socialized coping and how it may be applicable to parent and child interventions in the future.

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Chapter 1 - Introduction

Childhood Stress and Health

Although stress is typically noted for the maladaptive distress it can cause to the mind and body, stress that one experiences can also be adaptive. This positive stress, eustress, is contrasted to distress, and it may lead to increased productivity and growth, therefore representing its adaptive nature and even the prediction of overall increased life satisfaction (O'Sullivan, 2011). The human body is well-equipped to handle short-term, infrequent stressors; when the stressors are repetitive or constant, however, negative effects sometimes accrue. The sympathetic nervous system (SNS) and hypothalamic-pituitary-adrenal (HPA) axis evolved to respond quickly and powerfully to life threatening events. When chronically activated, the physiological stress response systems can become dysregulated. Different from eustress, this chronic stress can overtax the HPA system, leading to repetitive, excessive releases of stress hormones or dysregulation of stress hormone release, whether it be a lack of habituation, the inability to recover from the stress, or a lack of response to a stressor in the first place (McEwen, 2000; McEwen & Gianaros, 2010).

As opposed to homeostasis, a process in which stability relies on maintaining set points, allostasis is the body's ability to make adaptations when faced with stress (Sterling, 2012). McEwen and Stellar (1993) have defined the negative outcomes resulting from over-activation of this regulatory system as allostatic load. Predisposing factors such as genetics, environment, biographical factors (e.g. age, race, occupation, and education), psychosocial qualities, behaviors, and clinical experiences (e.g. medications, surgeries, and treatments) increase or

decrease the level of allostatic adjustment an individual must employ once faced with a stressor (Beckie, 2012).

When faced with stressors, primary allostatic mediators are activated or released. Examples of these mediators include hormones such as cortisol that the neuroendocrine system releases during and following a stressor to activate a stress response. Immune and inflammatory factors are also primary mediators. When activated too frequently, these can take a toll on the body and affect other areas and systems of the body, such as metabolism, the cardiovascular system, and inflammatory proteins. In the end, these secondary outcomes stemming from the primary mediators can lead to tertiary outcomes such as physical and mental health diseases and disorders, reduced quality of life, and premature death (Beckie, 2012).

Psychological and Physiological Effects of Stress

One population that experiences great stress and the factors that contribute to allostatic load is children facing poverty-related stress. Poverty-related stress is defined by Wadsworth et al. (2008) as "the multitude of stressors associated with poverty that create the stress context for children and families." Some examples include economic strain, family conflict, violence, and discrimination—such stressors have been associated with internalizing and externalizing behaviors, social problems, delinquency, and physical health problems (Wadsworth et al., 2008; Santiago, Wadsworth, & Stump, 2009). For a population of low-income, rural White children, the total exposure to poverty-related stressors relates to a higher risk of emotional difficulties, such as parent-reported distress and challenges involving self-regulatory behavior (Evans & English, 2002). These socioemotional difficulties observed in children exemplify the negative effect poverty-related stress can have on child development.

In addition to these negative psychological outcomes, researchers have noted physiological changes. Higher overnight urinary cortisol levels have been found in children who have lived in poverty for longer and experience more poverty-related stress than their middle class peers (Evans & Kim, 2007). Higher levels of stress hormones are considered markers of dysregulation of the stress response system, the HPA axis. When activated by a stressor, the HPA axis produces cortisol, a hormone responsible for regulating physiological processes including metabolism, immunity and behavioral processes (de Kloet, Joëls, & Holsboer, 2005; Smith & Vale, 2006). The dysregulation of the HPA axis in children links to detrimental outcomes associated with these processes, such as metabolic syndrome, high blood pressure, and depressive and post-traumatic stress disorder (Shea, Walsh, MacMillan, Steiner, 2004). Additionally, increased resting blood pressure, another measure of psychophysiological activity, links to greater cumulative levels of poverty-related stress (Evans & English, 2002). This increased cardiovascular and circulatory system activity can damage the body if elevated for too long—leading to hypertension and heart disease, for example.

Buffering Poverty-Related Stress

Even though stress has the ability to have these negative effects on child psychological and physiological health, coping buffers the negative effects of poverty-related stress. Lazarus and Folkman (1984) defined coping as the "constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person" (p. 141). Some of these strategies can specifically target poverty-related stress. Engagement forms of coping are some of the adaptive efforts used by children to address a stressor. These proactive strategies include problem solving, emotional expression, cognitive

restructuring, and utilizing social support, and can be broken into two groups: primary and secondary control coping (Tobin, Holroyd, Reynolds, & Wigal, 1989). Problem solving and emotional expression, strategies directed specifically at the stressor and its effects are part of primary control coping, whereas secondary control involves cognitive restructuring and seeking social support that help the individual adapt to the problem (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001).

Use of primary and secondary control coping has been found to decrease anxious or depressed and aggressive behavior in children facing poverty-related stress. In addition, use of these strategies decreases maladaptive responses, like disengagement, to address future stress (Wadsworth & Berger, 2006; Santiago, Etter, Wadsworth, & Raviv, 2012). For children facing family conflict related to poverty-related stress, secondary control coping was shown to moderate the effects conflict had on internalizing behavior, and that primary control coping is helpful in decreasing internalizing symptoms, but primarily in girls (Santiago & Wadsworth, 2009). It is imperative that children develop adaptive tactics early in life to fight the negative effects of stress. One longitudinal study has shown that primary and secondary control coping is associated with future adaptive coping strategies and fewer maladaptive responses (Santiago, Etter, Wadsworth, & Raviv, 2012). It follows therefore, that responses such as primary and secondary control coping will decrease the negative impact of stress, because those who use these strategies are actively working towards solving a problem or adapting to a problem.

Unfortunately, not all coping efforts are effective. Internalizing problems such as depression, anxiety, and feelings of inadequacy are common outcomes of disengagement coping (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001; Abaied & Rudolph, 2010b). Researchers have also observed this pattern in children facing poverty-related stress, illustrating

how maladaptive coping behaviors, in addition to the stress itself, can have a detrimental effect (Wadsworth & Berger, 2006). The utilization of disengagement strategies to cope with family conflict, a type of poverty-related stress, can worsen internalizing symptoms (Santiago & Wadsworth, 2009). Not only does disengagement has a negative effect on child health, but even when optimal coping strategies are possible to use, they are not always implemented.

Even though children may have a variety of coping strategies to utilize, the best ones are not always used. In the context of poverty-related stress, disengagement coping strategies such as denial may be the most appropriate strategy to deal with stress, at least in the short-term (Hauser & Bowlds, 1990). At times, it may be difficult for children to utilize engagement strategies because in certain situations, especially regarding familial socioeconomic status, children cannot control the stressor or act directly on it. In this case, distraction, a strategy imbedded in secondary control coping, can be helpful and adaptive as well (Hauser & Bowlds, 1990). A study by Wadsworth and Compas (2002) found that for those experiencing high levels of economic strain, disengagement coping was used more that engagement strategies. They suggested that those with high levels of stress may have less strategies to manage the challenges they face.

Coping Behavior Acquisition

How do children learn to use these strategies when they face stress? Theories surrounding the acquisition of coping behaviors suggest different ways that children learn to cope. Band and Weisz suggest that coping is dependent on cognitive development and matures with natural development. For example, preadolescents gain cognitive and social skills that allow them to employ more sophisticated strategies, including problem solving and support seeking (Band & Weisz, 1988). Social Learning Theory (Bandura, 1971) suggests that children learn new

behaviors like coping skills through observational learning, which highlights the importance of figures that model behavior, like teachers, friends, and other family members (Compas, 1998). These figures may passively teach coping skills, but at times, these figures actively suggest coping methods. Socialization of coping theory suggests that through instructing and advising, parents or other socializers influence the way that children cope (Kliewer & Lewis, 1995).

Parental Modeling of Coping

According to Social Learning Theory, parent cognitive and behavioral responses to stress and their suggestions on how to cope with it could play a major role in coping behavior acquisition in children (Bandura, Ross, & Ross, 1963). Parents intentionally and unintentionally model behavior that teaches their child to behave in certain ways, especially in the context of dealing with stress. This theory sets out to explain why people act the way that they do and specifies that direct experience and observation of models play a major role in learned behaviors (Bandura & McClelland, 1977). This theory would suggest that parents who face conflict "head-on" will have children who do the same. Conversely, parents who tend to ignore or deny the problems in their life may have children who also disengage. Many studies have looked at how parental modeling affects acquired coping styles in children, but results often show that relationship trends depend on parent and child gender (Power, 2004). The gender specificities of associations between parent and child coping cast doubt about modeling as the leading method of coping acquisition in children, but these existing studies do not completely rule out the effect parent modeling has on children.

Parental Socialization of Coping

Another major theory, socialization of coping, focuses on the messages figures such as parents send to their children on how to cope (Miller, Kliewer, Hepworth & Sandler, 1994). These instructions guide child behavioral and cognitive coping methods (Abaied & Rudolph, 2010a). As with parent modeling, it is expected that parents who suggest to their child that they should engage in problem solving when arguing with a friend will have children who are more inclined to employ that strategy. This is opposed to parents who may tell their child to ignore a bully; in doing so, they socialize their child to disengage, and the child may be more likely to continue to use that strategy in the future. Studies have shown the power of socialization of coping on children. Socialization of disengagement coping by mothers is associated with higher levels of depression in children facing interpersonal stress (Abaied & Rudolph, 2010b). Kilewer, Fearnow and Miller (1996) succeeded in measuring how both socialization and modeling affect coping behaviors in children and showed that maternal modeling and socialization of coping had an effect on active coping in daughters and avoidance coping in sons and that when combined, parental modeling and socialization had moderation effects on the coping efforts in their child. These findings suggest that both methods of coping acquisition may play a role in shaping child coping behaviors.

Present Research

Interestingly, connections between parent behaviors and coping extend in to the area of psychophysiological stress. Research by Afifi and colleagues (2011) found that parent communication skills, similar to parent modeled and socialized coping, can affect physiologic recovery from stress in children. Researchers used salivary alpha-amylase (sAA) as a measure of

physiological stress over time during an experiment and found that adolescents with parents who were more effective at communicating recovered faster from stressful discussions than those with less effective communicators as parents. These findings connect parent behaviors to the child's psychobiological stress response system, but researchers do not fully understand the processes that underlie these associations.

Previous research has shown that parents play a role in the coping skills their child acquires, and coping behaviors that children use, especially in the context of poverty-related stress, can diminish the negative effects of the stress. From these findings, this research project hypothesizes that the mechanism between parent modeling and socialization of coping and child physiological stress is the child's own learned coping skills. In order to evaluate the effect that parent coping behaviors have on child acquisition of coping, the research will evaluate the individual effects of both the theory of parent modeling and the theory of socialization of coping on child coping strategies and physiological reactivity.

Hypotheses

1) Child reports of engagement coping will correlate with the levels of engagement coping reported on the parental RSQ (Responses to Stress Questionnaire) and parental SOC (Socialization of Coping Questionnaire) and conversely, the level of child disengagement coping will correlate with disengagement coping on the parental SOC and RSQ. 2) Parents with higher than average levels of modeled and socialized disengagement will have children with significantly different cortisol reactivity as measured by the area under the curve with respect to ground (AUCg) as contrasted to children with parents who display higher than average modeled and socialized engagement (Pruessner, Kirschbaum, Meinlschmid, & Hellhammer, 2003). 3) We

hypothesize that child coping will mediate the relationship between parent coping, including modeled and socialized coping, and child reactivity to stress. 4) Consistencies between parent modeling and socialization of coping and their effects on children's coping and reactivity will also be explored.

Chapter 2 – Methods

Participants

Fourth and fifth grade students (M age = 10.61 years, S.D. = .68 years) and one of their parents were recruited from schools in a smaller metropolitan area in the northeastern U.S. (n = 93) and a large metropolitan area in western U.S. (n = 34) to participate in the study. The data from the first 34 participants were dropped from these analyses because they were administered a different parent Socialization of Coping (SOC) questionnaire from the rest of the sample. The remaining sample of 92 preadolescents was composed of 44 (47.3%) females and 49 (52.7%) males. Mothers (90.2%) tended to be the adult respondents. This study recruited from a wide socioeconomic range so children facing poverty-related stress could be compared with those who did not. Median annual household income for the sample was $71,780 (SD=$35,759, n=79) with 13 (14.1%) parents unwilling or unable to report their annual family income. 21 (22.8%) reported income indicative of an income to needs ratio below 2. The majority of the participants identified as White (96.7%, n=89)

Procedure

The overarching aim of the Preadolescent Stress and Coping (PASC) project was to demonstrate the physiologic correlates of engagement and disengagement coping. The following condensed procedure aims to highlight the specific elements of the PASC study germane to the hypotheses of this particular research study.

The targeted schools, selected because at least 50% of children were enrolled in the federal school lunch program, distributed recruitment letters to their 4^{th} and 5^{th} grade classes.

This ensured a wide range of socioeconomic strata in the sample. These recruitment letters invited caregivers to sign their children up for the study. Caregivers who agreed to have their children participate in the study completed consent, questionnaires about their own behaviors, and a request to be contacted by the researchers, giving the researchers the opportunity to schedule child appointments for the study. Researchers informed the parents that the 1.5-hour research appointments would take place at the child's elementary school between 3:00 PM and 5:30 PM. During the 90 minute visit, children completed interviews, questionnaires and the Trier Social Stress Test (TSST-C; Kirschbaum, Pirke, & Hellhammer, 1993). Within the experiment, children provided seven saliva samples across the 1.5-hours.

At the beginning of the appointment, children were paired with an experimenter and the first saliva sample was provided by the child (T1). Before the next saliva sample 40 minutes later (T2), researchers administered child pre-assessment questionnaires to give cortisol levels time to return to baseline. Following the T2 saliva collection, the Trier Social Stress Test occurred in another room. In this room, experimenters instructed the children that they had to prepare and give a speech to a group of expert judges. These judges were blind to the condition of the child. After completion of the five-minute speech, the judges asked the children to do an oral arithmetic task. At the conclusion of the stressor, the experimenter collected a third saliva sample (T3).

Following this, the children were randomly assigned to different coping condition rooms. Experimenters told all participants "I need you to wait here for a few minutes while they discuss how well you did and score your performance. I will be back to let you know how you did in a few minutes. The participants in the control condition were primed to use avoidant coping with the following statement: "While you are waiting, try not to think about how well you did or did

not do on those tasks." Those in the distraction coping room were told "While you are waiting, feel free to play around with any of the materials we have here for you: Legos, puzzles, instruments, and arts supplies. You can take home what you create." The fourth saliva sample was taken 10 minutes later (T4). 10-minute structured interviews followed to gain insight into the child's reported coping strategies that preceded the TSST-C. After collecting saliva for the fifth time (T5), experimenters debriefed the children and listened to a ten-minute audio guided progressive muscle relaxation, at which time the sixth saliva was required (T6).

Physiological Measures

HPA axis activity was assessed through salivary cortisol levels. At saliva checkpoints, experimenters asked children drool into a straw that drained into vials (Davis, Bruce, & Gunnar, 2002). Large meals, teeth brushing, and sugary drinks were prohibited before the session to and experimenters obtained medication records from parents to ensure the validity of the samples. Medical grade freezers were used to store the saliva samples, which were transported to the PSU Core Biomarker Lab in a portable freezer where the samples were assayed for cortisol using an immunosorbent assay kit.

The 40-minute questionnaire period after the T1 sample allowed for participants' cortisol levels to reach baseline. Taken after the 40-minute period, this T2 sample is considered baseline cortisol level for the experiment. The 20-minute cortisol processing delay makes T4 a representation of the peak reactivity to stress. The area under the curve with respect to ground (AUCg) from T2 to T4 represents the reactivity to the TSST (Pruessner, Kirschbaum, Meinlschmid, & Hellhammer, 2003). T5 and T6 should correspond with child coping, debrief,

and progressive muscle relaxation--therefore cortisol values from these time points are not of interest in this study with its focus on the reactivity phase of the stress response.

Questionnaires

Child Coping Questionnaire

Children complete the social stress version of the Responses to Stress Questionnaire (RSQ; Connor-Smith et al., 2000) during the 40-minute period between T1 and T2. This 57 item self-report measure evaluates the individual for 10 coping types and 9 involuntary stress response types. All together, these scales are composed into three coping factors (primary control, secondary control, disengagement) and 2 involuntary stress response factors (involuntary engagement and disengagement). For the purpose of this study, the three coping factors will be utilized in analyses. For this sample primary control coping ($\alpha = .73$), secondary control coping ($\alpha = .76$), and disengagement coping ($\alpha = .70$) showed appropriate internal validity.

Problem solving and emotional regulation and expression are components of primary control coping. Statements like “I try to think of different ways to change the problem or fix the situation” and “I let someone or something know how I feel” represent the coping types included in the primary control coping factor. Elements of secondary control include acceptance, distraction, and cognitive restructuring. Statements like “I realize that I just have to live with things the way they are” and “I think about the things that I am learning from the situation, or something good that will come from it” represent the coping types included in the secondary control coping factor. When combined, primary control and secondary control form an engagement coping composite. Engagement coping involves responses to stress that involve addressing the stressor (Connor-Smith et al., 2000). This is contrasted to the disengagement

factor involving avoidance, denial, and wishful thinking. Statements like "I deal with the problem by wishing it away" represent disengagement coping. Although they are different ways of responding to stress, engagement and disengagement are not polar opposites on a spectrum. Instead, individuals can use and represent both forms of coping in their daily life.

Parent Questionnaires

Prior to scheduling their child's appointment, parents are required to complete online questionnaires. If unable to access these questionnaires before their child's appointment, researchers provided the parents with paper copies of the questionnaires to complete while waiting for their child to complete their appointment.

Like for the children, the RSQ was also administered to the parents. The parent version of the questionnaire parallels the child RSQ, except instead of questions illuminating responses to peer related stress, the parents were asked for their responses to family stress. Like the child RSQ, engagement and disengagement coping composites were created.

Abaied and Rudolph developed the parent Socialization of Coping Questionnaire (SOC) with the intention of measuring the effects of maternal SOC on depression and externalizing psychopathology (2010b, 2011). This 36-item SOC questionnaire was used in the PASC study to understand the extent to which parents suggest and coach their children to use engagement and disengagement coping strategies in times of peer stress. The questions "reflected cognitive, affective, and behavioral responses to stress." For example, questions like "If my child gets into a physical fight with a bully at school and comes home upset, I would…" are followed by potential responses such as primary control ("Talk with my child about other ways to deal with the bully next time"), secondary control ("Tell my child that everything will be all right."),

disengagement, (“Suggest that my child stay away from the bully next time.”),emotional expression (“Encourage my child to talk about how the bully made her/him feel bad.”), punitive (“Tell my child that he or she is overreacting.”), and distressed (“Feel upset myself.”). Parents are asked to respond to each of these options on a 1 to 7-point scale (1=very unlikely to suggest this, 7=very likely to suggest this.) The areas of interest for this study are the parent responses to primary and secondary engagement and disengagement.

Covariates

Child and parent gender. Males received a code of zero while females received a code of 1.

Chapter 3 – Data Analytic Plan

Data Reduction and Preprocessing

Participants who did not fit the typical age for the study (n = 1) were excluded from the study as well as the participants from the large metropolitan area (n = 34) were excluded from analysis because they did not complete the same parent SOC questionnaire that the majority of the parent participants did. Researchers assessed the data from the remaining 92 participants.

Missing Data

The total percentages of missing data points for demographic and study variables was 2.17%. For all individual variables, percentages missing did not exceed 6.5%.

Bivariate Associations

Pearson correlations used to examine bivariate associations between parent engagement composite and disengagement RSQ and SOC scores, child physiological reactivity, and child engagement composite and disengagement RSQ. Associations were found for the sample as a whole and for separately for child genders.

Regression Analysis

To examine whether child coping mediated the relationship between parent coping styles and child physiological reactivity, regression analysis was planned. First, we evaluated whether conditions of mediation as suggested by Baron and Kenney (1986) were met. Because parental

SOC and modeling were not associated with HPA reactivity, mediation analyses were not conducted.

Data Reduction

New scales were created for engagement and disengagement coping. Z-scores were taken of parent ratio scores for primary and secondary coping within the RSQ and SOC to standardize the variables. The new standardized variables were combined to form two new composite variables, parent modeled engagement and parent socialized engagement. Parent ratio scores for RSQ and SOC disengagement were standardized in the same manner so all values could be compared.

In order to assess the effect of parent high and low engagement and disengagement RSQ and SOC scores on child cortisol AUCg, the standardized SOC and RSQ engagement composites and disengagement scores were recoded into new variables by splitting the scores at 0, the mean. High values (>0) were assigned the value 1 and low (<0) values assigned the value 0.

Comparing Groups

Independent sample t-tests were used to compare child cortisol AUCg values as divided by the 1 and 0 values of SOC and RSQ engagement composites and disengagement scores. Values including t, degrees of freedom, and two-tailed significance were collected from the t-test for Equality of Means.

AUCg

Reactivity to the TSST-C was calculated using T2, T3, and T4 cortisol values. These calculations capture the area of the trapezoid underneath a linear plot of the cortisol levels.

Chapter 4 – Results

Preliminary Results

Descriptive statistics and correlations between parent engagement composite and disengagement RSQ and SOC scores, child physiological reactivity, and child engagement composite and disengagement RSQ were analyzed with all child participants and separately by child gender. No correlations were observed between child physiological reactivity and the parent modeling and socialization of coping and child coping variables. This finding did not confirm the hypothesis that parent modeled coping and socialization of coping was predictive of child physiological reactivity to the TSST, and mediation tests were therefore not conducted.

Table 1: Bivariate correlations between parent and child coping and physiological data

Both Child Genders	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Parent Modeled Engagement (1)	---						
Parent Socialized Engagement (2)	.022	---					
Parent Modeled Disengagement (3)	-.519**	-.268*	---				
Parent Socialized Disengagement (4)	-.261*	.460**	-.031	---			
Child Engagement (5)	.071	.209*	.074	.097	---		
Child Disengagement (6)	-.008	-.284**	.110	-.154	-.549**	---	
Child Cortisol AUCg (7)	.096	.080	-.114	.137	.011	-.159	---

$p < .05$ = * , $p < .01$ = **

Bivariate Correlations for All Genders

Between Parents and Child

Child reports of engagement coping were correlated with parent socialized engagement ($r = .209$, $p < .05$) but not to parent modeled engagement ($r = .071$). Child disengagement did

inversely relate to socialized engagement (r=-.284, p<.01). Child reports of disengagement did not correlate to parent modeled coping (r=.110, p<.31) or parent socialization of coping (r=-.154, p<.14).

Inconsistencies and Consistencies in Parent Coping Variables

Parent modeled engagement was not associated with socialized engagement (r=.022, p<.84) and parent modeled disengagement was not associated with socialized disengagement (r=-.031, p<.78). Although these were not significant, other relationships between parent modeling and socialization were found. Parent modeled engagement inversely correlated to parent modeled disengagement (r=-.519, p<.001).Parent modeled disengagement inversely correlated to socialization of engagement coping (r=-.268, p<.012). Parent socialization of disengagement inversely correlated to modeled engagement (r=-.261,p<.015), but was positively associated with socialization of engagement (r=.460, p<.000).

Child Coping variables

Child reports of engagement and disengagement were inversely related (r=-.549, p<.01).

Table 2: Bivariate correlations between parent and male child coping and physiological data

Male Child Participants	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Parent Modeled Engagement (1)	---						
Parent Socialized Engagement (2)	.063	---					
Parent Modeled Disengagement (3)	-.508**	-.373*	---				
Parent Socialized Disengagement (4)	-.310*	.408**	-.017	---			
Child Engagement (5)	.044	.161	-.106	.017	---		
Child Disengagement (6)	.101	-.211	.102	-.056	-.510**	---	
Child Cortisol AUCg (7)	.022	.132	-.162	.101	.111	-.258	---

$p < .05$ = * , $p < .01$ = **

Table 3: Bivariate correlations between parent and female child coping and physiological data

Female Child Participants	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Parent Modeled Engagement (1)	---						
Parent Socialized Engagement (2)	-.016	---					
Parent Modeled Disengagement (3)	-.532**	-.180	---				
Parent Socialized Disengagement (4)	-.215	.510**	-.036	---			
Child Engagement (5)	.095	.259	.209	.189	---		
Child Disengagement (6)	-.101	-.366	.131	-.275	-.580**	---	
Child Cortisol AUCg (7)	.148	.052	-.090	.180	-.054	-.090	---

$p < .05$ = * , $p < .01$ = **

Gender Differences in Children

Differences were observed between male and female child participants. For parents of male participants, modeled disengagement was not significantly correlated to socialization of engagement ($r=-.180$, $p<.23$) in the same way that it was for females ($r=-.373$, $p<.015$) and the group as a whole. The inverse association between socialized disengagement and modeled engagement was also nonsignificant for parents of male participants ($r=-.215$, $p<.16$) but was significant for females ($r=-.310$, $p<.049$) and the group as a whole. In female children only, parent modeled disengagement negatively correlated to parent socialized engagement ($r = -.373$, $p< .015$). For female participants, they lacked the significant inverse relationship between parent

socialization of engagement and child disengagement (r=-.211, p<.17) that was observed for the entire group and for males (r=-.366, p<.011). The variables were inversely related for both boys and girls, though, highlighting a similar relationship between parent socialization and child disengagement for both male and female participants.

Table 4: Independent samples t-test comparing child cortisol reactivity between low and high subgroups of parent disengagement and engagement socialized and modeled coping

Child Cortisol Reactivity →		**N**	**Mean**	S.D.	**t**	**df**	**p**
Parent Socialized Disengagement	**Low**	39	.028	.052			
	High	49	.049	.097	-1.32	77	.19
Parent Modeled Disengagement	**Low**	44	.056	.093			
	High	40	.023	.065	1.84	82	.069+
Parent Socialized Engagement	**Low**	33	.025	.071			
	High	55	.048	.086	-1.31	86	.19
Parent Modeled Engagement	**Low**	45	.025	.074			
	High	39	.058	.089	-1.85	82	.068+

.10 > p > .05 = +

Parents as a Predictor for Cortisol

Although the mediation between parent coping behaviors and child cortisol was not confirmed, other possible relationships between parents coping and child reactivity were explored. T-tests were used to understand how cortisol reactivity AUCg varied for two groups of parents, divided by above and below the mean for engagement and disengagement modeled or socialized coping.

There was no significant difference in child cortisol AUCg with low socialized disengagement (M=.028, SD=.052) and high socialized disengagement (M=.049, SD=0.097) conditions; t (77)= -1.32, p<.19 and low (M=.025, SD=.071) and high (M=.048, SD=.087) socialized engagement; t (86)= -1.31, p<.19. Trending relations were found between low modeled disengagement (M=.056, SD=.093) and high modeled disengagement (M=.023, SD=.065) parents; t (82)=1.84, p<.069. There was also a trending difference between low (M=.025, SD=.074) and high (M=.058, SD=.089) modeled engagement; t (82)= -1.85, p<.068.

Chapter 5 - Discussion

The main aim of this study was to examine whether child coping, as learned from their parent, explained the relationship between parent coping and child physiological stress arousal. Although this hypothesis was not confirmed, the results of the study, the first of its kind, add important new information regarding the pathways by which parents may affect their child's stress physiology.

Trends in Child Stress Physiology

Although child cortisol AUCg did not correlate to the parent and child coping variables, there is a trend-level link between parent self-reported modeled coping behavior and child physiology. This was identified by comparing parents who scored high versus low for engagement and disengagement modeling. Higher cortisol AUCg was found for children whose parents were high on modeled engagement and for children with parents who modeled less disengagement, but no trending or significant associations were found between parent socialization levels and child cortisol. It is possible that the parents in the high modeled engagement group are the same as the parents in the low modeled disengagement group, especially when the strong correlation between those two variables is considered (r=0.519**), which would explain why both of these modeled strategies show trending results. Although nonsignificant, the trending relationship between child physiology and parent behaviors suggests an underlying connection between the variables. One explanation for this lack of a strong association could be that the child RSQ is not a valid measurement for in vivo coping strategies. Instead, it measures what children report they would do under certain circumstances. One would expect that child in vivo coping styles would be more highly associated with the physiological

reactivity a child experiences, rather than the coping behaviors they self-report. In other words, what the child does in the moment could have the strongest connection the cortisol reactivity they experience. The following question is unanswered and may influence future research: what behaviors are children really using when faced with a stressor? In finding the answer to this question, future researchers may be more adept at elucidating how and if those child coping behaviors are acquired from parents and then how child in vivo coping relates to cortisol reactivity.

Additionally, there is not a set range or value for a "normal" cortisol reaction, but the fact that these children, who have observed high engagement and lower levels of disengagement from their parents, have a cortisol reaction is beneficial. The cortisol reaction is a reflection of a properly functioning HPA axis (McEwen, 2000). Studies have shown that dysregulated and blunted cortisol stress reactivity and responses are indicative of early childhood stress (De Bellis et al., 1994; MacMillan et al., 2009; Elzinga et al., 2007; Gunnar & Vazquez, 2001; Heim & Nemeroff, 2001). Specifically in reference to the TSST-C, some children who face great levels of poverty-related stress may not show a reaction to the social evaluative stressor, indicative of an overtaxed and disturbed stress response system (McEwen, 2000). More engagement and less disengagement are adaptive strategies for parents to model to children, explaining the greater physiological reaction. The fact that there is an HPA axis response, as indicated by the cortisol reactivity, suggests that the system is in working order. The response from the HPA axis may be associated with the adaptive engagement coping styles a parent models.

Another important physiological factor to consider is that cortisol levels, a marker of the HPA axis activity, are heavily influenced by more than stress on an individual. Research within the last decade has suggested that pubertal development and the transition into adolescence leads

to changes in HPA activity (Gunnar et al., 2009). The age of child participants complicates the focus the research has on physiological activity, since pubertal stage was not taken into account for in this study.

Despite the lack of consideration in this study for the changes that occur to the HPA axis during puberty, stress reactivity during preadolescence is still an innate and natural occurrence. The TSST-C was developed to elicit that exact physiological reaction (Kirschbaum, Pirke, & Hellhammer, 1993). The stress system, as measured by cortisol release, makes many developmental changes before the age of five (Gunnar & Donzella, 2002). The changes seen in basal cortisol levels and changes in response to stressful stimuli allude to the development and change of the HPA axis in early life. The HPA axis has been shown to be malleable by coping styles that a person learns and uses (Wadsworth et al., in press). There is limited research to support the idea that coping methods affect "reactivity" to stress, which was the focus of this study and occurs before effortful coping begins, but the "recovery" period of the stress response that occurs from T5 and after is affected by coping styles. Those who use secondary control coping after the TSST-C will recover faster than those who disengage (Bendezú et al., 2013; Wadsworth et al., in press). These findings add to the understanding of how coping in children affects recovery from stress, but more future researchers should investigate the reactivity period of the stress response and how coping may or may not affect cortisol levels during this time.

Associations between Parent Coping Behaviors

Bivariate correlations revealed information about individual parent coping behaviors. When looking at engagement or disengagement correlations across modeling and socialization, nonsignificant associations were found. This shows that parents do not necessarily "practice

what they preach." This inconsistency was unexpected, but it can be explained. How parents choose to act in relation to family stress may not be how they would envision or suggest to their child to respond to peer stress. The RSQ and SOC are different questionnaires that measure engagement and disengagement differently. This may explain the difficulty in comparing engagement and disengagement across modeling and socialization.

Parents did show coping consistency in other ways, though. When looking at relations between disengagement and engagement, patterns in association were found. Engagement coping in parents predicted less disengagement coping in parents. In their own way, the parents that were part of the study were consistent in their coping methods by doing or suggesting less maladaptive coping, such as disengagement, while demonstrating more adaptive, engagement coping themselves. These associations suggest some consistency of parents modeling and teaching adaptive, or less maladaptive, coping strategies. This pattern was not observed between parent socialized engagement and disengagement, which were found to be positively associated. This may be due to the fact that parents are socializing their child more in general at this time in their life. Preadolescence is a time for conflict with parents and friends, emotion and mood changes, and risky behavior (Arnett, 1999) and socialization, both engagement and disengagement, may be an appropriate method of teaching children how to cope with stress.

Parents as a Predictor for Child Behavior

Associations were also discovered between parent methods of coping and child coping behaviors. Parent socialization of engagement is associated with child engagement coping which confirms the first hypothesis, but this same relationship is not observed between parent modeling of engagement and child coping. This finding suggests that engagement behaviors in children are

a reflection of parents advising those adaptive strategies, but not of the parents acting that way. Abaied and Rudolph (2010b) found similar findings and suggested that mothers in particular are important to child risk of psychopathology. The lack of association between child behaviors and parent modeling suggests that modeling has less of an effect on the coping that a child acquires during preadolescence.

It is also important to consider that the positive association between socialization of engagement and child engagement behaviors may be a reflection of the increased usage of engagement strategies in children and the increased number of opportunities for parents (and other coaches and figures) to advise that strategy. The age of the participants is important to note. As children age, they also experience stress more intensely, especially when faced with stress from not being in control of their own choices, getting in trouble, feeling left out, and having conflicts with parents and friends (Rew, Principe, & Hannah, 2012). These social stressors may naturally elicit suggestions and advice from their parent as well as increased use of engagement strategies by the child.

When split by gender, differences were observed in how parents modeled and socialized coping to their children. Male children had parents who did not show associations between modeled disengagement and socialized engagement and between modeled engagement and socialized disengagement, whereas females followed the trends seen in the general child participant sample. Females also showed some differences from the general participant population. The parent socialization of engagement was nonsignificant and inversely associated with child disengagement, unlike the significant association seen for the entire group. This points to possible differences between boys and girls at this age. Although the association between child sex and maternal socialization of coping has been found to be nonsignificant for children of

a slightly younger age (Monti, Rudolph, & Abaied, 2014), the differences observed in this study between male and female groups may be due to parent-child relationship differences that occur with age. It is difficult to ascertain if these differences were due to actual differences in gender or the small sample size. A larger sample size may help to uncover differences between male and female child participants.

Limitations

One limitation of the study is that the findings relied on one-time point correlational data. Because of this, it is impossible to infer causality between parent and child coping strategies. A longitudinal study may reveal change in child coping strategies and how they relate to parents' strategies over time, potentially increasing the associations between parent and child behavior.

Another limitation is that all of the questionnaires are self-report. What the parents and children say they do to cope with stress may not be what they actually do. However, given coping's covert nature, self-report measures of coping are currently the standard in the field. In addition, the use of multiple informants (parent and child) and multiple methods of assessment (questionnaire, biological sampling, experimental manipulation) in this study mitigate against self-reporting biases somewhat.

One other limitation is that this study did not include the family cohesion coping acquisition theory. In this study, we tested Social Learning Theory using the RSQ and tested Socialization of Coping Theory using the SOC questionnaire, but no data assessing parent-child relationships were available. Cohesive families have children who are supported and feel secure and accepted because of the parents that they have. An extension of attachment theory, the family cohesion coping acquisition theory posits that parents who make their child feel more

accepted may have children who are more likely to use adaptive coping styles and less disengagement strategies (Kliewer, 1995). This theory might be more highly associated with child coping behaviors than modeling and socialization.

Future Directions

This study took a large step in attempt to connect parent modeling and socialization of coping to child stress physiology. Although the hypothesis that child coping behaviors mediate the relationship between parent modeling and socialization and child reactivity to stress was not confirmed, the findings improve our understanding of how children acquire coping and self-regulation. There is evidence that parent socialization of coping, but not modeling, is associated with child coping behaviors and that child physiologic stress reactivity shows some connection to parent modeled coping behavior, but not to socialization. These methods of teaching coping have different effects on child behavior and physiology. Future researchers can build on these findings by deconstructing the individual contributions of socialization of coping versus parent modeling of coping on child behavior and physiology. If child coping behaviors can have an effect on stress physiology and if parent socialization can predict child behavior, future research may unlock new pathways to resilience for children at developmental risk.

Because this study has shown that parent socialization of engagement coping predicts increased child engagement coping behaviors and less disengagement, future interventions that teach children adaptive ways to cope could simultaneously teach parents how to socialize engagement coping. This may bolster adaptive and decrease maladaptive coping behaviors, thus improving child outcomes. Although based on trending results, parent modeling may play a role in child interventions that aim to augment their responses to stress. In these interventions, leaders

could reinforce to parents how important their modeled engagement and disengagement coping behaviors are to their child's physiology. To do so, intervention leaders may need to teach parents how to cope with their own stress in adaptive ways.

For future researchers to connect parent modeled and socialized behavior to child cortisol AUCg, it may be necessary to measure child coping during the TSST so that it is directly applicable to the experience that elicits the cortisol response. To do so, future researchers should study in vivo coping behaviors as is done in Wadsworth et al. (in press). Children's behaviors during the experiment may be most closely related to the proceeding cortisol reactivity.

In future efforts to replicate and extend this study, researchers should account for gender of parents and children and pubertal age. For example, it is possible that differences between those with earlier or later pubertal development could explain the lack of support for the second hypothesis. This hypothesis had stated that parents with higher than average levels of modeled and socialized disengagement will have children with significantly different cortisol reactivity as contrasted to children with parents who display higher than average modeled and socialized engagement. In addition, the association between child coping and parent coping behaviors may have been affected by family cohesion, which was not measured in this study. Future studies should include a measure of family cohesion to understand how this coping acquisition theory affects child behavior and physiology.

To understand a child and their behaviors, researchers must try to understand what underlying effects a parent has on the child's life. This research study opens up future studies to connect parenting to child coping and in the end, child physiological reactivity to stress. Future researchers must make efforts to replicate the findings from this study that suggest that different parent methods of transmission of coping behaviors, modeling and socialization, have discrete

effects on a child's physiology and behavior. Is socialization of coping really the most salient form of coping acquisition for children? If so, parent and child coping interventions may focus on teaching parents to socialize their child to use more engagement strategies and less disengagement strategies. When and how in development does modeling come into play and can the trending associations between child cortisol and high levels of parent engagement and low levels of parent disengagement be replicated? Continuation of this research in a larger sample may reinforce the finding that parent modeled behavior influences child stress physiology.

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- Study funded by the National Institute of Child Health and Development aiming to investigate the physiological changes that occur when children are faced with and coping with stress
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LEADERSHIP:

Phi Sigma Pi: Gender-Inclusive National Honor Fraternity, 2013-2016
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- *President*
  - Served as elected leader of 70+ person chapter
  - Oversaw responsibilities and organized leadership materials for 9 executive board members
- *Secretary*
  - Managed communication with 60+ members and served as a liaison between the national office and chapter
- *Fundraising Chair*
  - Created a fundraiser that became a profitable tradition to connect Penn State alumni with the fraternity
  - Organized fraternity volunteer efforts to develop, recruit and execute fundraising events
- *Recruitment Chair*
  - Worked within a team to plan and execute three weeks of recruitment events
  - Increased community-wide communication and recruited 40 potential new members

Women's Leadership Initiative, 2014-2016
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- Cultivated personal leadership philosophy and professional skills with emphasis on the health care professional field
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WORK EXPERIENCE:

Program and Outreach Intern, 2014
Cancer Support Community of Philadelphia, Gilda's Club of Warminster, Warminster, PA
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