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Emotion Socialization And Emotional Functioning In Late Adolescence And Emerging Adulthood

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EMOTION SOCIALIZATION AND EMOTIONAL FUNCTIONING IN LATE ADOLESCENCE AND EMERGING ADULTHOOD

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ABSTRACT

Parental emotion socialization has been associated with youth emotional development. However, less is known about the influences of emotion socialization on emotional functioning in late adolescence and emerging adulthood. The first manuscript examined the factor structure of The Emotions as a Child Scale (EAC) in late adolescence and emerging adulthood and evaluates its measurement invariance across gender and ethnicity. The results showed that parental responses to children's negative emotions could be categorized into supportive and unsupportive responses and the EAC demonstrated stronger measurement invariance across gender than ethnic groups. The second manuscript examined coping strategies as mediators of the relationship between parental emotion socialization and emotional functioning. It revealed that coping styles mediated associations between parental responses and youth internalizing and externalizing problems, with important differences across gender and ethnicity. The third manuscript investigated the role of parental emotion socialization in psychological and physiological reactivity to a standardized social stress task (the Trier Social Stress Test; TSST). Unsupportive parental responses to children's negative emotions were associated with blunted cortisol reactivity and greater negative emotions to a psychosocial stressor in females and African American youth, whereas supportive parental responses predicted more adaptive responses to stress in males and European American youth. Overall，

findings highlight the need to consider emotion socialization practices and goals from a gender- and culture-specific perspective.

Keywords: emotion socialization, factor structure, coping, stress reactivity, adjustment

DEDICATION

This dissertation is dedicated to my parents and my husband

ACKNOWLEDGEMENTS

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INTRODUCTION

Among various socialization agents that contribute to children's emotional development, parents exert the most substantial and continuous influence (Baker, Fenning, & Crnic, 2011). Parental emotion socialization refers to parental behaviors that influence which emotions youth experience, which emotions youth decide to express or suppress, and how youth express their emotions (Parke, 1994). It could be categorized into two types of processes: indirect and direct. Indirect methods include parental modeling and parental expectancy communications (Klimes-Dougan & Zeman, 2007). For example, children may learn how to express emotions by mimicking their parents' behaviors and by discussing emotions with their parents. Direct methods refer to contingency learning, through which children learn that certain parental behaviors are contingent upon their display of certain emotions (Garside & Klimes-Dougan, 2002; Klimes-Dougan et al., 2007). Indeed, parental responses provide feedback about the value and appropriate expression of emotions (Nelson, O'Brien, Blankson, Calkins, & Keane, 2009), and represent the most salient method of direct emotion socialization (Eisenberg et al., 1998). This direct method of emotion socialization, involving parental responses to negative emotions, is the subject of this dissertation.

In general, emotion socialization has been conceptualized with two major approaches. The first one is the emotion philosophy approach, which identifies two types of meta-emotion philosophies (Gottman, Katz, & Hooven, 1996). Parents who adopt the "emotion-coaching" philosophy value their children's negative emotions and consider

them opportunities to improve children's emotion competence and strengthen parent-child intimacy. Consequently, their children are more open to communicating their feelings and better at regulating emotions. In contrast, "emotion-dismissing" parents view negative emotions as inappropriate and harmful. As a result, their children may not develop good emotion regulation skills and may try to avoid expressing negative emotions openly.

The second approach to understanding emotion socialization is the functionalist perspective on emotions (Campos & Barrett, 1984). This theory posits that each discrete emotion has its own adaptive and regulatory functions. Despite the importance of innate factors, the social environment, and parents in particular, provide the most extensive opportunities for children to learn and modify emotional triggers and associated responses (Tomkins, 1962). In particular, parents apply differential responses to children's discrete emotions (Tomkins, 1963, 1991), which may facilitate or discourage the expression of these specific emotions over time. Under this framework, Malatesta-Magai and her colleagues (Malatesta & Wilson, 1988; Malatesta-Magai, 1991) proposed that parental emotion-specific socialization strategies influence how affective organizations develop, which is crucial to emotional well-being in children. The experience or expression of too much or too little of a particular emotion may put an individual at risk for emotion-related problems.

In prior literature, parental emotion socialization has been associated with various aspects of youth adaptive and maladaptive emotional functioning (Klimes-Dougan et al., 2007; Morelen & Thomassin, 2013; Suveg, Zeman, Flannery-Schroeder, & Cassano, 2005). For instance, supportive parental responses to children's negative emotions (e.g.,

comfort) have been linked to better emotion regulation skills and emotional competence, whereas unsupportive parental responses (e.g., punishment) predict more internalizing and externalizing problems (Denham, Bassett, & Wyatt, 2007; Dunsmore, Booker, & Ollendick, 2013; O'Neal and Magai 2005). However, the majority of studies have focused on infancy, childhood and early adolescence (Denham et al., 2000; O'Neal & Magai, 2005), so less is known about the roles of emotion socialization in late adolescence and emerging adulthood. In addition, mixed results have been produced about gender and cultural differences in parental emotion socialization effects (Brown, Craig, & Halberstadt, 2015; Friedlmeier, Corapci, & Cole, 2011; Garside & Klimes-Dougan, 2002; Leerkes, Supple, & Gudmunson, 2014; Morelen, Jacob, Suveg, Jones, & Thomassin, 2013; Root & Denham, 2010).

Therefore, the overall goal of this project is to examine the association between parental emotion socialization and emotional functioning in late adolescence and emerging adulthood, and how gender and ethnicity moderate this relationship. The first aim of the present study was to explore the factor structure of The Emotions as a Child Scale (EAC; Magai & O'Neal, 1997) in late adolescence and emerging adulthood, compare it to previously described theory-driven models, and evaluate its measurement invariance across gender and ethnicity. The EAC is a commonly used measure to assess how parents directly socialize their children's negative emotions. However, this scale has not been validated in late adolescence and emerging adulthood. In addition, the majority of studies assumed that emotion socialization would be interpreted in the same way across various subgroup populations, yet no study has specifically examined measurement invariance (Morelen & Thomassin, 2013). The findings of this first study will contribute to the relia-

bility, validity and generalization of emotion socialization assessment and also lay the foundation for the next two studies.

After validating the EAC in late adolescence and emerging adulthood, the second aim of the present study was to examine the mechanisms underlying parental emotion socialization effects on emotional functioning in this population. Although the relationships between parental emotion socialization and emotional functioning are well established (Morelen & Thomassin, 2013), the underlying mechanisms are not fully understood. One such mechanism may be the types of strategies youth adopt to cope with stress, as some coping styles promote psychological well-being, whereas others contribute to maladjustment (Endler & Parker, 1994). We hypothesized that supportive parental responses to anger, fear, and sadness would predict lower levels of aggression, anxiety and depressive symptoms, respectively; and these effects would be mediated by task-oriented and social diversion coping. In addition, we expected that unsupportive parental responses to anger, fear, and sadness would predict more aggression, anxiety and depressive symptoms, respectively; and these effects would be mediated by emotion-oriented and distraction coping. Possible gender and ethnic differences in these effects were also explored.

Finally, the majority of existing studies rely on parent or child self-report of emotional problems, with relatively few studies utilizing multi-source measures of emotional functioning during stressful situations. Appropriate regulation of stress responses is crucial to physical and psychological well-being (Cohen et al, 2000) and has been proposed to be a major contributor to gender and racial disparities in health (Oldehinkel & Bouma, 2011; Utsey et al., 2013). Thus, the third aim of the present study was to examine the role

of parental emotion socialization strategies in psychological and physiological reactivity to a standardized social stress task - the Trier Social Stress Test (TSST; Kirschbaum, Pirke, & Hellhammer, 1993). We hypothesized that more unsupportive and less supportive parental response to negative emotions would be linked with stronger physiological reactivity, lower levels of effort mobilization, and heightened negative emotional responses to acute psychosocial stress. Possible gender and ethnic differences in these effects were also explored.

In summary, the present study addressed the association between parental emotion socialization and emotional functioning across gender and ethnicity groups in late adolescence and emerging adulthood with the following three papers: Paper 1 examined the psychometric properties of the EAC in late adolescence and emerging adulthood; Paper 2 examined the mediating role of coping between emotion socialization and emotional functioning; and Paper 3 examined the linkages between emotion socialization and acute social stress responses.

PAPER 1

FACTOR STRUCTURE OF THE EMOTIONS AS A CHILD SCALE IN LATE ADOLESCENCE AND EMERGING ADULTHOOD

by

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Abstract

Although the Emotions as a Child Scale (EAC) has been widely used in research with children and adolescents, no peer-reviewed studies have examined its factor structure using factor analytic methods. Likewise, the measurement equivalence of the scale across gender and ethnicity has never been investigated. To address these gaps, this study examines the factor structure of the scale in late adolescence and emerging adulthood, compares it to previous theory-driven models, and evaluates its measurement invariance across gender and two ethnic groups. Participants were 1087 individuals participating in a larger community-based study of adolescent health (mean age = 19.35 years, *SD* = 1.19). Results of exploratory and confirmatory factor analyses suggest that a two-factor model from a shortened version of the scale (three items were eliminated from each emotion scale), involving supportive and unsupportive socialization strategies, is a good alternative model to the original five-factor structure for researchers interested in broader conceptualization of emotion socialization strategies. This two-factor model of the shortened scale showed stronger measurement invariance across gender than ethnic groups. Future studies addressing ethnic differences with this measure should compare the results with and without imposing corresponding invariance constraints on non-invariant items. Findings of this study should be replicated in other age and ethnic groups, and examine the predictive utility of the abbreviated two-factor model for emotion-related outcomes across development.

Keywords: emotion socialization, factor structure, measurement invariance, late adolescence, emerging adulthood

Introduction

Parents socialize their children's emotions by responding in certain ways to their children's emotions, expressing their own emotions, and communicating their own beliefs about emotional experience and display (Eisenberg, Cumberland, & Spinrad, 1998). Growing evidence shows that both indirect and direct processes of parental emotion socialization practices significantly influence children's emotional development (Klimes-Dougan & Zeman, 2007; O'Neal & Magai, 2005). In contrast to indirect emotion socialization strategies, such as parental modeling and parental expectancy communications (Klimes-Dougan et al., 2007), the current study focuses on the direct component of emotion socialization, that is, how parents respond to children's emotions. These responses provide feedback about the value and appropriate display of emotions (Nelson, O'Brien, Blankson, Calkins, & Keane, 2009), and represent the most influential method of direct emotion socialization (Eisenberg et al., 1998). In general, comforting parental responses to children's emotions are related to positive developmental outcomes, such as better emotion regulation skills, and more adaptive psychosocial functioning (Eisenberg et al., 1998; Morris, Silk, Steinberg, Myers, & Robinson, 2007). Conversely, punitive and dismissive parental responses are associated with more externalizing and internalizing problems (Dunsmore, Booker, & Ollendick, 2013; O'Neal and Magai 2005). Finally, parental responses to negative emotions produce more opportunities for emotion socialization, and these responses are more useful for understanding the development of psychopathology (O'Neal & Magai, 2005; Shipman & Zeman, 2001). Therefore, the current study focused on socialization of three negative emotions most associated with externalizing and internalizing problems: anger, fear, and sadness. These three emotions are included among the six basic emotions, besides happiness, surprise, and disgust (Ekman, 1992).

The Emotions as a Child Scale (EAC; Magai & O'Neal, 1997) is a commonly used measure assessing parental emotion socialization (Kehoe, Havighurst, & Harley, 2014; Sharp, Cohen, Kitzmann, & Parra, 2016; Silk et al., 2011). Across four emotions (anger, fear, sadness, and shame), the scale assesses five dimensions of emotion socialization strategies that either encourage or discourage children's emotional expressions: reward, punish, override, neglect and magnify. Despite the scale's popularity, few studies have evaluated its factor structure. Additionally, the dimensions of this scale were grouped differently across studies (e.g., Garside & Klimes-Dougan, 2002; Klimes-Dougan, Brand, & Garside, 2001), so there is a need for evaluation and comparison of alternative factor structures that would inform future research with this scale. In addition, previous research indicates that perceptions of parental emotion socialization strategies differ by gender and ethnicity (Fivush, 1998; Pinderhughes, Dodge, Bates, Pettit, & Zelli, 2000). However, no studies have evaluated the measurement invariance of the EAC across gender and ethnicity. Thus, this study examines the factor structure of the EAC, compares it to previously used factor structures, and evaluates its measurement invariance across gender and ethnicity, focusing on African American and European American youth.

The Emotions as a Child Scale

The Emotions as a Child Scale (EAC) was developed to measure how parents directly socialize their children's four negative emotions – anger, fear, sadness, and shame (Garside & Klimes-Dougan, 2002; Magai & O'Neal, 1997). Five core parental emotional socialization strategies were categorized that either encourage or discourage children's emotional expressions. The first strategy, "Reward (or Support)," consists of parental be-

haviors that comfort, empathize, and assist the child in dealing with the issue that caused the emotion (e.g., "my parent helped me deal with the issue that made me sad"). The second strategy, "Punish", occurs when parents discourage the child's emotional display, by behaviors such as expressing disapproval of the child's emotion, asking the child to stop feeling that way, and identifying the behavior as inappropriate for the child's age (e.g., "my parent let me know s/he did not approve of my being sad"). The third strategy, "Override," refers to parental behaviors that suppress the child's emotional expression by instructing the child to change the emotion or distracting him or her (e.g., "my parent told me to cheer up"). "Neglect" is the fourth strategy and refers to parental behaviors that ignore the child's emotions (e.g., "my parent did not pay attention to my sadness"). The last strategy, "Magnify," consists of parental reactions that express strong emotions that may or may not mirror the child's emotion (e.g., "my parent/caregiver got very sad"). Each subscale consists of three items, for a total of 15 items per emotion. The current study focused on the anger, fear, and sadness scales of the EAC.

The EAC can be implemented through either parent report or youth report, which differ in the wording but not content of the items. This study used the youth version, where adolescents were asked to recall how parents responded to their emotions when they were children. An example item is "When I was angry, my parent/caregiver told me to cheer up." Although the validity of recalling information from childhood may be questioned, previous studies have shown that adults' reports of childhood parenting are moderately correlated with their parents' reports, and are consistent over time (Brewin, Andrews & Gotlib, 1993; Leerkes, Supple, Su, & Cavanaugh, 2015).

This EAC is rooted in the functionalist perspective of emotions which posits that each discrete emotion has its own adaptive and regulatory functions (Campos & Barrett, 1984). For example, fear may act as a signal of danger or threat and activate appropriate coping behaviors (Steimer, 2002). Due to the emphasis on discrete emotions, one strength of the EAC is that the socialization of each negative emotion is measured separately. Indeed, measurement of emotion-specific socialization strategies has been more useful for identifying gender-typed parenting behaviors and links to psychopathology than a more global approach that combines socialization strategies across emotions (Fivush, 1998; O'Neal & Magai, 2005). Another strength of the EAC is that the measurement of emotion socialization is not limited to specific situations, but refers to parental responses to negative emotions in general. Scores on the EAC dimensions have acceptable levels of reliability and validity (Garside & Klimes-Dougan, 2002; Klimes-Dougan et al., 2001; Morris et al., 2007). For example, internal reliability of the five strategy subscale scores ranged from .66 to .94 in an adult sample (Magai & O'Neal, 1997). Test-retest reliability for the five strategy subscale scores ranged from .49 to .86 among adolescents and young adults (Klimes-Dougan et al., 2001). Acceptable validity was indicated by modest correlations between parent and youth reports (Kehoe et al., 2014).

Factor Structure of the Emotions as a Child Scale

Several theory-driven models have been proposed for the scale. In one model, the five subscales are retained as separate factors (Model 1; Figure 1). Alternatively, items from multiple subscales can be grouped in a broader factor. In one such model (Model 2; Figure 1), parental emotional socialization strategies expected to facilitate emotional expressions include items from reward and override subscales, whereas those expected to

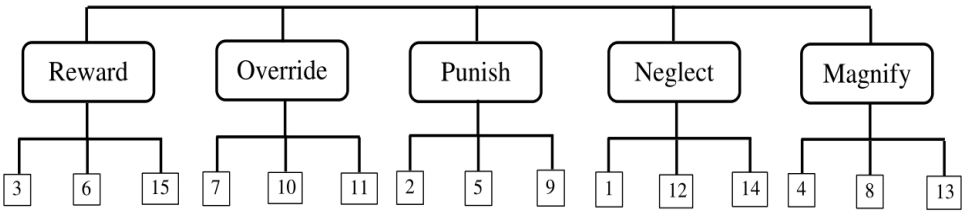
inhibit emotional expressions include items from punish, neglect and magnify subscales (O'Neal & Magai, 2005). In another theory-driven model (Model 3; Figure 1), override is included among inhibitive strategies, whereas magnify falls under facilitative strategies (Garside & Klimes-Dougan, 2002).

Surprisingly, there are no published peer-reviewed studies validating the factor structure of the EAC using factor analytic methods, with only an unpublished dissertation (Garside, 2004) and a conference poster (Klimes-Dougan et al., 2001) cited in the literature. Furthermore, these two studies have produced mixed evidence on the underlying structure of the EAC, with the major controversy focusing on the override and magnify dimensions (Klimes-Dougan et al., 2014). In support of both theory-driven models (Models 2 and 3), reward has been found to be a facilitative strategy, whereas punish and neglect have clustered together as inhibitive strategies (Garside, 2004; Klimes-Dougan et al., 2001). The unpublished factor analyses have identified override as a supportive strategy (Klimes-Dougan et al., 2001), whereas some empirical studies found associations between override and children's behavioral problems, questioning this classification (Hastings & De, 2008). Magnify is generally grouped with other supportive strategies for fear and sadness, but its role in anger is more ambiguous, perhaps because parental magnification of anger may be directed toward their child (Klimes-Dougan et al., 2001).

These inconsistencies between the theory-driven models of EAC and the two unpublished studies on factor structure of the EAC may have negative impact on the measure's validity and reliability, as well as comparability of results across studies, yet no investigation has compared previously described factor structures. In addition, previous

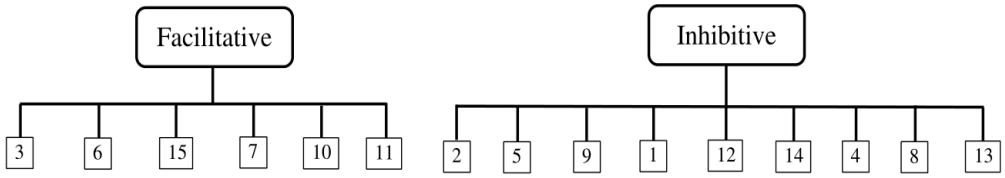
Figure 1. *Theory-driven Models for the Emotions as a Child Scale (EAC) with Loadings from CFA Models below Items*

Model 1



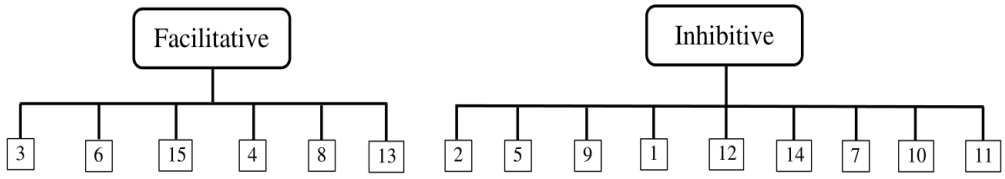
Anger:	.76	.70	.84	.80	.38	.79	.45	.54	.73	.55	.82	-.29	.70	.69	.82
Fear:	.81	.75	.79	.82	.30	.75	.43	.49	.66	.77	.80	-.44	.72	.71	.68
Sadness:	.84	.71	.83	.71	.52	.78	.54	.45	.75	.73	.79	-.48	.76	.70	.38

Model 2



Anger:	.75	.71	.83	.75	.34	.73	.34	-.11	.00	.55	.81	-.28	-.14	.04	-.02
Fear:	.81	.75	.78	.77	.22	.68	.47	-.11	.11	.77	.80	-.39	.05	.16	.00
Sadness:	.82	.71	.80	.67	.43	.66	.30	-.13	.05	.72	.79	-.44	.48	.38	.12

Model 3



Anger:	.76	.71	.84	-.14	.04	-.03	.34	-.11	.00	.54	.81	-.28	.75	.34	.74
Fear:	.82	.76	.79	.05	.16	-.00	.48	-.12	.11	.77	.80	-.39	.77	.22	.68
Sadness:	.83	.71	.82	.48	.39	.11	.31	-.13	.05	.72	.81	-.44	.68	.45	.68

studies utilizing this scale have focused mostly on infancy, childhood, and early adolescence (Denham et al., 2000; O'Neal & Magai, 2005), so less is known about the factor structure of the EAC in late adolescence and emerging adulthood. Yet, this developmental period is characterized by intense, extreme moods (Arnett, 1999, 2000) and high risk of emotional problems (Kessler et al., 1994). Late adolescent depression also predicts mental health problems in young adulthood and later in the lifespan (Cuijpers & Smit, 2004; Rao, Hammen, & Daly, 1999), making emotion socialization an important construct to study at this time. Further, given the importance of discrete emotions (Fivush, 1998; O'Neal & Magai, 2005), examining factor structure of each emotion scale separately is more informative and flexible for studies focusing on discrete emotion socialization practices.

Measurement Invariance across Gender and Ethnicity

Evidence suggests that perceptions of parental emotion responses may differ by gender and ethnicity. Generally, boys report more negative parental responses to their expressions of fear (Casey & Fuller, 1994) and sadness (Fuchs & Thelen, 1988), but experience more tolerance of expressions of anger than girls (Fivush, 1998). Previous research also indicated that boys are more likely to report punishment for their expressions of anger, fear, and sadness, whereas girls are more likely to report support for their expressions of fear (Garside & Klimes-Dougan, 2002). In addition, parents generally discuss emotions with their daughters more than with their sons and tend to discourage anger in their daughters (Klimes-Dougan et al., 2007; Zahn-Waxler, 2000). These differences in parental socialization strategies will likely be reflected in boys' and girls' differential experiences and perceptions of emotion socialization.

Ethnic differences on emotion socialization also have been suggested (Montague, Magai, Consedine, & Gillespie, 2003). Cultural context influences caregivers' beliefs and expectations about appropriate displays of emotions as well as endorsed socialization strategies (Friedlmeier, Corapci, & Cole, 2011). For instance, African American parents tend to use more physical punishment than Caucasian parents (McGroder, 2000; Pinderhughes et al., 2000). Since parental discipline is an important part of children's socialization, many researchers have speculated that the harsh discipline might contribute to greater emotion inhibition and self-isolation in African American children (Consedine & Magai, 2003; Plasky & Lorion, 1984). However, some have speculated that more stringent and harsh discipline is beneficial and adaptive within African American families, as it may better protect children in unstable and challenging environments (Pinderhughes et al., 2000). Thus, it is possible that emotion socialization strategies also vary by ethnicity, especially between African American and European American families.

Despite research suggesting gender and ethnic differences in emotion socialization, existing studies have not assessed measurement invariance across these groups. Measurement invariance assumes that the instrument measures the same constructs that can be interpreted in the same way across population subgroups (Byrne & Watkins, 2003). The different types of measurement invariance include configural, metric, scalar, and residual variance invariance (Wu, Li, & Zumbo, 2007). Previous research has demonstrated that each type of measurement invariance plays an essential albeit different role in the validity and reliability of heterogeneous group comparisons (Chen, 2008). Without the premise of measurement invariance, artifacts of measurements may obscure true group differences (Byrne & Stewart, 2006; Chen, 2008; Cotter, Evans, & Smokowski, 2015).

Given the lack of published studies examining the factor structure of the EAC, as well as no research on its factor structure in late adolescence and emerging adulthood and its measurement invariance across gender and ethnicity, the present study aims to (a) explore the factor structure of the EAC (youth-report version) in late adolescence and emerging adulthood; (b) compare the factor structure of the anger, fear, and sadness scales to previously described theory-driven factor structures; and (c) evaluate measurement invariance of the EAC across gender and ethnicity. In addition, we examined the convergent validity of the best fitting model scores with a measure of parent-child connectedness.

Method

Participants

Participants were 1087 individuals (*M* age = 19.35 years, *SD* = 1.19; range = 16-23; 58% were 16-19 years old and 42% were 20-23 years old) participating in a larger community-based study of adolescent health. Participants were recruited from fifth grade classrooms in public schools in a large city in the Southeast U.S. and followed throughout adolescence and emerging adulthood. Because perceived emotion socialization was assessed only at the last wave (Wave 4), data from previous assessments are not included in this report. Of the current participants, 50% (n = 541) were male and 50% (n = 546) were female. Approximately 61% (n = 667) of participants were African American, 36% (n = 388) were European American, and 3% (n = 32) were other ethnicities.

Procedures

All study procedures were approved by the University of Alabama at Birmingham Institutional Review Board. After providing informed consent, each participant was in-

terviewed individually by a trained interviewer using computer-assisted technology. Most participants were interviewed in person at a university research lab, but a small portion of individuals who had moved away from the local area (25%) were interviewed over the phone.

Measures

Emotions as a Child Scale (EAC; Youth report)

The EAC (Magai & O'Neal, 1997) was used to measure youth-reported parent/caregiver emotion socialization practices for anger, fear, and sadness (15 items for each emotion). Participants were asked to rate how often their parent responded to each emotion when they were children on a scale ranging from 1 (Never) to 5 (Very often). Each emotion scale includes five subscales of three items each: reward (e.g., "comforted me"), neglect (e.g., "focused on me"; reverse-coded), override (e.g., "told me to cheer up"), punish (e.g., "let me know s/he did not approve"), and magnify (e.g., "got very sad"). Higher scores reflect greater use of each socialization strategy. For the anger scale, Cronbach's alphas in the current study were .82, .58, .68, .57, and .77 for the reward, neglect, override, punish, and magnify subscale, respectively. For the fear scale, the alphas were .84, .68, .63, .50, and .75, respectively. For the sadness scale, the alphas were .83, .74, .65, .54, and .66, respectively.

Parent-child Connectedness Scale

Participants reported the quality of their relationships with their parents using a 5-item parent-child connectedness scale (Resnick et al., 1997). Sample items include, "How close do you feel to your parents?" and "Most of the time, your parents are warm and loving toward you". Responses were rated on a 5-point scale ranging from 1 (Not at all) to 5

(Very much) or from 1 (Strongly agree) to 5 (Strongly disagree). Cronbach's alpha was .81 in the current study.

Data Analyses

To increase the generalizability of the results, the data were randomly divided into two samples. Sample 1 had 547 participants and Sample 2 had 540. The two samples were equivalent in age, gender and ethnicity. Sample 1 was randomly chosen for exploratory factor analyses (EFAs), whereas Sample 2 was used for confirmatory factor analyses (CFAs) and tests of measurement invariance across gender and ethnicity.

Using SPSS 22.0, the EFAs were conducted on Sample 1 to explore the factorial structure of the measure separately for the three emotions: anger, fear, and sadness. Factorability of the items was first examined with item correlations, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO), and the Bartlett's test of sphericity. Then, EFA was conducted using principal axis factor extraction and oblique rotation. If factor correlations were less than .32, the EFA would be rerun with orthogonal rotation (Tabachnick & Fiddell, 2007). Multiple criteria were utilized to inform factor retention, including (a) eigenvalues > 1 (Kaiser, 1960), (b) the scree test (Cattell, 1966), (c) Horn's parallel analysis (HPA; Horn, 1965) and (d) Velicer's minimum average partial correlation (MAP; Velicer, 1976). Among these approaches, HPA and MAP tend to be the best criteria for determining the number of factors (Frazier & Youngstrom, 2007; Velicer, Eaton, & Fava, 2000). For a final factor solution, several items were eliminated based on low factor loadings (<.40), low communalities (≤.30), or cross-loadings across factors (>.40). Cronbach's alpha was used to examine internal consistency of the final factors.

Following the EFAs, confirmatory factor analyses (CFAs) with maximum-likelihood (ML) estimation were conducted on Sample 2 in Mplus 7.0 to compare alternative factorial structures and to test measurement invariance of the measure. First, comparisons were made among four non-nested models: the original 5-factor solution (Model 1), the two theory-driven models (Model 2 and 3), and the Model indicated by the EFAs. The factors were allowed to correlate in each model. The following indices were used to evaluate model fit: Comparative Fit Index (CFI; Bentler, 1990), root-mean-square error of approximation (RMSEA; Steiger & Lind, 1980), standardized root-mean-square residual (SRMR; Bentler, 1995), Akaike's Information Criterion (AIC; Akaike, 1973), the Bayesian Information Criterion (BIC; Schwarz, 1978), and the Sample-Size Adjusted BIC (SABIC; Sclove, 1987). Good fit was indicated by CFI $\geq$.95 and SRMR and RMSEA $\leq$ .05; acceptable fit was suggested by CFI $\geq$.90, SRMR $\leq$.10, and RMSEA $\leq$.08 (Marsh, Hau, & Wen, 2004; Schermelleh-Engel, Moosbrugger, & Müller, 2003). Lower values of AIC, BIC and SABIC indicated a better model fit (Nylund, Asparouhov, & Muthén, 2007). Convergent validity of the best fitting model scores was examined with Pearson's correlations with parent-child connectedness.

Finally, measurement invariance across gender and ethnicity (African American vs. European American) was evaluated for the final model using multiple group CFAs (Millsap & Yun-Tein, 2004). A sequence of model comparisons between the nested models were performed by constraining a set of parameters in an increasingly hierarchical order (Wu, Li, & Zumbo, 2007), testing the following: 1) Configural invariance evaluates whether the same factor model exists across groups. In this situation, the parameters are free to vary across groups. It serves as the baseline model for higher levels of invariance

to be examined. 2) Metric invariance tests whether the factor loadings of a construct are equal across groups, which shows that the strength of relations between individual items and their corresponding underlying constructs are the same across groups. It is evaluated by comparing the metric invariance model with the configural invariance model. 3) Scalar invariance specifies both intercepts and factor loadings to be equivalent across groups, which implies that no systematic response biases exist across groups. Comparison is made between the metric invariance model and the scalar invariance model. Factor means can be compared when scalar invariance is achieved. 4) Residual variance invariance is the most constrained model in which the variance of item residual is equal across groups in addition to factor loadings and intercepts. It implies that the latent construct is measured with the same degree of measurement error in both groups. Residual variance invariance is investigated by comparing the residual variance invariance model with the scalar invariance model. In addition to chi-square difference test, the following criteria recommended by Chen (2007) were applied: For testing metric invariance, a change in CFI of $\geq$ - .010, supplemented by a change in RMSEA of $\geq .015$ or a change in SRMR of $\geq .030$, would indicate non-invariance; for testing scalar and residual variance invariance, a change in CFI of $\geq$ -.010, supplemented by a change in RMSEA of $\geq .015$ or a change in SRMR of $\geq .010$, would indicate non-invariance. Partial measurement invariance was tested if full invariance was not satisfied in each step. The modification index was used to identify non-invariant items, with the large modification indices indicative of non-invariance (Bagheri, Jafari, Tashakor, Kouhpayeh, & Riazi, 2014). In this situation, the equality constraints on the parameter of the item with the largest modification index value is freed one at a time through an iterative process (Byrne, Shavelson, & Muthen, 1989).

Results

Exploratory Factor Analyses

Factorability of the 15 emotion socialization items was supported for each emotion scale by a number of correlations greater than .30, KMO values of .88 to .90 (above the recommended value of .60), and significant Bartlett's tests of sphericity ($\chi^2_{(105)}$ = 3259.77 to 3772.39, all $p < .001$).

Anger scale

The criterion of eigenvalue greater than 1 suggested the extraction of 3 factors accounting for 32.28%, 19.34%, and 7.29% of the total variance, respectively. However, the eigenvalue of the third factor (1.09) was only slightly greater than 1, making the retention of the third factor an arbitrary decision (Zwick & Velicer, 1986). The scree plot showed a significant slope change after 2 factors, indicating a two-factor solution. For the Velicer's MAP Test, it took 2 steps to get to the lowest average squared partial correlation, also suggesting 2 factors. Finally, parallel analysis showed that only the first two eigenvalues were greater than the 95th percentile eigenvalues from random data, indicating the presence of two factors. Given these results, two factors were retained.

Over several runs of the EFA, three items were eliminated because of low communalities (<.30; items 10, 14), and cross-loadings (>.40; item 2). The EFA was repeated with the remaining 12 items, yielding two factors with 7 and 5 items, respectively. Factor 1 included items from 3 dimensions: reward (items 3, 6, 15), neglect (items 1, 12), and override (items 7, 11). Therefore, the first factor was named 'supportive responses'. Factor 2 included items from the remaining 2 dimensions: punish (items 5, 9) and magnify (items 4, 8 13). Thus, the second factor was named 'unsupportive responses'. Cronbach's

alphas for the supportive and unsupportive responses subscales were .90 and .76, respectively. Overall, the two factors accounted for 58.23% of the total variance. All items had factor loadings above .55 and were free from cross-loadings. The factor loadings for the original 15-item solution and the final 12-item solution are presented in Table 1, together with eigenvalues and percentages of variance explained by each factor.

Fear scale

Eigenvalues of two factors were greater than 1, with the first factor accounting for 35.74% and the second factor for 19.71% of the total variance. In addition, the scree test, Velicer's MAP test and parallel analysis all suggested a two-factor solution. Therefore, two factors were retained.

Based on the EFA results, item 10 was dropped because of low communalities (=.30). Item 2 and 14 were dropped because of increased alpha after deletion and low correlation with the composite score of the other items (the corrected item-total correlation for item 2 and 14 were .52 and .34, respectively. The EFA was repeated with the remaining 12 items. The factorial structure of the Fear scale mirrored that of the anger scale. Thus, factor 1 was named "supportive responses" and factor 2 was named "unsupportive responses". Cronbach's alphas were .91 and .76 for the supportive and unsupportive responses subscales, respectively. Overall, the two factors accounted for 61.93% of the total variance. All items had factor loadings above .55 with no cross-loadings. The factor loadings, eigenvalues and variance explained by each factor for the original and final solutions are presented in Table 1.

Sadness scale

A three-factor solution was indicated by eigenvalues greater than one, with the

Table 1

Factor Loading Matrix, Eigenvalues and Variance Explained by Each Factor for The Original 15-item Solution and The Final Solution

Item When I was angry/fearful/sad, parent/caregiver	Anger 15 Items[a]		Anger 12 Items		Fear 15 Items		Fear 12 Items		Sadness 15 Items		Sadness 12 Items	
	I	II	I	II	I	II	I	II	I	II	I	II
1. responded to my anger/fear/sadness.	.68		.68		.81		.82		.82		.83	
3. helped me deal with the issue.	.80		.82		.85		.86		.84		.85	
6. asked me what made me angry/fear/sad.	.79		.81		.82		.82		.78		.79	
7. told me not to worry.	.75		.76		.84		.83		.74		.76	
11. told me to cheer up.	.78		.77		.78		.77		.60		.64	
12. focused on me.	.86		.86		.85		.85		.83		.84	
15. comforted me.	.79		.80		.79		.81		.81		.82	
4. got very angry/fearful/sad.		.78		.79		.70		.74		.56		.61
5. told me that I was acting younger.		.56		.56		.60		.58		.48		.51
8. expressed that s/he was very angry/fearful/sad		.72		.74		.72		.74		.66		.71
9. let me know s/he did not approve.		.71		.72		.73		.74		.71		.67
13. got very upset.		.74		.77		.76		.79		.71		.75
2. told me to stop being angry/fearful/sad.	.51				.57					.50		
10. bought me something I liked.	.44					.47						
14. did not pay attention.		.43				.50			-.65			
Eigenvalue	4.84	2.90	4.38	2.61	5.36	2.96	4.86	2.58	5.38	2.33	4.81	2.07
Explained Variance (%)	32.28	19.34	36.48	21.76	35.74	19.71	40.46	21.47	35.86	15.53	40.08	17.28

Note: Loadings < .40 omitted.

[a] For the anger scale, items 4 and10 (low communalities) were first eliminated. After a re-run of the EFA, item 2 was eliminated due to cross-loadings (loadings on factor 1 and factor 2 were .50 and .42, respectively).

first factor accounting for 35.86%, the second factor for 15.53%, and the third factor for 7.75% of the total variance. Similar to the Anger scale, the eigenvalue of the third factor (1.16) was close to 1, not providing strong support for retaining this factor. The scree test, Velicer's MAP Test and parallel analysis all suggested a two-factor solution. Given these results, a two-factor solution was adopted.

Over several runs of the EFA, item 10 was dropped because of low communalities (<.30) and low factor loading (<.40). Item 14 was dropped because of increased alpha after deletion and low correlation with the composite score of the other items (the corrected item-total correlation for item 14 were .51). Item 2 showed the lowest communalities (.32) and factor loading (.45) after the elimination of items 10 and 14. Additionally, subsequent analyses showed great increase in model fit with item 2 excluded. Considering that elimination of item 2 also contributed to the consistency of the EAC, item 2 was dropped from the final model. In the final solution, 7 and 5 items loaded on factor 1 and factor 2, respectively. The factorial structure of the Sadness scale paralleled those of the Anger and Fear scales. Thus, factor 1 was named “supportive responses” and factor 2 was named “unsupportive responses”. Cronbach’s alphas were .90 and .69 for the supportive and unsupportive responses subscales, respectively. Overall, the two factors accounted for 57.36% of the total variance. All items had factor loadings above .50 with no cross-loadings. The factor loadings, eigenvalues and variance explained by each factor for the original and final solutions are presented in Table 1.

Overall, the EFAs indicated identical 2-factor structures across anger, fear, and sadness scales: a supportive factor including reward (items 3, 6, 15), neglect (reverse-

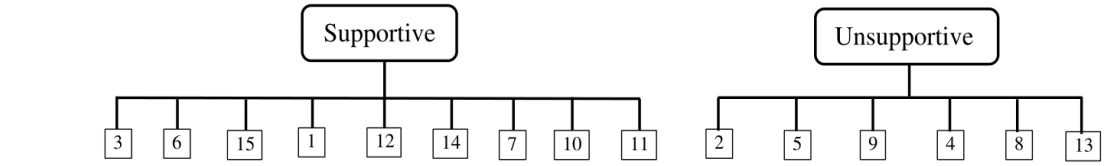
coded items - items 1, 12), and override (items 7, 11) items, and an unsupportive factor consisting of punish (items 5, 9) and magnify (items 4, 8, 13) items.

Confirmatory Factor Analyses

Results of the EFAs showed a 2-factor model (Model 4; Figure 2). However, it is not consistent with both theory-driven models (Model 2 and 3). The two reverse-coded neglect items (1 and 12) were included among supportive strategies in Model 4, whereas the neglect subscale fell under unsupportive strategies in Model 2 and 3. However, similar to Model 2, override was grouped as a supportive strategy and magnify as an unsupportive strategy in Model 4.

Figure 2. *EFA Models for the Emotions as a Child Scale (EAC) with Loadings from CFA Models below Items*

Model 4



Anger:	.75	.70	.84	.54	.81	-.28	.75	.34	.72	.33	.50	.61	.70	.69	.80
Fear:	.81	.75	.79	.77	.81	-.41	.76	.20	.66	.28	.49	.59	.70	.69	.68
Sadness:	.82	.71	.81	.73	.80	-.45	.67	.42	.65	.40	.15	.36	.72	.69	.41

Comparisons were made among the original 5-factor solution (Model 1), the two 2-factor theory-driven models (Model 2 and 3), and the 2-factor EFA solution (Model 4) using Sample 2. First, the four structures were compared using the original 15-item scale. Next, model fit indices on the abbreviated scale were also compared. The better fitting models from the 15- and 12-item versions were then compared. As shown in Table 2, the 5-factor solution (Model 1) for the abbreviated scale had the best model fit, but the model fit of the 2-factor abbreviated EFA solution (Model 4) was also adequate (sadness scale

had the lowest model fit among the three emotion scales, but was still marginally acceptable). The other 2-factor models (Model 2 and 3) had a poor fit to the data. However, the Cronbach's alphas for some subscales of the abbreviated 5-factor model were below acceptable levels (e.g., .52 to .56 for the punish subscale; Table 3). In addition, since three items were dropped from each emotion scale, there were only two items loading on most dimensions of the abbreviated 5-factor model (i.e., neglect, override, and punish). Because a minimum of three items are recommended for each factor of a multidimensional scale (Raubenheimer, 2004), the second best fitting model (the abbreviated Model 4) was retained for further analyses.

Convergent Validity

Using the abbreviated Model 4, perceived supportive parental responses across all three emotions were moderately correlated with parent-child connectedness (r = .37 to .47, p<.001). In addition, perceived unsupportive parental responses to anger were negatively correlated with parent-child connectedness (r = -.15, p<.001), although perceived unsupportive responses to fear and sadness were not related to parent-child connectedness (r = .00 and -.04, p>.20). These results support the convergent validity of the Model 4 scale scores, particularly the supportive parental responses scale scores.

Measurement Invariance

Gender and ethnicity measurement invariance were evaluated for the abbreviated Model 4 for the anger, fear, and sadness scales using Sample 2.

Gender Invariance

As shown in Table 4, the configural invariance model fit the data well for the anger, fear, and sadness scales. The fit index values supported full metric invariance (equal

Table 2

CFA Model Fit Statistics for the Emotions as a Child Scale (EAC)

Model Fit Index	15-item				12-item			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Anger								
CFI	.90	.64	.64	.87	.97	.68	.68	.95
SRMR	.09	.14	.14	.10	.05	.15	.15	.05
RMSEA	.09	.15	.15	.09	.06	.17	.17	.07
χ^2	399.732	1213.45	1212.57	490.66	132.28	915.09	915.55	185.26
df	80	89	89	89	44	53	53	53
AIC	21152.64	21948.36	21947.47	21225.57	16526.87	17291.68	17292.14	16561.85
BIC	21388.67	22145.77	22144.89	21422.98	16724.28	17450.47	17450.93	16720.64
Sample-Size Adjusted BIC	21214.08	21999.75	21998.87	21276.96	16578.26	17333.02	17333.48	16603.19
Fear								
CFI	.84	.66	.66	.80	.95	.72	.72	.92
SRMR	.12	.15	.15	.13	.05	.14	.14	.06
RMSEA	.12	.16	.16	.12	.08	.17	.17	.09
χ^2	649.95	1272.11	1271.90	779.74	196.74	853.00	852.69	271.21
df	80	89	89	89	44	53	53	53
AIC	21052.58	21656.74	21656.53	21164.37	16317.50	16955.76	16955.45	16373.97
BIC	21288.51	21854.06	21853.86	21361.70	16514.83	17114.48	17114.17	16532.69
Sample-Size Adjusted BIC	21113.92	21708.04	21707.84	21215.68	16368.81	16997.03	16996.72	16415.24

Sadness[+]								
CFI	.88	.74	.74	.80	.95	.81	.81	.88
SRMR	.09	.11	.11	.11	.06	.09	.09	.09
RMSEA	.09	.13	.13	.11	.08	.13	.13	.10
χ^2	449.65	908.97	895.41	716.62	181.63	551.90	540.32	359.87
df	80	89	89	89	44	53	53	53
AIC	21150.73	21592.04	21578.48	21399.69	16645.46	16997.73	16986.15	16752.98
BIC	21386.66	21789.37	21775.81	21597.02	16842.78	17156.45	17144.87	16911.70
Sample-Size Adjusted BIC	21212.07	21643.35	21629.79	21451.00	16696.76	17039.00	17027.42	16794.25

[+] Supportive responses with unsupportive responses were moderately correlated in Model 4 for the 12-item scale.

Table 3

Cronbach's Alphas for Subscales of the Abbreviated 5-factor Model (Model 1) and Abbreviated 2-factor Model (Model 4)

	Abbreviated Model 1					Abbreviated Model 4	
	Reward	Neglect	Override	Punish	Magnify	Supportive	Unsupportive
Anger	.81	.62	.77	.56	.78	.90	.76
Fear	.83	.76	.76	.52	.74	.91	.76
Sadness	.83	.72	.71	.56	.62	.90	.69

Note: Model 1 subscales include 3 items for Reward and Magnify, and 2 items for Neglect, Override, and Punish.

factor loadings) in all three emotion scales across gender: ΔCFI < .01, ΔRMSEA < .01, and ΔSRMR < .02. These results imply that the associations of all items with their corresponding latent construct (supportive or unsupportive emotion socialization strategies) are equivalent across gender. Next, full scalar invariance (equal intercepts and factor loadings) was supported by values of ΔCFI, ΔRMSEA and ΔSRMR less than .01. Finally, the residual variance invariance model (equal residual variance, intercepts, and factor loadings) did not result in a significant loss of model fit over the scalar invariance model in all three emotion scales: ΔCFI, ΔRMSEA, and ΔSRMR were all less than .01 for anger and sadness scale; ΔCFI = .01 for fear scale, but ΔRMSEA and ΔSRMR were both less than .01. In addition, tests of mean differences indicated lower endorsement of unsupportive responses to anger and higher endorsement of supportive responses to fear in females compared to males (Table 5).

Ethnicity Invariance

Since 97.1% of current participants were African American and European American, measurement invariance across ethnicity was conducted in these two subgroups only. As shown in Table 6, the configural fit indices indicated an acceptable fit for all three emotion scales. Metric invariance (equal factor loadings) was fully supported for the anger and fear scales, with ΔCFI < .01, ΔRMSEA < .01, and ΔSRMR < .02. However, ΔCFI > .01 for the sadness scale implied that full metric invariance was not present. Modification indices indicated that item 7 (told me not to worry) had factor loadings that varied across groups. After allowing loadings of item 7 to vary across groups, partial metric invariance of the sadness scale was met: CFI < .01, ΔRMSEA < .01, and ΔSRMR < .02. Item 7 had a higher loading on the sadness supportive scale for African American

Table 4

Tests of Measurement Invariance of the Emotions as a Child Scale across Gender

Invariance Test	χ^2 (*df*)	χ^2/df	CFI (ΔCFI)	RMSEA (ΔRMSEA)	SRMR (ΔSRMR)	Δ χ^2 (Δ*df*)	*p*
Anger scale							
Configural invariance	237.638 (106)	2.24	.951 (—)	.068 (—)	.058 (—)	—	—
Full metric invariance	269.104 (116)	2.32	.943 (-.008)	.070 (.002)	.076 (.018)	31.47 (10)	<.001
Full scalar invariance	283.514 (126)	2.25	.942 (-.001)	.068 (-.002)	.076 (.000)	14.41 (10)	.16
Full residual variance invariance	312.209 (138)	2.26	.935 (-.007)	.068 (-.000)	.078 (.002)	28.70 (12)	<.01
Fear scale							
Configural invariance	306.503 (106)	2.89	.931 (—)	.084 (—)	.065 (—)	—	—
Full metric invariance	327.279 (116)	2.82	.927 (-.004)	.082 (-.002)	.074 (.009)	20.78 (10)	<.05
Full scalar invariance	338.294 (126)	2.68	.927 (.000)	.079 (-.003)	.073 (-.001)	11.02 (10)	.36
Full residual variance invariance	376.318 (138)	2.73	.917 (-.010)	.080 (.001)	.079 (.006)	38.02 (12)	<.001
Sadness scale[+]							
Configural invariance	443.178 (106)	4.18	.869 (—)	.109 (—)	.087 (—)	—	—
Full metric invariance	454.746 (116)	3.92	.869 (.000)	.104 (-.005)	.094 (.007)	11.57 (10)	.32
Full scalar invariance	474.669 (126)	3.77	.865 (-.004)	.101 (-.003)	.095 (.001)	19.92 (10)	<.05
Full residual variance invariance	503.773 (138)	3.65	.858 (-.007)	.099 (-.002)	.103 (.008)	29.10 (12)	<.01

[+] Supportive responses with unsupportive responses were moderately correlated at different levels of measurement invariance.

Table 5

Latent Mean Comparisons across Gender and Ethnicity

		Female[1]	African Ameri-can[1,2]	African Ameri-can[1,3]
Anger	Supportive	.14	-.09	-.05
	Unsupportive	-.29**	.07	.07
Fear	Supportive	.20*	-.23*	-.20*
	Unsupportive	-.19	.50***	.50***
Sadness	Supportive	.14	-.18	-.12
	Unsupportive	.03	.28*	.36**

Note: [1] Male and European American scores were fixed to 0
[2] No constraints on non-invariant items
[3] Constraints on non-invariant items
*p<.05, **p<.01, ***p<.001.

individuals (.65) compared to European Americans (.40).

The scalar invariance model (equal intercepts and factor loadings) resulted in a noticeable loss of fit over the metric invariance model for all three emotion scales: ΔCFI ≥ .01. Using modification indices as a guide, item 11 (told me to cheer up) on all three emotion scales and items 7 (not to worry) and 9 (no approval of the emotion) of the sadness scale were relaxed from the equality constraints of intercepts, resulting in partial scalar invariance for the three emotion scales: ΔCFI, ΔRMSEA, and ΔSRMR were all less than .01. Non-invariant intercepts of the above items indicated that there were systematic measurement biases that influenced the way participants responded to items across groups. Specifically, African American individuals reported higher levels of parental responses of "cheer up" to anger, fear, and sadness. They also reported higher level of parental responses of "not to worry" and "no approval of my being sad" to sadness.

Finally, invariance of partial residual variance was met by relaxing the equality of the residual variance of most items except for items 5 (I acted younger than my age), 6 (asked me the reason), 7 (not to worry), 8 (parent expressed anger), 12 (focused on me), and 15 (comforted me) of the anger scale; items 5 (I acted younger than my age), 6 (asked me the reason), 7 (not to worry), and 9 (no approval of my fear) of the fear scale; and items 1 (responded to my sadness), 4 (parent got very sad), 8 (parent expressed sadness), and 15 (comforted me) of the sadness scale.

Specifically, European Americans had lower measurement error for all the non-invariant items than African Americans, except for items 7 (not to worry) of sadness scale and 11 (cheer up) across the three emotion scales (see Table 7). In addition, since different levels of partial measurement invariance existed for all three emotion scales,

latent means were further compared both with and without imposing invariance constraints on non-invariant items across ethnic groups. As shown in Table 5, the same pattern of results was obtained under both conditions. Specifically, African Americans and European Americans did not differ in endorsement of anger socialization strategies, but African Americans reported lower levels of supportive responses to fear and higher levels of unsupportive responses to fear and sadness.

Discussion

This is the first study examining the factor structure of the EAC in late adolescence and emerging adulthood, comparing it to previously described factor structures, and evaluating measurement invariance of the scale across gender and two ethnicity groups (African American vs. European American). The results suggest that the abbreviated 2-factor EFA solution (supportive and unsupportive socialization strategies; Model 4 in Figure 2) is a good alternative model for late adolescence and emerging adulthood to the original 5-factor structure which had poor internal consistency for most subscales. Measurement invariance of this 2-factor EFA solution (Model 4) over gender showed full measurement invariance for all three emotion scales. Different levels of partial measurement invariance were observed for the three emotion scales across ethnicity.

Consistent with previous theory-driven models, results of factor analyses confirmed a 2-factor structure of the EAC. One major difference of the current model (Model 4) from previous theory-driven 2-factor models (Models 2 and 3) is that items from theneglect dimension factored under supportive strategy in Model 4. Specifically, this occurred for the two reverse-coded neglect items (e.g., responded to my anger; focused

Table 6

Tests of Measurement Invariance of the Emotions as a Child Scale across Ethnicity

Invariance Test	$\chi^2(df)$	χ^2/df	CFI(ΔCFI)	RMSEA (ΔRMSEA)	SRMR (ΔSRMR)	$\Delta\chi^2(\Delta df)$	*p*
Anger scale[++]							
Configural invariance	264.498(106)	2.50	.942(—)	.076(—)	.065(—)	—	—
Full metric invariance	294.906(116)	2.54	.934(-.008)	.077(.001)	.082(.017)	30.41(10)	<.001
Full scalar invariance	332.979(126)	2.64	.924(-.010)	.079(.002)	.080(-.002)	38.07(10)	<.001
Partial scalar invariance	320.460(125)	2.56	.928(-.006)	.077(.000)	.083(.001)	25.55(9)	<.01
Partial residual variance invariance	347.505(131)	2.65	.921(-.007)	.079(.002)	.091(.008)	27.05(6)	<.001
Fear scale							
Configural invariance	340.321(106)	3.21	.920(—)	.092(—)	.071(—)	—	—
Full metric invariance	365.780(116)	3.15	.915(-.005)	.091(-.001)	.085(.014)	25.46(10)	<.01
Full scalar invariance	408.737(126)	3.24	.904(-.011)	.093(.002)	.081(-.004)	42.96(10)	<.001
Partial scalar invariance	390.034(125)	3.12	.910(-.005)	.090(-.001)	.083(-.002)	24.25(9)	<.01
Partial residual variance invariance	414.238(129)	3.21	.903(-.007)	.092(.002)	.095(.012)	24.20(4)	<.001
Sadness scale[+]							
Configural invariance	374.817(106)	3.54	.895(—)	.098(—)	.084(—)	—	—
Full metric invariance	413.076(116)	3.56	.884(-.011)	.099(.001)	.103(.019)	38.26(10)	<.001
Partial metric invariance	400.057(115)	3.48	.888(-.007)	.097(-.001)	0.095(.011)	25.24(9)	<.01
Partial scalar invariance	418.421(122)	3.43	.884(-.004)	.096(-.001)	.096(.001)	18.36(7)	<.05
Partial residual variance invariance	435.702(126)	3.46	.879(-.005)	.097(.001)	.101(.005)	17.28(4)	<.01

[+] Supportive responses with unsupportive responses were moderately correlated at different levels of measurement invariance.

[++] Supportive responses with unsupportive responses were negatively correlated at different levels of measurement invariance for European American group.

Table 7

Residual Variance of Non-invariant Items across Ethnicity

		European American	African American
Anger	A1 (responded to my anger)	.47	.83
	A3 (helped me)	.34	.55
	A4 (got angry)	.37	.76
	A9 (not approve of my anger)	.66	1.12
	A11 (cheer up)	**.63**	.42
	A13 (got upset)	.26	.50
Fear	F1 (responded to my fear)	.27	.59
	F3 (helped me)	.25	.44
	F4 (got fearful)	.25	.63
	F8 (expressed fearful)	.28	.72
	F11 (cheer up)	**.75**	.50
	F12 (focused on me)	.21	.45
	F13 (got upset)	.38	.71
	F15 (comforted me)	.24	.47
Sadness	S3 (helped me)	.23	.44
	S5 (I acted younger)	.87	1.42
	S6 (asked what made me sad)	.36	.61
	S7 (told me not to worry)	**.56**	.42
	S9 (not approve of my sadness)	.72	1.40
	S11 (cheer up)	**.64**	.56
	S12 (focused on me)	.19	.51
	S13 (got upset)	.61	1.22

Note: Bolded items have greater residual variance in European American individuals; all other items have greater residual variance in African American individuals.

on me), so it is not surprising that these items clustered together with other supportive strategies. By contrast, the third neglect item (did not pay attention) was dropped because of low communalities and low factor loading (anger scale) or low correlation with the composite score of the other items (fear and sadness scales), suggesting that the neglect subscale may be problematic due to the combination of reverse-coded and non-reverse-coded items (as also indicated by low alphas of .58 to .74). Overall, elimination of this and two other items greatly improved the fit of Model 4, as well as the original 5-factor model (Model 1). Further, convergent validity of Model 4 scale scores was acceptable. In general, our findings suggest that perceived emotion socialization can be divided into two separate types of strategies that occur across all three emotions: supportive and unsupportive socialization strategies.

Measurement invariance analyses provide some useful insights into the measurement properties of the EAC. Full measurement invariance across gender was supported for all three emotion scales, suggesting that results from the three emotion scales can be interpreted in the same way for males and females. In addition, comparisons of latent means revealed lower endorsement of unsupportive responses to anger and higher endorsement of supportive responses to fear in females compared to males, contrary to some prior research indicating that females are more discouraged from expressing anger than males (Klimes-Dougan et al., 2007). It is possible that males experience more tolerance of anger expressions than females, but because they display anger more frequently or more overtly, they report unsupportive parental responses more frequently than females (Garside and Klimes-Dougan 2002). Overall, the evidence suggests strong measurement invariance for the EAC across gender.

Analyses across ethnicity showed that different levels of partial measurement invariance existed for all three emotion scales. The sadness scale showed partial metric invariance with item 7 (told me not to worry) being non-invariant. Factor loading differences indicated that this item was more related to the "supportive" dimension in African American than in European American participants. This discrepancy may be explained by greater use of harsh discipline in African American families (Pinderhughes et al., 2000), which may make "override" parental responses perceived as more supportive compared to European American families. In addition, all three emotion scales were observed to be partial scalar invariant. It is worth noticing that item 7 (told me not to worry) of the sadness scale and item 11 (told me to cheer up) of the three emotion scales demonstrated intercept non-invariance. Both items were from the "override" dimension of the original 5-factor Model. Specifically, African American participants tended to report higher levels of parental responses of both "do not worry" and "cheer up", as well as "did not approve" of sadness. The scores on most of these items also had lower measurement error among the African American participants. Together with the partial metric invariance of the "do not worry" item, these differences suggest that African American parents may be more likely to utilize override socialization responses and do so more consistently. Given the paucity of research on emotion socialization in African American culture (Cole & Tan, 2007), it would be interesting to directly examine the role of override parental responses in African American adolescent's emotion socialization processes in future research. In addition, it would be important to replicate the present invariance results, as the theoretical significance of some items' lack of invariance was not clear.

Further comparisons of latent means provide meaningful information. In this study, African Americans reported lower levels of supportive responses to fear and higher levels of unsupportive responses to fear and sadness; however, they did not differ in endorsement of anger socialization strategies. Although studies of ethnic differences in emotion socialization are rare (Nelson, Leerkes, O'Brien, Calkins, & Marcovitch, 2012), our findings demonstrated the importance of considering emotion socialization practices and goals within cultural context (Cole & Tan, 2007; Halberstadt et al., 2013). For instance, one study found that the display of submissive negative emotions, especially fear and sadness, is viewed as less acceptable in African American families, and elicits more negative consequences than in European American families (Nelson et al., 2012). This is consistent with our results suggesting less supportive and more unsupportive parental responses to fear and sadness reported by African American youth. It is possible that African American parents' attempts to suppress their children's submissive negative emotions are adaptive, for instance, by helping to prepare the children for dealing with unstable and chronically stressful environments (Leerkes et al., 2015). Indeed, unsupportive emotion socialization was associated with more depressive symptoms in European American but not for African American children and women (Leerkes et al., 2015; Vendlinski, Silk, Shaw, & Lane, 2006), further indicating that these culturally specific strategies may be adaptive. Interestingly, unsupportive emotion socialization was related to elevated anger in both ethnic groups (Leerkes et al., 2015), which is consistent with our results of no ethnic differences in the levels of supportive and unsupportive emotion socialization for anger. Future studies should provide more in-depth examination of parental beliefs and

responses to different types of negative emotions, as well as the adaptability of each emotion specific socialization strategy in different cultural contexts.

The current study has important implications for future emotion socialization research. The results demonstrate that the EAC is an appropriate measure to make comparisons across gender, at least in late adolescence and emerging adulthood. In addition, despite greater extent of measurement variance, the EAC appears to be a useful measure for studying ethnic differences in emotion socialization. It should be noted that guidelines for dealing with non-invariant items remain unresolved in the literature (Cotter, Evans, & Smokowski, 2015). Chen (2008) recommends comparing the groups of interest with and without imposing corresponding invariance constraints on non-invariant items. If the differences are small, it may be appropriate to make group comparisons. In the current study, the results for latent mean comparisons yielded similar results when all the non-invariant items were constrained to be equal across ethnic groups (Table 6). To account for violations of measurement invariance, future studies addressing ethnic differences with this measure should compare the results after allowing non-invariant items to vary and after fixing all items to be equal. Further, the present study found moderate correlations between perceived supportive and unsupportive parental responses in the 2-factor EFA model. This suggests that there may be common underlying constructs between the two types of perceived parental responses that need further examination. Finally, future studies may wish to utilize the abbreviated 2-factor EFA structure of the EAC (Model 4), which was the best fitting and reliable model in this study.

Findings of this study should be considered in light of its limitations. First, participants were recruited from one metropolitan area in the Southeast U.S, so the results may

not generalize to other geographic areas or cultures. Especially, the average parental education level was high in the current sample, indicating that the sample may not be representative of various socioeconomic backgrounds. Second, the model fit of the sadness scale was not as good as the anger and fear scales, thus more research is warranted for further examination of the factor structure of the sadness scale. Third, factor analyses of the EAC resulted in the removal of three items across the three emotion scales. Future research should validate the better performance of this shortened scale and examine the test-retest reliability of the revised measure. Fourth, we only evaluated measurement invariance of the EAC across two ethnicity groups (European American vs. African American). Future studies should examine the measure's invariance for other ethnic groups (e.g., Hispanic/Latino). Fifth, the current study used youth report which relies heavily on the recall of childhood information, whose accuracy might be influenced by the linguistic and cognitive skills of the participants (Klimes-Dougan & Zeman, 2007). Finally, the study was conducted in a cohort that is older than the cohorts used in prior studies (Denham et al., 2000; O'Neal & Magai, 2005). Therefore, the abbreviated 2-factor EFA structure may be an outcome of developmental changes. For example, it is possible that late adolescents and emerging adults' memory becomes more homogenized over time relative to the younger samples in prior research. It is also possible that late adolescents and emerging adults tend to report parenting in a more generalized way. However, there were few differences in emotion socialization strategies reported by late adolescents (ages 16-19) and emerging adults (ages 20-23) in this sample – the two groups only differed on unsupportive responses to anger, which were slightly lower in the younger group ($M=12.06$ vs. 12.63, $t(1085)=2.29$, $p=.02$). Nevertheless, future research should examine

measurement invariance of the 2-factor EFA structure across various developmental periods.

Despite these limitations, this study adds to the literature by exploring the factor structure of the EAC and comparing it to previously described factor structures. The two-factor EFA model from an abbreviated version of the scale, involving supportive and unsupportive socialization strategies, is a good alternative model to the original five-factor structure for researchers interested in broader conceptualization of emotion socialization strategies. Our findings are also noteworthy in evaluating measurement invariance of the EAC across gender and ethnicity, which has been understudied in prior research. Although the non-invariant items need further evaluation in future research, the EAC is well suited for studying gender and ethnic differences in emotion socialization. Future research should replicate these results in other age and ethnic groups, and examine the predictive utility of the abbreviated two-factor model for emotion-related outcomes across development.

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PAPER 2

EMOTION SOCIALIZATION AND EMOTIONAL FUNCTIONING IN LATE ADOLESCENCE AND EMERGING ADULTHOOD: COPING STYLES AS MEDIATORS

by

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Abstract

Although parental emotion socialization practices are well-documented predictors of children's and adolescents' emotional problems, the mechanisms through which they contribute to emotional functioning are not fully understood. The aim of this study was to examine coping strategies as mediators of the relationship between parental emotion socialization and emotional functioning in late adolescence and emerging adulthood, and whether these relationships varied by gender and ethnicity. Participants were 1,087 individuals (mean age = 19.35 years; 50% male; 61% African American, 36% European American) who reported on parental emotional socialization of sadness, fear, and anger; their corresponding emotional functioning (depressive and anxiety symptoms; aggression); and coping strategies. Parental supportive responses to sadness, fear, and anger were associated with lower reports of depression, anxiety, and aggression, whereas parental unsupportive responses were related to higher levels of these problem behaviors. Greater emotion-oriented coping mediated the effects of unsupportive parental responses to all three emotions, as well as supportive responses to sadness. Distraction coping mediated the effects of unsupportive responses to anger and sadness, as well as supportive responses to anger. Finally, task-oriented coping mediated the effect of supportive responses to fear. These relationships were further moderated by gender and ethnicity. The findings suggest that parental emotion socialization may contribute to emotional functioning by fostering specific coping strategies, with important differences across gender and ethnic subgroups of youth.

Keywords: emotion socialization, coping, aggression, anxiety, depression, late adolescence, emerging adulthood

Introduction

Parental responses to emotional expressions, particularly to negative emotions, represent a direct form of emotion socialization and have profound influence on children's emotional functioning (O'Neal and Magai 2005). Existing evidence shows that negative parental responses contribute to poor socioemotional outcomes, whereas positive parental reactions are associated with adaptive emotional functioning (Dunsmore et al. 2013). Although most studies on emotion socialization focus on young children, limited research with older children and adolescents concurs that negative parental emotion socialization practices are linked to internalizing and externalizing problems (Dunsmore et al. 2016). For example, mothers' negative responses to adolescents' aggressive and positive behaviors during mother-adolescent interactions predicted the onset of major depressive disorder six years later (Schwartz et al. 2014). Additionally, parents of depressed adolescents provide fewer supportive and more unsupportive responses to sadness and anger than parents of non-depressed adolescents (Shortt et al. 2016). Finally, invalidating parental responses (e.g., neglect) to negative emotions predicted adolescent externalizing symptoms (e.g., aggression) (Buckholdt et al. 2014).

The socialization of negative emotions is typically studied as a global construct, assuming that parents respond in the same way to different emotions (O'Neal and Magai 2005). However, some studies suggest that parents respond in different ways to different emotions, and these emotion-specific responses are more useful for understanding the development of psychopathology (O'Neal and Magai 2005). Indeed, most forms of psychopathology are tied to specific emotions (Garside and Klimes-Dougan 2002). For example, anger, fear, and sadness are typically associated with aggression, anxiety, and de-

pression, respectively (Byrne 2000). Thus, it is important to understand the socialization of specific emotions and how it relates to specific forms of psychopathology. Yet, the links between emotion-specific socialization strategies and emotional functioning have not been systematically investigated (Shortt et al. 2016). Thus, this study examined the links between emotion socialization specific to three emotions (anger, fear, sadness) and related forms of psychopathology (aggression, anxiety, depression, respectively).

Coping as a Mediator between Emotion Socialization and Emotional Functioning

Emotion socialization may influence emotion functioning through multiple mechanisms. Identifying these mechanisms, or mediators, is important for theoretical and intervention development (MacKinnon 2000). Several mediators have been identified, such as children's emotion regulation (Buckholdt et al. 2009), arousal level (Cummings and Davies 1994), emotional expressivity (Eisenberg et al. 1998), and attachment styles (Magai et al. 2004). However, these mediators mostly involve children's emotional bonds with caregivers, whereas less is known about the underlying cognitive and behavioral processes.

One such mechanism might be coping, which encompasses both cognitive and behavioral strategies used by individuals to regulate emotion, cognition, behavior, physiology, and the environment in response to negative events (Tamres et al. 2002). Three basic dimensions of coping responses include task-oriented, emotion-oriented, and avoidant coping (Endler and Parker 1990). Task-oriented coping refers to active behaviors and thoughts that deal directly with the stressor, such as scheduling time better. Emotion-oriented coping involves self-preoccupation, fantasizing, and indulging in emotional responses to stress, such as blaming oneself. The third strategy, avoidant coping, refers to

behaviors designed to escape the stressful situation, through social diversion or distraction. For instance, visiting a friend represents social diversion coping, whereas non-social activities, such as window shopping, would qualify as distraction coping (Endler and Parker 1994). In general, task-oriented coping and social diversion are considered adaptive, whereas emotion-oriented coping is considered maladaptive (Endler and Johnson 2001). Findings for distraction coping are mixed. Some research indicates that distraction coping is associated with poorer adjustment (Halberstadt et al. 2008), but others suggest it is a protective factor, especially in uncontrollable situations (Dashora et al. 2011).

Emotion Socialization and Coping

Multiple studies support the link between parental emotion socialization strategies and children's coping with stress. Positive parental responses to children's emotions are related to better emotional and behavioral regulation capacities (Katz et al. 2012) and more socially appropriate behaviors (Eisenberg et al. 2000), that may promote more effective coping (Compas et al. 2001). On the contrary, children who repeatedly receive negative parental responses are more likely to experience heightened physical and emotional arousal in stressful contexts (Buck 1984), which may interfere with their efforts to cope with stress (Eisenberg et al. 1996).

Parental emotion socialization is found associated with how children deal with stress (Eisenberg et al. 1998). Maternal punitive and overriding responses have been linked to more distraction coping and less task-oriented coping and social diversion in elementary school children (Eisenberg et al. 1996). Positive parental responses, such as comforting, have been positively associated with task-oriented coping and social diversion (Eisenberg et al. 1998). In addition, parents' beliefs that children's emotions are val-

uable are associated with children's task-oriented and social diversion coping, whereas parents' beliefs that children's emotions are dangerous are associated with distraction coping (Halberstadt et al. 2008).

Coping and Emotional Functioning

Coping plays a key role in health and adjustment (Lazarus 1993). Based on the cognitive appraisal theory (Lazarus and Folkman 1991), coping encompasses processes of continuous cognitive appraisals and reappraisals of the stressful context. The type of coping chosen is largely dependent on individuals' appraisal of the situation's changeability. When the situation is viewed as remediable, task-oriented coping is more likely to be utilized, whereas emotion-oriented and avoidant coping may be preferred when the situation is believed to be unalterable (Zeidner and Saklofske 1996). The chosen coping strategy then mediates the effects of the stressor on psychological outcomes (Lazarus and Folkman 1984). Emotion-oriented and avoidant coping can help maintain emotional balance and reduce stress in the short term (Zeidner and Saklofske 1996). However, task-oriented coping is more adaptive in the long run as it helps individuals deal actively with the stressor (Penley et al. 2002). If few task-oriented strategies are utilized, negative emotions are more likely to accumulate as a stressor approaches or endures. This may cause feelings of being overwhelmed and helplessness, which may cause emotional problems, such as depression and anxiety (Edwards and Holden 2001). In summary, children who receive unsupportive parental responses to emotions may gradually develop maladaptive coping styles, causing increased internalizing and externalizing problems. By contrast, supportive parental responses to emotions may promote more adaptive coping strategies that will translate into better psychological adjustment. Therefore, this study investigated

whether coping mediates the associations between socialization of specific emotions and related psychopathology.

The Moderating Role of Gender and Ethnicity

The links among emotion socialization, coping, and emotional functioning may vary with the gender of the child. Parents usually use different emotion socialization strategies with boys and girls (Klimes-Dougan et al. 2007), which might lead to different perceptions and consequences of parental responses to emotions between genders (Garside and Klimes-Dougan 2002). Females are more likely than males to use the full range of coping strategies, especially emotion-oriented coping (Wilson et al. 2005), which may not be as harmful for females as for males. For instance, one study showed that the use of emotion-oriented strategies reduced depressive symptoms for females, but not for males (Howerton and Van Gundy 2009), although emotion-oriented coping placed early adolescent girls at greater risk for internalizing problems than boys in another study (Nolen-Hoeksema and Girgus 1994). However, little is known about how gender moderates the processes involved in emotion socialization, coping, and emotional functioning (Eisenberg et al. 1998).

Furthermore, few studies of emotion socialization used ethnically diverse samples (Cole and Tan 2007), with the majority of research being conducted in the United States using primarily European American families (Deater-Deckard et al. 1996). Studies indicate that European American parents typically endorse supportive emotion socialization strategies, such as expressive encouragement, over non-supportive strategies, such as punishment (Wong et al. 2009). The emotion socialization processes of African American families are less well-known (Cole and Tan 2007), but studies on other dimensions of

parenting suggest that authoritarian parenting is more common in African American families than in European American families (Jackson-Newsom et al. 2008). Findings regarding ethnic differences in the relationship between parenting and children's adjustment, however, have been mixed. For example, maternal nurturance, parental monitoring, and parental norms are equally strong predictors of multiple problem behaviors in African American, European American, and Hispanic children (Windle et al. 2010). By contrast, physical discipline is related to externalizing problems in European American children, but not African American children, suggesting that the meaning of physical discipline may vary across ethnic groups (Deater-Deckard et al. 1996). With regard to coping, African American children and adolescents face different stressors and utilize different coping strategies compared to European American youth (Chapman and Mullis 2000), which may partly explain ethnic disparities in socioemotional adjustment (Friedlmeier et al. 2011). However, little is known about ethnic differences in the links between coping and adjustment. Thus, we examined possible gender and ethnic differences between African American and European Americans in the relationships between emotion socialization, coping, and emotional functioning.

Goals and Hypotheses

In summary, emotion socialization is related to emotional functioning and coping strategies, and maladaptive coping contributes to socioemotional problems. Thus, coping might mediate the effect of emotion socialization on emotional functioning. This study aimed to examine if coping strategies mediate the relationship between parental emotion socialization and emotional functioning in late adolescence and emerging adulthood, a generally stressful transition period (Arnett 2000). We hypothesized that supportive pa-

rental responses to anger, fear, and sadness would predict less aggression, anxiety and depressive symptoms, respectively, and these effects would be mediated by task-oriented and social diversion coping strategies. Additionally, we expected that unsupportive parental responses to anger, fear, and sadness would predict more aggression, anxiety and depressive symptoms, respectively, and these effects would be mediated by emotion-oriented and distraction coping strategies. Moderating effects of gender and ethnicity on the links between emotion socialization, coping, and emotional functioning were also explored, but due to limited research on this topic no directional hypotheses were formulated.

Method

Participants

Participants were 1,087 (*M* age = 19.35 years, *SD* = 1.19; range = 16-23) individuals from a larger community-based study of adolescent health. Youth were recruited from fifth grade classrooms in public schools in a large city in the Southeast U.S. and followed throughout adolescence. Because emotion socialization was assessed only at the last wave, data from previous assessments were not included. There were 49.8% (n = 541) males and 50.2% (n = 546) females in the sample, with 61.4% (n = 667) identifying as African American, 35.7% (n = 388) as European American, and 2.9% (n = 32) as other ethnicities. Six percent of the sample dropped out of high school, 8.3% were still in high school, 29.9% completed high school but were not in college, and 55.8% were in college. Among the youth parents, 7.4% did not complete high school, 20.7% completed high school but did not attend college, 31.3% had some college education or a 2 year degree, and 40.6% graduated from a 4-year college or had a graduate degree.

Procedures

All study procedures were approved by the university Institutional Review Board. After providing informed consent, each participant was interviewed individually by a trained interviewer using computer-assisted technology. Most participants were interviewed in person at a research lab, but individuals who have moved away from the local area (8.6%) were interviewed over the phone.

Measures

Emotion socialization

An abbreviated version of the Emotions as a Child Scale (EAC; Magai and O'Neal 1997) measured emotion socialization (Guo et al. 2016). The scale is composed of two subscales: supportive and unsupportive parental responses for anger, fear and sadness. Supportive parental responses include reward (e.g., "comforted me"), neglect (e.g., "focused on me"; reverse-coded), and override (e.g., "told me to cheer up") dimensions (7 items). Unsupportive parental responses include punish (e.g., "let me know s/he did not approve") and magnify (e.g., "got very sad") dimensions (5 items). Participants rate how often their parent responded to each emotion in the given way when they were children on a scale ranging from 1 (Never) to 5 (Very often). Cronbach's alpha for anger, fear and sadness was .89, .92, and .90 for the supportive subscales, respectively, and .78, .77, and .65 for the unsupportive subscale, respectively. Items were summed to form subscales.

Coping

Coping strategies were measured using the Coping Inventory of Stressful Situations (CISS; Endler and Parker 1994). The CISS has 16-items scales for Task-oriented

coping (α = .88), Emotion-oriented coping (α = .86), and Avoidance coping, which can be divided into Social Diversion (α = .72) and Distraction (α = .78). Sample items include: "Focus on the problem and see how I can solve it" (Task-oriented coping); "Feel anxious about not being able to cope" (Emotion-oriented coping); "Visit a friend" (Social Diversion); "See a movie" (Distraction). Participants rated how much they engage in each activity when they encounter a difficult or stressful situation from 1 (Not at all) to 5 (Very much); items were summed.

Aggression

Participants reported the frequency of aggressive behaviors in the last 12 months using five items from the Self-Reported Delinquency Scale (Elliott et al. 1985), including fighting, hitting, pulling a knife or gun on someone, cutting or stabbing, and shooting at someone. Responses were rated on a 7-point scale but were recoded to a dichotomous format (0-never, 1- one or more times) to reduce skewness, and summed (α = .65).

Anxiety symptoms

The 10-item physiological anxiety scale of the Revised Children's Manifest Anxiety Scale (Reynolds and Richmond 1978) was used (e.g., "Do you often feel sick in your stomach?"). Items were rated No (0) or Yes (1) and summed (α = .65).

Depressive symptoms

The depression scale of the DISC Predictive Scales (Lucas et al. 2001) was used to assess depressive symptoms experienced in the last year (e.g., "During the past 12 months, has there been a time when you had less energy than you usually do?"). The 6 symptoms were rated on a dichotomous scale (No =0, Yes = 1) and summed (α = .71).

Covariates

Participants' age, gender (0=male, 1=female), ethnicity (0=European Americans, 1=African Americans), academic status, and parental education served as demographic covariates. Academic status included dropped out of high school, still in high school, completed high school but not in college; and in college (reference group). Parental education ranged from 'did not complete high school' (1) to 'graduated from a 4-year college or had a graduate degree' (4).

Data Analyses

Missing data (0.3% of all data points) were handled using Full Information Maximum Likelihood (FIML) in all analyses. Associations among variables were examined with correlations, t-tests, and repeated measures ANOVAs. Mediation models were tested using path analysis in Mplus 7.11 using maximum likelihood estimation with robust standard errors (MLR) due to non-normal distributions of some variables. Three models were examined with parental responses to each emotion (anger, fear, and sadness) and a corresponding outcome (aggression, anxiety, and depressive symptoms). For each model, the direct effect of parental responses on emotional/behavioral functioning was first tested. Next, the four coping styles (task-oriented, emotion-oriented, social diversion, and distraction coping) were added as mediators and tested with bias-corrected bootstrapping with 10,000 bootstrap samples. Finally, multi-group modeling examined gender and ethnic differences in the relationship between emotion socialization, coping, and adolescents' emotional and behavioral functioning. If a model showed group differences, follow-up analyses tested each path with Bonferroni correction (p = .025 for direct models; p = .0036 for the mediation models).

Results

Preliminary Analyses

Descriptives and correlations are presented in Table 1. Consistent with our hypotheses, supportive parental responses to anger, fear, and sadness were associated with lower levels of aggression, anxiety, and depressive symptoms, respectively. Similarly, unsupportive parental responses to anger, fear, and sadness were associated with more aggression, anxiety, and depressive symptoms, respectively. Paired samples t-test indicated more supportive than unsupportive parental responses for each emotion (t (1084) = 34.32 to 53.76, $p < .001$). A repeated measures ANOVA showed significant differences among supportive parental responses to the three emotions [F (1.92, 2075.39) = 111.23, $p < .001$]. Follow up paired samples t-tests indicated that supportive parental responses to sadness were more frequent than supportive parental responses to fear [t (1084) = 6.04, $p < .001$], which were more frequent than supportive parental responses to anger [t (1084) = 8.08, $p < .001$]. Similarly, unsupportive parental responses differed across the three emotions [F (1.95, 2110.39) = 200.88, $p < .001$], with unsupportive parental responses to anger more frequent than unsupportive parental responses to sadness [t (1084) = 3.91, $p < .001$], which were more frequent than unsupportive responses to fear [t (1084) = 16.40, $p < .001$].

Additionally, task-oriented coping and social diversion were more strongly associated with supportive parental responses than unsupportive parental responses across the three emotions, whereas emotion-oriented coping and distraction coping were more strongly related to unsupportive parental responses than supportive parental responses.

Table 1

Descriptive Statistics and Correlations among Main Variables

	M (SD)	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1.Supportive anger	3.67 (0.80)	1.00											
2. Unsupportive anger	2.46 (0.82)	-0.04	1.00										
3. Supportive fear	3.78 (0.86)	**0.76**	0.01	1.00									
4. Unsupportive fear	2.04 (0.78)	**0.09**	**0.54**	0.08*	1.00								
5. Supportive sadness	3.92 (0.79)	**0.81**	-0.05	**0.75**	0.02	1.00							
6. Unsupportive sadness	2.37 (0.71)	**0.25**	**0.57**	**0.16**	**0.60**	**0.21**	1.00						
7. Task-oriented coping	3.62 (0.62)	**0.25**	0.07*	**0.26**	0.04	**0.21**	**0.10**	1.00					
8. Emotion-oriented coping	2.61 (0.69)	-0.05	**0.32**	-0.02	**0.27**	-0.07*	**0.24**	**0.10**	1.00				
9. Social diversion coping	3.35 (0.82)	**0.24**	**0.10**	**0.24**	0.07*	**0.22**	**0.13**	**0.36**	**0.22**	1.00			
10. Distraction coping	2.77 (0.77)	**0.13**	**0.16**	**0.09**	**0.24**	**0.12**	**0.26**	**0.20**	**0.35**	**0.36**	1.00		
11. Aggression	0.57 (0.97)	**-0.10**	**0.09**	**-0.15**	**0.09**	**-0.10**	**0.11**	-0.03	**0.11**	-0.07*	-0.02	1.00	
12. Anxiety	2.89 (2.14)	-0.16	**0.18**	**-0.14**	**0.08**	**-0.16**	**0.12**	**-0.13**	**0.47**	0.04	**0.13**	**0.14**	1.00
13. Depression	2.05 (1.71)	**-0.17**	**0.17**	**-0.13**	0.07*	**-0.19**	0.08*	-0.05	**0.46**	0.02	0.07*	0.04	**0.54**

Note: *p<.05, bold indicates $p < .01$

Finally, task-oriented coping was associated with fewer anxiety symptoms. Emotion-oriented coping was linked with more aggression, anxiety, and depressive symptoms. Social diversion coping was related to less aggression, and distraction coping was related to more anxiety and depressive symptoms. A repeated measures ANOVA showed significant differences in the frequency of the four types of coping [F (2.92, 3151.42) = 645.98, $p < .001$]. Post-hoc comparisons indicated that the endorsement of task-oriented coping was greater than social-diversion coping [t (1078) = 11.08, $p < .001$], which was greater than distraction coping [t (1078) = 21.48, $p < .001$]. Endorsement of distraction coping was greater than emotion-oriented coping [t (1078) = 6.44, $p < .001$].

Independent-samples t tests (Table 2) indicated that compared to males, females reported more supportive parental responses and fewer unsupportive parental responses to all emotions, used more emotion-oriented, social diversion and distraction coping strategies, and reported less aggression, but more anxiety and depressive symptoms. In terms of ethnic differences, compared to European Americans, African Americans reported more unsupportive parental responses to fear and sadness and fewer supportive parental responses to fear, used less social diversion coping and more distraction coping, and reported more aggressive behaviors.

Main Analyses

Anger and aggression

The direct effect model showed that supportive parental responses to anger predicted fewer aggressive behaviors ($\beta = -.08$, $p = .010$), whereas unsupportive parental responses predicted more aggressive behaviors ($\beta = .06$, $p = .033$). Mediation analysis (Figure 1) indicated that greater distraction coping mediated the effect of supportive

Table 2

Gender and Ethnic Differences in Main Variables

	Female M (SD)	Male M (SD)	t-value	African Ameri-can M (SD)	European American M (SD)	t-value
Supportive anger	3.75 (0.82)	3.59 (0.77)	3.24**	3.68 (0.84)	3.65 (0.71)	0.69
Unsupportive anger	2.34 (0.82)	2.57 (0.81)	-4.68***	2.46 (0.87)	2.45 (0.73)	0.18
Supportive fear	3.88 (0.84)	3.67 (0.87)	4.03***	3.74 (0.92)	3.85 (0.74)	-2.26*
Unsupportive fear	1.97 (0.75)	2.12 (0.80)	-3.02**	2.13 (0.83)	1.89 (0.64)	5.15***
Supportive sadness	3.99 (0.82)	3.85 (0.75)	2.85**	3.91 (0.84)	3.95 (0.68)	-0.75
Unsupportive sadness	2.33 (0.72)	2.41 (0.69)	-1.90**	2.44 (0.76)	2.25 (0.60)	4.47***
Task-oriented coping	3.60 (0.66)	3.65 (0.57)	-1.12	3.63 (0.66)	3.62 (0.54)	0.08
Emotion-oriented coping	2.68 (0.71)	2.53 (0.66)	3.48**	2.62 (0.72)	2.58 (0.62)	1.05
Social diversion coping	3.47 (0.83)	3.22 (0.78)	5.03***	3.29 (0.84)	3.46 (0.76)	-3.37**
Distraction coping	2.88 (0.76)	2.65 (0.76)	4.95***	2.92 (0.79)	2.48 (0.64)	9.87***
Aggression	0.38 (.72)	0.77 (1.15)	-6.56***	0.69 (1.08)	0.36 (.70)	6.12***
Anxiety	3.21 (2.22)	2.56 (2.01)	5.02***	2.81 (2.16)	3.02 (2.11)	-1.55
Depression	2.25 (1.75)	1.85 (1.65)	3.80***	2.02 (1.68)	2.11 (1.77)	-0.77

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

parental responses to anger on fewer aggressive behaviors (*B* = -.002, 95% *CI* = [-.004, -.001]). Additionally, greater emotion-oriented coping mediated the effect of unsupportive parental responses on more aggressive behaviors (*B* = .011, 95% *CI* = [.006, .018]), and there was a weaker but significant mediation effect with greater distraction coping mediating the opposite relationship between unsupportive parental responses and *fewer* aggressive behaviors (*B* = -.004, 95% *CI* = [-.008, -.001]). Both direct effects became non-significant after mediators were introduced, suggesting full mediation. The ratio of the indirect effect to the total effect was .20 and .53 for supportive and unsupportive parental responses, respectively. The R^2 were .10, .13, .11, .15 and .12 for task-oriented, emotion-oriented, social diversion, distraction coping and aggression, respectively.

Fear and anxiety

In the direct effect model, supportive parental responses to fear predicted fewer anxiety symptoms (β = -.16, *p* = .000), whereas unsupportive parental responses predicted more anxiety symptoms (β = .12, *p* = .000). Mediation analyses (Figure 2) indicated that greater use of task-oriented coping mediated the effect of supportive parental responses on lower anxiety symptoms (*B* = -.012, 95% *CI* = [-.019, -.007]). The direct effect was reduced but remained significant (β = -.102, *p* = .000), suggesting partial mediation. Additionally, greater emotion-oriented coping mediated the effect of unsupportive parental responses on more anxiety symptoms (*B* = .078, 95% *CI* = [.059, .099]). The direct effect became non-significant, suggesting full mediation. The ratio of the indirect effect to the total effect was .38 and 1.15 for supportive and unsupportive parental responses, respectively. The R^2 were .10, .10, .09, .15 and .28 for task-oriented, emotion-oriented, social diversion, distraction coping and anxiety, respectively.

Sadness and depression

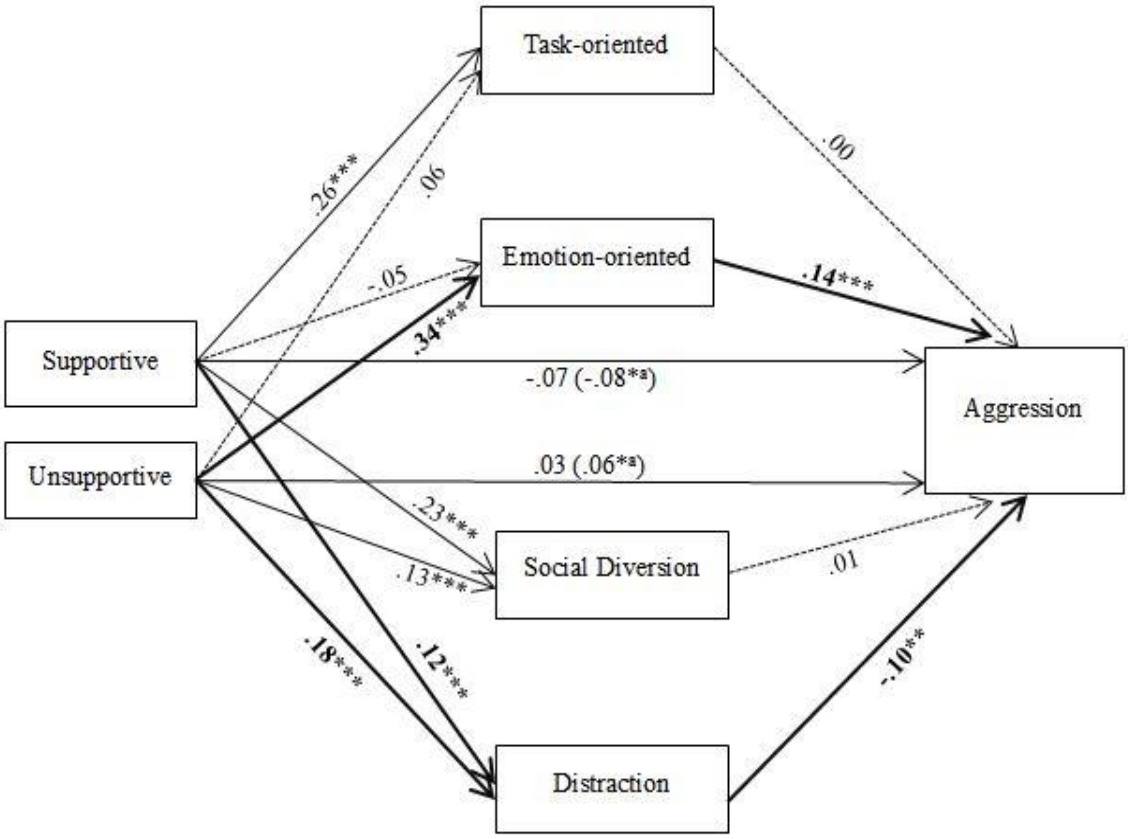
The results from the direct effect model showed that supportive parental responses to sadness predicted fewer depressive symptoms (β = -.22, *p* = .000), whereas unsupportive parental responses predicted more depressive symptoms (β = .14, *p* = .000). Mediation analyses (Figure 3) indicated that lower use of emotion-oriented coping mediated the effects of supportive parental responses on lower depressive symptoms (*B* = -.020, 95% *CI* = [-.029, -.011]). The direct effect was reduced but remained significant (β = -.14, *p* = .000), suggesting partial mediation. Additionally, greater emotion-oriented coping mediated the effects of unsupportive parental responses on more depressive symptoms (*B* = .064, 95% *CI* = [.048, .081]), and there was a weaker but significant mediation effect with greater distraction coping mediating the opposite relationship between unsupportive parental responses and *fewer* depressive symptoms (*B* = -.007, 95% *CI* = [-.014, -.001]). The direct effect became non-significant, suggesting full mediation. The ratio of the indirect effect to the total effect was .86 and .08 for supportive and unsupportive parental responses, respectively. The R^2 were .08, .09, .10, .16 and .26 for task-oriented, emotion-oriented, social diversion, distraction coping and depression, respectively.

Multigroup Models

Gender differences

Multigroup modeling showed significant gender differences in the direct effect model for each emotion (anger: χ^2 (9) = 42.61, $p < .001$; fear: χ^2 (9) = 46.88, $p < .001$; and sadness: χ^2 (9) = 30.53, $p < .001$). Follow up tests indicated that supportive parental responses to anger predicted lower aggression in females only, whereas unsupportive parental responses to anger predicted more aggression in males only (Table 3). By contrast,

Fig. 1 Coping Styles as Mediators between Parental Responses to Anger and Aggression

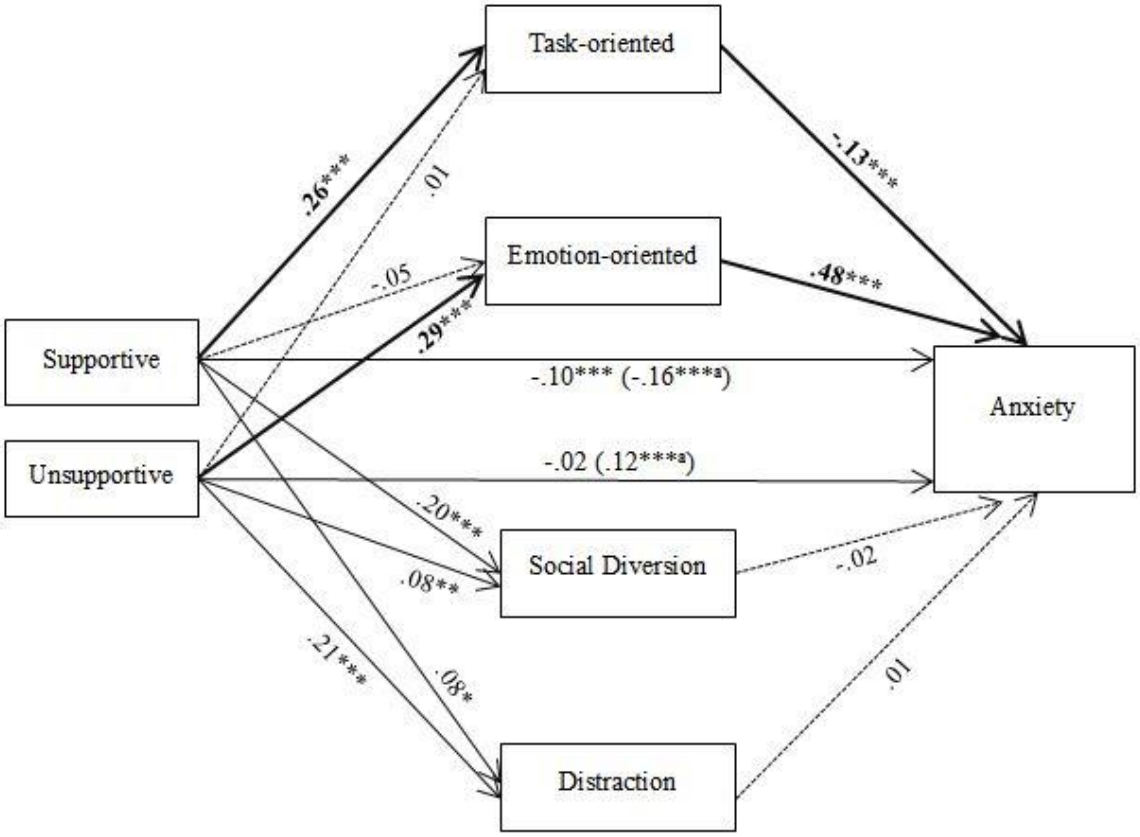


Note: Bolded paths and coefficients indicate significant mediating paths. Dashed lines indicate nonsignificant paths

[a] When mediators are not in the model

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

Fig. 2 Coping Styles as Mediators between Parental Responses to Fear and Anxiety

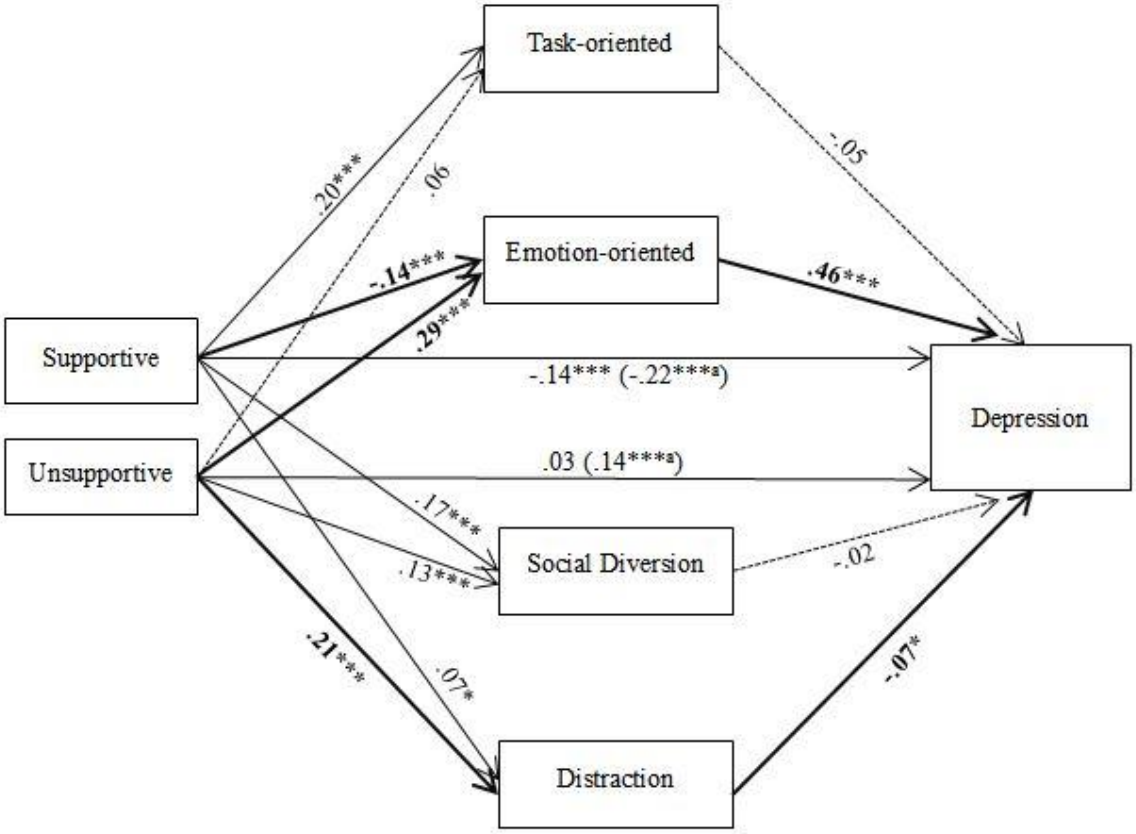


Note: Bolded paths and coefficients indicate significant mediating paths. Dashed lines indicate nonsignificant paths

[a] When mediators are not in the model

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

Fig. 3 Coping Styles as Mediators between Parental Responses to Sadness and Depression



Note: Bolded paths and coefficients indicate significant mediating paths. Dashed lines indicate nonsignificant paths

[a] When mediators are not in the model

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

the links between supportive parental responses to fear and sadness and lower anxiety and depression were stronger in males than in females, whereas the links between unsupportive parental responses and greater anxiety and depression were stronger in females than in males.

For the mediation models, multigroup modeling showed significant gender differences for each emotion model (anger: χ^2 (51) = 135.24, $p < .001$; fear: χ^2 (51) = 110.89, $p < .001$; and sadness: χ^2 (51) = 91.62, $p < .001$). Follow up tests indicated that the links between supportive parental responses and more task-oriented coping were stronger for males (Table 3). Relationships between unsupportive responses to anger and sadness and task-oriented coping were stronger in males. Supportive parental responses to anger and fear were associated with less emotion-oriented coping in males only, whereas unsupportive responses to anger and fear predicted emotion-oriented coping more strongly in females. Both supportive and unsupportive parental responses were related to social diversion coping more strongly for females. As shown in Table 3, some links between coping and adjustment were slightly stronger for males, whereas other links were slightly stronger for females.

Further, the direct effects of supportive responses to fear and sadness were more strongly related to lower anxiety and depression in males. Similarly, unsupportive responses to anger and fear were related to more aggression and less anxiety in males, but not females. By contrast, supportive responses to anger predicted less aggression in females only. As shown in Table 4, emotion-oriented coping mediated the effects of supportive and/or unsupportive parental responses for all emotions in both males and females. Similarly, task-oriented coping mediated the effects of supportive parental responses on

lower anxiety in both genders. However, distraction coping was a significant mediator of parental responses effect on lower aggression and depression in males only.

Ethnic differences

Multigroup modeling showed significant ethnic differences in the direct effect models for anger and fear, but not for sadness (anger: χ^2 (9) = 33.85, $p < .001$; fear: χ^2 (9) = 26.54, $p < .01$; sadness: χ^2 (9) = 10.62, $p = .30$). Follow up tests indicated that supportive parental responses to anger predicted lower aggression in European Americans only, whereas unsupportive parental responses to anger predicted more aggression in African Americans only (Table 3). By contrast, the link between supportive parental responses to fear and lower anxiety was stronger in African Americans than in European Americans, whereas the relationship between unsupportive parental responses and greater anxiety was stronger in European Americans than in African Americans.

Table 3

Gender and Ethnic Differences in Unstandardized Path Coefficients of the Direct Effect Model and the Mediation Model

	Anger		Fear		Sadness		Anger		Fear		Sadness	
	Female	Male	Female	Male	Female	Male	African American	European American	African American	European American	African American	European American
Direct Effect Model												
Supportive → Adjustment	**-.02****	-.00	-.04***	**-.07*****	-.06***	**-.08*****	-.006	**-.014****	**-.06*****	-.04***	-	-
Unsupportive → Adjustment	.01	**.04*****	**.11*****	.04*	**.09*****	.05**	**.03*****	.01	.05**	**.10*****	-	-
Mediation Model												
Supportive → Task	.41***	**.49*****	.38***	**.47*****	.33***	**.40*****	-	-	-	-	-	-
Unsupportive → Task	.05	**.20***	-	-	.06	**.21***	-	-	-	-	-	-
Supportive → Emotion	-.03	**-.12***	-.05	**-.13***	-	-	-	-	-	-	-	-
Unsupportive → Emotion	**.99*****	.81***	**.91*****	.73***	-	-	-	-	-	-	-	-
Supportive → Social	**.18*****	.15***	**.15*****	.12***	**.14*****	.11***	.15***	**.22*****	.11***	**.18*****	.11***	**.17*****
Unsupportive → Social	**.16*****	.09**	**.12****	.05	**.17*****	.11**	.10**	**.20*****	.06	**.20*****	.11**	**.23*****
Supportive → Distraction	-	-	-	-	-	-	**.16*****	.03	**.11****	-.02	**.10****	-.03
Unsupportive → Distraction	-	-	-	-	-	-	**.37*****	.15**	**.42*****	.12*	**.48*****	.22***
Task → Adjustment	-	-	-.025***	**-.033*****	-.006	**-.012***	-	-	**-.03*****	-.02***	-	-
Emotion → Adjustment	.01**	**.02*****	**.10*****	.09***	**.08*****	.07***	**.01*****	.01*	.09***	**.10*****	-	-
Social → Adjustment	-.00	**.02***	-	-	-	-	-	-	-	-	-	-
Distraction → Adjustment	**-.02****	.00	-	-	-.01	**-.03****	-.01	**-.02****	-	-	-	-
Supportive → Adjustment	**-.02***	-.00	-.03*	**-.04*****	-.04***	**-.05*****	-.00	**-.01***	**-.04*****	-.02*	-	-
Unsupportive → Adjustment	.00	**.03*****	.02	**-.03***	-	-	**.02***	.00	-	-	-	-

Note: Supportive - supportive parental responses to child emotions; Unsupportive - unsupportive parental responses to child emotions; Task - task-oriented coping; Emotion - emotion-oriented coping; Social - social diversion coping; Distraction - distraction coping; Bolded items indicate stronger path coefficients.

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

Table 4

Significant Indirect Effects across Gender and Ethnicity

	Female	Male
Anger	-	Supportive→Distraction→Aggression
	Unsupportive→Emotion→Aggression	Unsupportive→Emotion→Aggression
	-	Unsupportive→Distraction→Aggression
Fear	Supportive→Task→Anxiety	Supportive→Task→Anxiety
	-	Supportive→Emotion→Anxiety
	Unsupportive→Emotion→Anxiety	Unsupportive→Emotion→Anxiety
Sadness	Supportive→Emotion→Depression	Supportive→Emotion→Depression
	Unsupportive→Emotion→Depression	Unsupportive→Emotion→Depression
	-	Unsupportive→Distraction→Depression
	African American	**European American**
Anger	Supportive→Emotion→Aggression	-
	Supportive→Distraction→Aggression	-
	Unsupportive→Emotion→Aggression	-
	Unsupportive→Distraction→Aggression	-
Fear	Supportive→Task→Anxiety	-
	Supportive→Emotion→Anxiety	-
	Unsupportive→Emotion→Anxiety	Unsupportive→Emotion→Anxiety
Sadness	Supportive→Emotion→Depression	-
	Unsupportive→Emotion→Depression	Unsupportive→Emotion→Depression

Note: Supportive - supportive parental responses to child emotions; Unsupportive - unsupportive parental responses to child emotions; Task - task-oriented coping; Emotion - emotion-oriented coping; Social – social diversion coping; Distraction – distraction coping.

For the mediation models, multigroup modeling showed significant ethnic differences for each emotion model (anger: χ^2 (51) = 266.37, $p < .001$; fear: χ^2 (51) = 237.23, $p < .001$; sadness: χ^2 (51) = 234.28, $p < .001$). Follow up tests indicated that the associations between parental responses and task- and emotion-oriented coping did not differ between African Americans and European Americans. However, the links between both types of parental responses and more social diversion coping were stronger for European Americans across the three emotions (Table 3). By contrast, the links between both parental responses and more distraction coping were stronger for African Americans. As shown in Table 3, some links between coping and adjustment were slightly stronger for African Americans, whereas other links were slightly stronger for European Americans.

Further, the direct effect of supportive responses to anger on less aggression was significant for European Americans, but not African Americans. By contrast, unsupportive parental responses to anger predicted more aggression in African Americans only. Similarly, supportive responses to fear were slightly more strongly associated with lower anxiety in African Americans. As shown in Table 4, coping styles were a more consistent mediator of parental responses on adjustment in African Americans. Specifically, emotion-oriented coping was the most consistent mediator, followed by distraction coping and task-oriented coping. For European Americans, only emotion-oriented coping mediated the effects of unsupportive parental responses on more anxiety and depression.

Discussion

This study examined four types of coping strategies as mediators of the relationship between parental responses to emotions and emotional functioning in late adolescence and emerging adulthood. Emotion-oriented coping emerged as the most consistent

mediator across all three emotions (anger, fear, and sadness), followed by distraction (anger and sadness), and task-oriented coping (fear). By contrast, social diversion coping did not mediate any emotion socialization effects. The direct effects from parental responses to adjustment, as well as the mediating effects of coping, were further moderated by gender and ethnicity.

The Mediating Role of Coping

Emotion-oriented coping demonstrated the strongest mediating effect between parental responses to emotions and adjustment. The results are consistent with the literature showing close relationships between emotion-oriented coping and both parental responses and emotional functioning (Compas et al. 2001). Unsupportive parental responses to negative emotions may signal to children that negative emotions are unwelcome or unacceptable, leading to self-blame and repression of emotions. Unsupportive parental responses to negative emotions may hinder the development of adaptive emotional regulation capacities (Katz et al. 2012), and, in turn, contribute to negative emotions and maladjustment. The finding that unsupportive parental responses were related to more emotion-oriented coping perhaps reflects a general mechanism that may explain the effects of parental unsupportive responses to a variety of negative emotions on both externalizing and internalizing problems.

On the other hand, supportive parental responses to negative emotions may convey to children that negative emotions are acceptable, and can be appropriately expressed and regulated (Buckholdt et al. 2014). Therefore, children may develop better emotion regulation skills and rely less on emotion-oriented coping with stress. In the current study, only supportive parental responses to sadness (but not the other emotions) were associat-

ed with lower emotion-oriented coping, which then predicted fewer depressive symptoms. The specificity of this result for sadness may be due to sadness being more likely to elicit support and attention than other negative emotions, as shown in this study and in previous research (Sharp et al. 2016).

Distraction coping was another strategy that yielded significant mediating effects. Higher levels of distraction coping partly mediated the effect of supportive parental responses to anger on lower aggression. In addition, there was a paradoxical effect where greater distraction also mediated the effects of unsupportive parental responses to anger and sadness on *lower* levels of aggression and depression, contrasting with the overall positive direct effect of unsupportive responses on higher aggression and depression. These results suggest that both supportive and unsupportive parental responses may contribute to greater use of distraction coping. However, the nature of distraction coping may differ across the two types of parental responses. For instance, distraction coping in response to supportive parental responses may be accompanied by acceptance of the situation, whereas distraction coping following unsupportive parental responses may involve denial or avoidance. Future research should examine these possibilities.

In the mediation models, the use of distraction coping was related to less aggression and depression, although its zero-order correlations (Table 1) were non-significant (for aggression) or positive (for depression). This pattern suggests that distraction coping alone may not be a helpful coping strategy, consistent with findings linking it with more socioemotional problems (e.g., Downey et al. 2010). However, when considered together with other coping strategies, distraction coping may be helpful in emotion regulation ef-

forts. Indeed, one study found that distraction coping was associated with decreased problem behaviors when including the effects of other coping strategies (Dashora et al. 2011).

Finally, distraction coping was not uniquely related to anxiety in the mediation models, likely because other coping methods (emotion- and task-oriented coping) played a more important role in anxiety symptoms. In particular, task-oriented coping mediated the effect of supportive parental responses to fear on lower anxiety. It is possible that supportive parental responses to fear help children develop a stronger problem-solving approach that helps them deal adaptively with fear and in turn, diminish anxiety (Mynors-Wallis 2005).

Contrary to expectations, social diversion coping did not mediate the effects of parental responses on emotional functioning. Nevertheless, both supportive and unsupportive parental responses to all emotions were associated with more social diversion coping. It is possible that different parental responses may foster different aspects of social diversion coping. For example, supportive parental responses may promote seeking out informational support, which may facilitate task-oriented coping, whereas unsupportive parental responses may encourage venting of emotional distress, which may lead to more emotion-oriented coping (Penley et al. 2002). To the extent that social diversion may encompass both adaptive and maladaptive aspects, it is not surprising that it was unrelated to emotional functioning in the present study. Additionally, prior research linking social diversion coping with better adjustment typically examined the effect of social diversion coping separately, without considering the effects of other coping strategies (Lipińska-Grobelny 2011). By contrast, our results indicate that other coping strategies

(e.g., emotion-oriented and task-oriented coping) play a more important role in emotional outcomes.

The Moderating Role of Gender

For externalizing problems, supportive parental responses to anger predicted lower aggression in females only, whereas unsupportive parental responses to anger predicted more aggression in males only. These findings may be best interpreted in terms of gender role socialization. Typically, females are socialized to be less aggressive, whereas males are expected to be assertive and even aggressive if needed (Fivush and Buckner 2000). Therefore, supportive parental responses to anger may be more effective in diminishing aggression in females, whereas unsupportive parental responses to anger may be more likely to invoke aggression in males.

For internalizing problems, the relationships between supportive parental responses to fear and sadness and lower anxiety and depression were stronger in males, whereas the links between unsupportive parental responses and greater anxiety and depression were stronger in females. Because females are more likely to experience understanding and social support for internalizing problems, unsupportive parental responses to internalizing affect may amplify these emotions in females. On the contrary, since males face more social pressure to be tough and less emotional (Brody and Hall 2000), supportive parental responses to internalizing emotions may be more important for preventing the development of internalizing problems in males.

With regard to coping, parental responses were associated with stronger social diversion coping in females, but stronger task-oriented coping in males. It is possible that parents transmit gender role expectations through coping socialization processes, by en-

couraging girls to rely on social relationships and boys to solve problems independently. Finally, although some gender differences emerged in the associations between coping and adjustment, they were of small magnitude, suggesting similar processes in males and females.

The Moderating Role of Ethnicity

For externalizing problems, supportive parental responses to anger predicted lower aggression in European Americans only, whereas unsupportive parental responses to anger predicted more aggression in African Americans only. Prior findings on ethnic differences in the effects of unsupportive parenting are mixed. Some studies suggest that unsupportive parental responses are associated with externalizing problems in European American but not African American children (e.g., Pinderhughes et al. 2000), but other research links unsupportive parental responses with problem behaviors in both ethnic groups (Leerkes et al. 2015). Methodological issues may contribute to these discrepancies, such as children's age, informant source, and the specific parenting behaviors examined. More research clarifying the nature and causes of possible ethnic differences in parenting effects on externalizing behaviors is needed. By contrast, few ethnic differences emerged in the associations between parental response to internalizing emotions and adjustment, suggesting similar processes in African American and European American families.

With regard to coping, parental responses were more strongly associated with social diversion coping in European Americans and distraction coping in African Americans. These findings may reflect differences in social norms, where European Americans may be more encouraged to utilize social relationships and African Americans may be socialized not to deal directly with stressors, perhaps because they encounter more un-

controllable stress (Goldmann et al. 2011). Indeed, African Americans have been found to be less dependent on and seek less support from peers (Shaw et al. 1999). Further, coping was a more consistent mediator between parental responses and adjustment for African Americans, particularly for emotion-oriented and distraction coping, which may also be related to socialization in more chronically stressful and unpredictable environments. Finally, ethnic differences in the associations between coping and adjustment were small, suggesting similar processes in both ethnic groups.

Implications

The present study contributes to the understanding of theoretical mechanisms and the development of effective interventions. The findings suggest that parental responses to emotions may help foster specific coping strategies, which may in turn promote or hinder emotional and behavioral adjustment. Thus, existing intervention programs for emotion socialization practices may be further improved by including components focusing on coping skills. Furthermore, the present study highlights the need to examine emotion socialization from a gender- and culture-specific perspective. The stronger role of specific parental emotion socialization in coping and emotional functioning of girls vs. boys and European American vs. African American youth suggests that some parental strategies may be more effective in specific subgroups of youth. For example, decreasing unsupportive parental responses to anger may be more effective for decreasing aggression in males and African Americans, whereas reducing unsupportive parental responses to fear may be more important for preventing anxiety in females and European Americans. Additionally, better understanding of gender role socialization and the cultural and

socioeconomic contexts of parenting may help shed light on gender and ethnic differences in coping strategies acquired by youth through emotion socialization practices.

Limitations and Future Directions

Findings of this study should be considered in light of its limitations. First, due to the cross-sectional nature of the study, no causal inferences about the relationships studied could be made. Although the evidence supported hypothesized effects from emotion socialization to coping to emotional functioning, it is also possible that emotional functioning influences coping and parental responses to emotions. Second, all variables were reported by the youth, which may have inflated the studied relationships. Third, our measure of parental responses did not distinguish between caregivers (e.g., mothers versus fathers), who might play different roles in the emotion socialization processes (Baker et al. 2011). Fourth, the average parental education level was high in the current sample, indicating that the sample may not be representative of various socioeconomic backgrounds. It is possible that emotion socialization processes and its predicted utility may vary by different socioeconomic status. Fifth, some gender and ethnic differences were small and may have limited practical significance. Finally, we focused on the ethnic differences between European American and African Americans; other ethnic groups should be examined in future research.

Conclusions

This study provided a comprehensive examination of coping styles as mediators of the effects of parental responses to negative emotions on emotional functioning in late adolescence and emerging adulthood. The results showed that emotion-oriented coping mediated the effects of unsupportive parental responses to multiple negative emotions, as

well as the effects of supportive responses to sadness. Additionally, distraction coping mediated the effects of parental responses to anger and sadness on aggression and depression. Finally, task-oriented coping mediated the effect of supportive parental responses on lower anxiety. Many of the paths from parental responses to coping and emotional functioning varied across gender and ethnicity, suggesting an important role of gender roles and culture in parental emotion socialization effects.

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PAPER 3

EMOTION SOCIALIZATION AS A PREDICTOR OF PHYSIOLOGICAL AND PSYCHOLOGICAL RESPONSES TO STRESS

by

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Abstract

Reactivity patterns to acute stress are important indicators of physical and mental health. However, the relationships between emotion socialization and stress responses are not well understood. The aim of this study was to examine whether parental responses to negative emotions predicted physiological and psychological responses to acute stress in late adolescence and emerging adulthood, and whether these relationships varied by gender and ethnicity. Participants were 973 individuals (mean age = 19.20 years; 50% male; 63% African American, 34% European American) who reported on parental emotion socialization. Participants completed a standardized social stress test in the laboratory (the Trier Social Stress Test; TSST). Heart rate, blood pressure and salivary samples were assessed from baseline throughout the task and during recovery period. Psychological responses to stress were measured immediately after the TSST. Unsupportive parental responses to children's negative emotions were associated with blunted cortisol reactivity and greater negative emotions to a psychosocial stress task in females and African American youth, whereas supportive parental responses predicted greater cortisol reactivity and lower negative emotions to stress in males and European American youth. Findings suggest that parental emotion socialization may be an important factor influencing physiological and psychological responses to stress, with important differences across gender and ethnic youth subgroups.

Keywords: emotion socialization, stress reactivity, late adolescence, emerging adulthood

Introduction

Understanding the ways in which children and adolescents respond to stress is important to understand normal development, as well as the development of physical illness and psychopathology (Connor-Smith, Compas, Wadsworth, Thomsen, & Saltzman, 2000). Emotion regulation abilities are closely related to physiological and psychological responses to stress (Gross & Levenson, 1997; Quirin et al., 2011). To the extent that emotion socialization is linked to emotion regulation abilities (Katz et al., 2012; Shortt et al., 2015), emotion socialization may play a central role in children learning to regulate their physiological and psychological responses to stress. However, direct investigations of these relationships are limited. Buck (1984) hypothesized that children who are discouraged from expressing negative emotions may gradually learn to suppress emotions, but experience heightened physiological arousal in emotionally evocative situations. Empirical studies have found that supportive emotion socialization strategies (e.g., acceptance and assistance with children's emotions) are associated with children's higher parasympathetic regulatory capacities (e.g., higher baseline vagal tone and greater vagal tone suppression) during parent-child interactions (Gottman et al., 1996). Interventions on improving parents' emotion socialization practices have resulted in less somatic complaints in youth (Kehoe, Havighurst, & Harley, 2015).

Although these findings are promising, prior work has focused primarily on regulatory physiology in general social context, and not on physiological responses to stress. Therefore, in the current study we used the Trier Social Stress Test (TSST; Kirschbaum, Pirke, & Hellhammer, 1993), which is one of the most commonly used paradigms to reliably induce acute psychosocial stress in a laboratory setting (Dickerson, Gruenewald, &

Kemeny, 2004; Eisenberger, Taylor, Gable, Hilmert, & Lieberman, 2007). The main purpose of this study was to examine whether emotion socialization predicted physiological and psychological responses to stress. This study focused on late adolescence and emerging adulthood, a developmental period characterized by many stresses and challenges that accompany the transition from adolescence into young adulthood (Arnett, 2000). Possible gender and ethnic differences in the effects of emotion socialization on stress reactivity were also explored.

Physiological Responses to Stress

Psychobiological responses to stress encompass two major systems: the autonomic nervous system (ANS) and the hypothalamic pituitary adrenocortical (HPA) axis (Chrousos, 2009). The ANS involves two coordinated, but also opposing systems: the excitatory sympathetic nervous system (SNS) and the inhibitory parasympathetic nervous system (PNS) (Porges, Doussard-Roosevelt, & Maiti, 1994). The SNS mobilizes bodily energy, whereas the PNS conserves and restores energy (Freeman, Dewey, Hadley, Myers, & Froelicher, 2006). In a stressful situation, activity of the SNS becomes dominant and produces a higher level of physiological arousal (e.g., increased heart rate and blood pressure) to cope with the stressor. By contrast, during rest the PNS is dominant and maintains a lower level of physiological arousal (e.g., decreased heart rate and blood pressure) (Appelhans & Luecken, 2006). The complex interactions between the two systems contribute to changes in cardiovascular activities (Stroud et al., 2009). ANS activation is quick (in seconds) and is typically considered as a "defense reaction" (Henry, 1993) – an active response to challenging, but controllable environmental demands (Schommer, Hellhammer, & Kirschbaum, 2003).

Stress also activates the HPA axis, triggering a sequence of events that involves the secretion of the corticotropic-releasing hormone (CRH) from the hypothalamus, stimulating the secretion of adrenocorticotropic hormone (ACTH) from the anterior pituitary gland, and the release of glucocorticoid hormones by the adrenal cortex (Tsigos & Chrousos, 2002). The main glucocorticoid hormone in humans is cortisol, which helps mobilize resources to meet the increased metabolic demands required to deal with the stressors (Kudielka & Kirschbaum, 2005). The secretion of cortisol occurs relatively slowly (in minutes) (Chen et al., 2015). HPA activation is typically considered as a "defeat reaction," occurring when the situation is perceived to be uncontrollable and with no hope of success (Björntorp, 2001; Henry, 1993).

A number of studies show that acute psychosocial stressors increase the reactivity of SNS and inhibit the reactivity of PNS, leading to increased heart rate, systolic blood pressure (SBP), and diastolic blood pressure (DBP) (Jezova, Makatsori, Duncko, Moncek, & Jakubek, 2004; Ulrich-Lai & Herman, 2009). Acute psychosocial stressors also elicit elevated HPA axis activity and increased cortisol secretion (Gaab et al., 2002; Kirschbaum et al., 1993; Sawchenko & Ericsson, 2000), especially stressors that are uncontrollable or characterized by social-evaluative threat (Dickerson & Kemeny, 2004). Although activation of the two stress systems is crucial for survival, chronic or repeated physiological responses to stressors may lead to dysregulation of stress systems, contributing to various physical and psychological disorders (Carney, Freedland, & Veith, 2005; Charmandari, Tsigos, & Chrousos, 2005; Stroud et al., 2009).

In the current study, we investigated whether retrospective reports of emotion socialization in childhood predict physiological responses to stress. Specifically, we fo-

cused on parental responses to negative emotions and both ANS (heart rate, SBP and DBP) and HPA axis reactivity (salivary cortisol) to acute psychosocial stress (the TSST).

Psychological Responses to Stress

It has been well documented that acute stress elicits heightened psychological responses, especially negative emotions (Allen, 2014). Besides emotional reactivity, individuals also react to stress by conscious cognitive effort to deal with the stressor, or mental effort mobilization (Brehm & Self, 1989; Gendolla & Richter, 2010). The intensity of mobilized efforts is determined by subjective task difficulty and performance contingent incentive (Gendolla & Krüsken, 2002; Wright, 2008). Effort typically increases with task difficulty, as long as the demands do not exceed the person's abilities (e.g., the task is viewed as doable) and the outcomes are justified (e.g., success is worth the efforts) (Gendolla & Richter, 2010). Thus, even with the same stressor, people might mobilize different levels of mental efforts (e.g., trying hard vs. giving up), due to differences in subjective evaluation of the task difficulty and importance of dealing with the stressor.

Thus, psychological responses to stress involve negative emotions and effort mobilization. However, these two domains have been typically studied in separate lines of research, so little is known about the relationship of these two types of responses. This study examined if emotion socialization predicts both types of psychological responses to stress. Specifically, we focused on parental responses to negative emotions and psychological responses (negative emotions and mental effort mobilization) to acute psychosocial stress (the TSST).

The Moderating Role of Gender and Ethnicity

Findings regarding gender differences in stress-related physiological responses

are inconsistent. Some studies found no gender differences in either cardiovascular (e.g., SBP and DBP) or HPA axis reactivity to acute stressors (Dickerson & Kemeny, 2004; Girdler, Turner, Sherwood, & Light, 1990; Kelly, Tyrka, Anderson, Price, & Carpenter, 2008). In contrast, other studies revealed that females show greater heart rate increase and males demonstrate greater salivary cortisol responses to acute stress (Kudielka, Buske-Kirschbaum, Hellhammer, & Kirschbaum, 2004; Kudielka et al., 2000; Lovallo, 2006; Spangler, 1997). In addition, dysregulation of the HPA axis has been proposed to be a major contributor to higher rates of depression in females (Oldehinkel & Bouma, 2011). With regard to psychological responses to stress, females tend to report higher level of negative emotions compared to males (Kelly et al., 2008; Kudielka et al., 2004; Troisi, 2001). Although gender differences in effort mobilization have received little attention in research, men tend to have higher SBP baseline values than women and no gender differences in effort-related cardiovascular reactivity have been observed (Gendolla, Richter, & Silvia, 2008). Therefore, the current study aimed to explore possible gender differences in both physiological and psychological responses to acute stressor, which may contribute to gender disparities in mental and physical health outcomes (Kudielka & Kirschbaum, 2005).

It has been well documented that racial/ethnic minorities, especially African Americans individuals, have higher rates of stress-related diseases (e.g., cardiovascular disease, hypertension, and stroke), higher mortality rates, and lower life expectancies than European American individuals (Kahn & Fazio, 2005; Williams, Neighbors, & Jackson, 2003). Psychosocial stress has been proposed to be a potential contributor to the observed health disparities, because ethnic minorities tend to be exposed to more psychoso-

cial stressors (Turner & Avison, 2003; Utsey et al., 2013) that can cause adverse physiological effects (Stroud et al., 2009). Mixed findings have been reported for ethnic differences in cardiovascular responses to acute stress, with some studies finding higher levels of cardiovascular baseline activity and reactivity to laboratory stressors in African American adults and others finding lower levels (Gillin et al., 1996).

Surprisingly, few studies have examined ethnic differences in HPA axis reactivity (DeSantis et al., 2007; Finney, Stoney, & Engebretson, 2002). One study found that African American adolescents have flatter cortisol slopes across the waking day than European American youth (DeSantis et al., 2007), a pattern which has been associated with poorer health outcomes (Adam & Gunnar, 2001). Thus, one aim of the current study was to examine possible ethnic differences in physiological and psychological responses to a standardized social-evaluative stressor (the TSST).

Goals and Hypotheses

Based on the literature reviewed, the purpose of this study was to investigate the associations between parental emotion socialization and physiological and psychological responses to stress. We hypothesized that more unsupportive and less supportive parental response to negative emotions would be linked with stronger physiological reactivity, lower levels of effort mobilization, and heightened negative emotional responses to acute psychosocial stress. Possible gender and racial differences in these effects were also explored.

Method

Participants

Participants were 973 individuals (*M* age = 19.20 years, *SD* = 1.13; range = 16-23) participating in a larger community-based study of adolescent health. Youth were recruited from fifth grade classrooms in public schools in a large city in the Southeast U.S. and followed throughout adolescence. Because perceived emotion socialization was assessed only at the last wave (Wave 4), data from previous assessments are not included in this report. Of the current participants, 50% (n = 487) were male and 50% (n = 486) were female. Approximately 63% (n = 617) of participants were African American, 34% (n = 331) were European American, and 3% (n = 25) were other ethnicities. About 7% of current participants dropped out of high school, 9% were still in high school, 30% completed high school but were not in college, and 54% were in college. Regarding parental education, 7% did not complete high school, 21% completed high school but did not attend college, 33% had some college education or a 2 year degree, and 39% graduated from a 4-year college or had a graduate degree.

Procedures

All study procedures were approved by the University of Alabama at Birmingham Institutional Review Board. After providing informed consent, each participant was interviewed individually by a trained interviewer. Most participants were interviewed in person at a university research lab, but individuals who have moved away from the local area (9%) were interviewed over the phone, and those participants did not attend the TSST task. The interview included self-report questionnaires that were administered through computer-assisted technology, anthropometric measurement of height and weight,

as well as Trier Social Stress Task (TSST, Kirschbaum et al., 1993). Blood pressure and heart rate were measured from baseline throughout the task and during a recovery period, and salivary cortisol was obtained at baseline, at peak stress, and at recovery. All interviews were conducted in the afternoon to minimize the effects of diurnal variation in cortisol production (Granger, Johnson, Szanton, Out, & Schumann, 2012). Participants were prescreened to exclude those with conditions that might affect cortisol level.

Measures

Emotion socialization

Emotion socialization was measured using the Emotions as a Child Scale (EAC; Magai & O'Neal, 1997), a measure assessing youth-reported parental emotion socialization practices for anger, fear and sadness. In the current study, the abbreviated version of the EAC (Guo, Mrug, & Knight, 2016) was used to provide broader conceptualization of emotion socialization. The abbreviated EAC is composed of two subscales across the three emotions: supportive and unsupportive parental responses (7 and 5 items, respectively). The supportive parental responses subscale includes the reward (e.g., "comforted me"), neglect (e.g., "focused on me"; reverse-coded), and override (e.g., "told me to cheer up") dimensions from the original EAC. The unsupportive parental responses subscale combines the punish (e.g., "let me know s/he did not approve") and magnify (e.g., "got very sad") items from the original EAC. Participants were asked to rate how often their parent responded to each emotion in the given way when they were children on a scale ranging from 1 (Never) to 5 (Very often). In the current study, item scores for the supportive and unsupportive scales were averaged across the three emotions (21 supportive and 15 unsupportive items). Cronbach's alphas were .96 and .87, respectively.

Trier social stress test

After getting acclimated to the lab environment and being interviewed for approximately 60 minutes, participants were asked to rest for five minutes (baseline) and then were introduced to the Trier Social Stress Test (TSST; Kirschbaum et al., 1993). They were asked to do their best on the task, and informed that those performing at the top 20% would receive a special prize. Participants were then given five minutes to prepare a speech for a job interview and then five minutes to present the speech in front of two judges. Next, participants were asked to do a mental arithmetic task (serial subtraction) for another five minutes, with the difficulty level adjusted based on the participants' performance to achieve similar difficulty level for each participant. The judges wore white coats and provided no positive feedback throughout the test. The participants were also videotaped during the tasks.

Heart rate and blood pressure

Before the baseline period started, a wrist cuff from Vasotrac blood pressure monitor was attached on each participant's non-dominant hand. Heart rate and blood pressure were recorded every 30 seconds from baseline throughout the task and a 5-minute recovery period. Baseline levels of heart rate and blood pressure were computed as the average of the last 2 baseline measurements (to allow participants to achieve a true baseline). Heart rate and blood pressure during the remaining periods (preparation, speech, math, and recovery) were averaged within each period (i.e., 10 measurements per each 5-minute period).

Saliva collection

Salivary cortisol is the most commonly used non-invasive biomarker of HPA axis responses (Skoluda et al., 2015). Saliva samples were collected using passive drool immediately before the baseline period (pre-task), 30 minutes after the 15-minute task began (15 minutes post-task; peak stress), and 55 minutes after the task began (40 minutes post-task; recovery). Samples were immediately frozen at -20 ºC and later shipped overnight on dry ice for cortisol analyses at the Institute for Interdisciplinary Salivary Bioscience Research at Arizona State University.

Psychological responses to stress

A self-report questionnaire was administered immediately after the TSST to assess participants' psychological responses to psychosocial stress. Participants were asked to rate their experiences with the speech and math tasks using 16 items on a scale ranging from 1 (Not at all) to 5 (Very much). Two subscales were derived with exploratory factor analysis – effort mobilization and negative emotions subscales (4 and 9 items, respectively; see Data Analyses and Results). Sample items include: "I tried hard to make a good impression on the audience" (effort mobilization); "During the tasks, I felt ashamed" (negative emotions). Cronbach's alphas were .83 and .89 for the effort mobilization and negative emotion subscales, respectively.

Covariates

Covariates include participants' age, gender, race, academic status, parental education, body mass index (BMI), and time of day when saliva samples were taken. Gender was coded 0 for male and 1 for female; ethnicity was coded 0 for European American and 1 for African American or other. Academic status was coded into three dummy coded

variables: dropped out of high school, still in high school, and completed high school but not in college; being in college served as the reference group. Parental education was reported on an ordinal scale ranging from 'did not complete high school' (1) to 'graduated from a 4-year college or had a graduate degree' (4).

Data Analyses

Descriptive statistics were performed and outliers truncated to 3 SD from the mean. Then, bivariate correlations among main variables were examined. Gender and ethnic differences among all main variables were examined using independent-samples t-test. Missing data were handled using Full Information Maximum Likelihood (FIML) in all analyses (Wothke, 2000). Because some of the variables were not normally distributed, the maximum likelihood estimation with robust standard errors (MLR) was used. The effects of emotion socialization on cortisol reactivity were tested with multiple regressions predicting overall cortisol secretion and its increase throughout the test, computed as areas under the curve with respect to ground and increase (AUC_G and AUC_I), respectively (Pruessner, Kirschbaum, Meinlschmid, & Hellhammer, 2003). The effects of emotion socialization on ANS reactivity to stress were tested using latent growth curve models in Mplus version 7.11. First, the Intraclass Correlation Coefficients (ICC) were estimated from unconditional means models (no predictors). Then, the growth curves of the ANS responses across the five periods (baseline, preparation, speech task, math task, and recovery) were characterized using unconditional growth models with an intercept, linear slope, and quadratic slope. Next, emotion socialization dimensions (supportive and unsupportive parental responses) were included as predictors of the growth curve parameters (intercept and slopes). Good fit was indicated by comparative fit index (CFI; Bentler,

1990) > .95, root-mean-square error of approximation (RMSEA; Steiger & Lind, 1980) ≤ .06, and standardized root-mean-square residual (SRMR; Bentler, 1995) ≤ .08. Covariates in all analyses included participants' age, gender, race, academic status, parental education, and body mass index (BMI). The cortisol analyses were also adjusted for time of day when saliva samples were taken.

For the psychological response model, exploratory factor analysis (EFA) was first conducted to explore the factorial structure of the TSST questionnaire. Factorability of the items was first examined with item correlations, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO), and the Bartlett's test of sphericity. Then, EFA was conducted using principal axis factor extraction and oblique rotation. If factor correlations were less than .32, the EFA was rerun with orthogonal rotation (Tabachnick & Fiddell, 2007). Multiple criteria were utilized to inform factor retention, including (a) eigenvalues > 1 (Kaiser, 1960), (b) the scree test (Cattell, 1966), (c) Horn's parallel analysis (HPA; Horn, 1965) and (d) Velicer's minimum average partial correlation (MAP; Velicer, 1976). Among these approaches, HPA and MAP tend to be the best criteria for determining the number of factors (Velicer, Eaton, & Fava, 2000). For the final factor solution, several items were eliminated based on low factor loadings (<.40), low communalities (≤.40), or cross-loadings across factors (>.40). Cronbach's alpha was used to examine internal consistency of the final factors.

Next, the effects of emotion socialization on psychological responses to stress were tested using path analysis in Mplus Version 7.11. Independent variables included supportive and unsupportive parental responses to negative emotions. Dependent variables included effort mobilization and negative emotions to stress. The independent and

dependent variables were allowed to covary. Covariates included participants' age, gender, race, academic status, and parental education.

Finally, multigroup modeling was conducted to explore possible gender and ethnic (African American vs. European American) differences for each physiological and psychological response model. The multigroup analyses compared the fit of a constrained model (all path estimates were constrained to be equal across gender or ethnic groups) with the fit of an unconstrained model (all path estimates were allowed to vary across groups). Moderation was indicated by a significantly better fit of the unconstrained model compared to the constrained model. If a model showed group differences, follow-up analyses investigated specific differences by freeing a single path at a time and comparing it to the fully constrained model. Again, a significantly better fit of the less constrained model indicated that the freed path varied across the two groups. To prevent inflation of Type I error due to multiple testing, these follow up analyses used Bonferroni correction with *p* level set at .025 for the cortisol reactivity model, .008 for the ANS reactivity models and .0125 for the psychological responses model.

Results

Preliminary Analyses

Correlations among main variables showed that supportive parental responses to negative emotions were associated with higher heart rate during the speech part of TSST ($r = .08$, $p < .05$) and higher reported effort mobilization ($r = .07$, $p < .05$), whereas unsupportive parental responses were linked to lower heart rate during the math part ($r = -.07$, $p < .05$) and more negative self-reported emotions during the task ($r = .11$, $p < .01$). In addition, SBP and DBP were highly correlated across the five time periods ($r = .92$

to .94, $p < .001$). Thus, only SBP was used in further analyses. Finally, effort mobilization was related to higher heart rate and SBP during the speech part ($r = .06$, $p < .05$ for heart rate, $r = .07$, $p < .05$ for SBP) and negative self-reported emotion was associated with higher heart rate at baseline and during the recovery period ($r = .08$, $p < .05$ for baseline, $r = .07$, $p < .05$ for recovery).

Independent-samples t tests (Table 1) indicated that females reported more supportive parental responses and fewer unsupportive parental responses to negative emotions compared to males. In addition, females had higher heart rate and lower SBP and cortisol levels (AUC_G and AUC_I) than males. Finally, females reported more negative emotions but similar level of effort mobilization during the TSST compared to males. In terms of ethnic differences, African American participants reported more unsupportive parental responses to negative emotions than European American participants, but similar levels of supportive responses. In addition, African American participants had lower heart rate and cortisol levels (AUC_G and AUC_I), as well as higher baseline SBP. Finally, African American participants reported more negative emotions but similar level of effort mobilization during the TSST compared to European American participants.

Main Analyses

Emotion Socialization and Physiological Responses to Stress

Cortisol reactivity model. Multiple regression analyses tested whether supportive and unsupportive parental responses predicted cortisol secretion. We hypothesized that individuals who received less supportive and more unsupportive parental response to negative emotions would show higher cortisol reactivity to the TSST. However, after

Table 1

Gender and Ethnic Differences in Main Variables

	Female M (SD)	Male M (SD)	t-value	African American M (SD)	European American M (SD)	t-value
Supportive	3.87 (0.78)	3.72 (0.71)	3.08**	3.78 (0.80)	3.84 (0.64)	-1.24
Unsupportive	2.21 (0.65)	2.38 (0.64)	-4.13***	2.35 (0.71)	2.21 (0.54)	3.46**
Heart rate, baseline	75.81 (11.75)	69.35 (12.54)	8.28***	71.77 (12.64)	73.64 (12.20)	-2.20*
Heart rate, preparation	88.15 (15.17)	79.00 (15.07)	9.44***	81.56 (15.22)	87.14 (16.21)	-5.26***
Heart rate, speech	93.69 (18.85)	83.88 (17.86)	8.31***	85.61 (17.78)	94.66 (19.79)	-6.92***
Heart rate, math	89.42 (17.80)	80.86 (16.22)	7.82***	83.16 (17.09)	88.71 (17.73)	-4.68***
Heart rate, recovery	78.94 (13.35)	72.11 (13.38)	7.93***	74.23 (13.78)	77.75 (13.45)	-3.76***
SBP, baseline	121.69 (15.99)	128.88 (20.13)	-6.16***	126.43 (18.19)	123.56 (18.73)	2.29*
SBP, preparation	133.06 (20.30)	143.35 (23.75)	-7.26***	138.48 (22.02)	138.22 (23.55)	0.17
SBP, speech	139.85 (24.66)	150.60 (28.37)	-6.31***	145.03 (25.99)	146.12 (28.74)	-0.59
SBP, math	138.47 (23.77)	150.43 (27.93)	-7.18***	144.07 (26.31)	146.08 (27.08)	-1.11
SBP, recovery	131.02 (19.90)	139.68 (21.59)	-6.49***	136.11 (21.16)	134.44 (21.16)	1.15
AUC_G	11.30 (9.15)	13.83 (8.10)	-4.43***	11.10 (7.31)	14.90 (9.99)	-5.95***
AUC_I	1.40 (5.38)	3.43 (6.35)	-5.19***	1.61 (4.96)	3.68 (6.90)	-4.71***
Effort mobilization	3.55 (1.09)	3.59 (1.03)	-0.48	3.53 (1.12)	3.65 (0.94)	-1.77
Negative emotions	2.80 (1.06)	2.38 (0.97)	6.41***	2.79 (1.09)	2.24 (0.85)	8.50***

Note: Supportive - supportive parental responses to child emotions; Unsupportive - unsupportive parental responses to child emotions; SBP - systolic blood pressure; AUC_G – area under the curve, ground; AUC_I – area under the curve, increase.
*p<.05, **p<.01, *** p<.001

adjusting for covariates, neither type of parental responses predicted cortisol reactivity (see Table 2).

Next, multigroup modeling tested gender and racial differences in the effects of parental responses on cortisol secretion. Significant gender differences emerged for both AUC_G and AUC_I models (AUC_G: χ^2 (11) = 22.15, $p < .05$; AUC_I: χ^2 (11) = 44.25, $p < .001$). Using Bonferroni correction for multiple testing, unsupportive parental responses uniquely predicted lower levels of AUC_G and AUC_I in females, whereas these effects were not significant for males (see Table 3). Although the effects of supportive parental responses also varied by gender, the path coefficients were not significant for either gender.

Similarly, multigroup modeling indicated significant racial differences in parental responses predicting cortisol levels (AUC_G: χ^2 (11) = 48.62, $p < .001$; AUC_I: χ^2 (11) = 40.66, $p < .001$). In this case, supportive parental responses to negative emotions uniquely predicted greater cortisol levels only in European American youth for both AUC_G and AUC_I, whereas unsupportive parental responses uniquely predicted lower cortisol levels only in African American youth for AUC_I (see Table 3).

ANS reactivity models. Unconditional means models yielded Intraclass Correlation Coefficients (ICC) of .20 for heart rate and .23 for SBP, indicating that 20% and 23% of the total variation in heart rate and SBP was due to differences among individuals (vs. changes within individuals over time). Then, unconditional growth models with an intercept, linear slope, and quadratic slope were conducted for heart rate and SBP across the five periods (baseline, preparation, speech task, math task, and recovery). As shown in Table 4, both unconditional growth models fit the data well. In both models, the linear

Table 2

Overall Path Coefficients of the Cortisol Reactivity Model

	AUC_G		AUC_I	
Variable	β	*p*	β	*p*
Supportive	-0.00	0.92	0.01	0.66
Unsupportive	-0.04	0.21	-0.05	0.11

Note: Supportive - supportive parental responses to child emotions; Unsupportive - unsupportive parental responses to child emotions; AUC_G – area under the curve, ground; AUC_I – area under the curve, increase. Covariates included participants' age, gender, race, academic status, parental education, body mass index, and time of day when saliva samples were taken.

Table 3

Gender and Ethnic Differences in Unstandardized Path Coefficients of the Cortisol Reactivity Models

	Male	Female	$\Delta\chi^2(1)$	*p*	European American	African American	$\Delta\chi^2(1)$	*p*
AUC_G								
Supportive	0.28	-0.37	13.25	<.001	**0.69***	-0.16	25.27	<.001
Unsupportive	-0.07	**-1.09***	14.17	<.001	0.78	-0.54	19.82	<.001
AUC_I								
Supportive	0.44	-0.14	25.55	<.001	**0.60***	0.20	9.59	<.01
Unsupportive	0.10	**-0.80****	25.24	<.001	0.23	**-0.54***	12.62	<.001

Note: Supportive - supportive parental responses to child emotions; Unsupportive - unsupportive parental responses to child emotions; AUC_G - area under the curve, ground; AUC_I - area under the curve, increase. Bolded items indicate significantly stronger path coefficients.
*p<.05, **p<.01.

slopes were significant and positive, indicating initial increase in heart rate and SBP after baseline. In addition, the quadratic slopes were significant and negative, reflecting a deceleration and eventual decline. The variance of intercept, linear slope and quadratic slope were significantly different from zero, indicating individual variability in these growth parameters.

Next, supportive and unsupportive parental responses to negative emotions were included as predictors of the three growth parameters, together with all covariates. As shown in Table 5, these conditional models had excellent model fit. Although supportive and unsupportive parental responses did not predict growth curve parameters of the two models, gender and race did. Specifically, females and European American participants had higher initial heart rate, followed by faster increase and greater quadratic deceleration than males and African American participants, respectively (see Figure 1). Additionally, females had lower initial SBP, followed by slower increase and slower quadratic deceleration than males, and African American participants had slower increase in SBP than European American participants, although these groups did not differ in initial level and quadratic deceleration (see Figure 2).

Then, multigroup modeling was used to examine gender and ethnic differences in the effects of parental responses on heart rate and SBP responses. However, no significant differences were detected (for gender: heart rate χ^2 (27) = 34.00, p = .17; SBP χ^2 (27) = 27.28, p = .45; for ethnicity: heart rate χ^2 (27) = 43.17, p = .03, but no ethnic differences were found for supportive and unsupportive parental responses paths; SBP χ^2 (27) = 23.00, p = .68).

Table 4

Results of Fitting Unconditional Latent Growth Curve Models for Quadratic Individual Change in Heart Rate and Systolic Blood Pressure

Variable	Parameter	Outcome	
		Heart Rate	SBP
Fixed effects			
Initial status	$\mu_{\pi 0}$	72.42***	125.24***
Linear rate of change	$\mu_{\pi 1}$	14.66***	16.86***
Quadratic rate of change	$\mu_{\pi 2}$	-3.48***	-3.59***
Variance components			
Level 1			
Baseline	$\sigma^2_{\varepsilon 1}$	16.64	-3.07
Preparation	$\sigma^2_{\varepsilon 2}$	56.78***	119.80***
Speech	$\sigma^2_{\varepsilon 3}$	91.84***	185.12***
Math	$\sigma^2_{\varepsilon 4}$	71.11***	155.64***
Recovery	$\sigma^2_{\varepsilon 5}$	41.65***	97.45***
Level 2			
Initial status	$\sigma^2_{\pi 0}$	144.43***	356.52***
Linear rate of change	$\sigma^2_{\pi 1}$	135.63***	239.51***
Quadratic rate of change	$\sigma^2_{\pi 2}$	6.82***	10.28***
Initial status × Linear rate of change	$\sigma^2_{\pi 01}$	-15.44	-40.55
Initial status × Quadratic rate of change	$\sigma^2_{\pi 02}$	2.33	3.25
Linear rate of change × Quadratic rate of change	$\sigma^2_{\pi 12}$	-30.14***	-48.66***
Goodness-of-fit			
χ^2 (df = 6)		32.92***	22.46**
CFI		0.98	0.98
RMSEA		0.07	0.05
SRMR		0.02	0.05

Note: SBP- Systolic Blood Pressure

***p* <.01, *** *P*<.001

Table 5

Selected Parameter Estimates and Standard Errors for Heart Rate and Systolic Blood Pressure Reactivity Using Conditional Latent Growth Curve Models

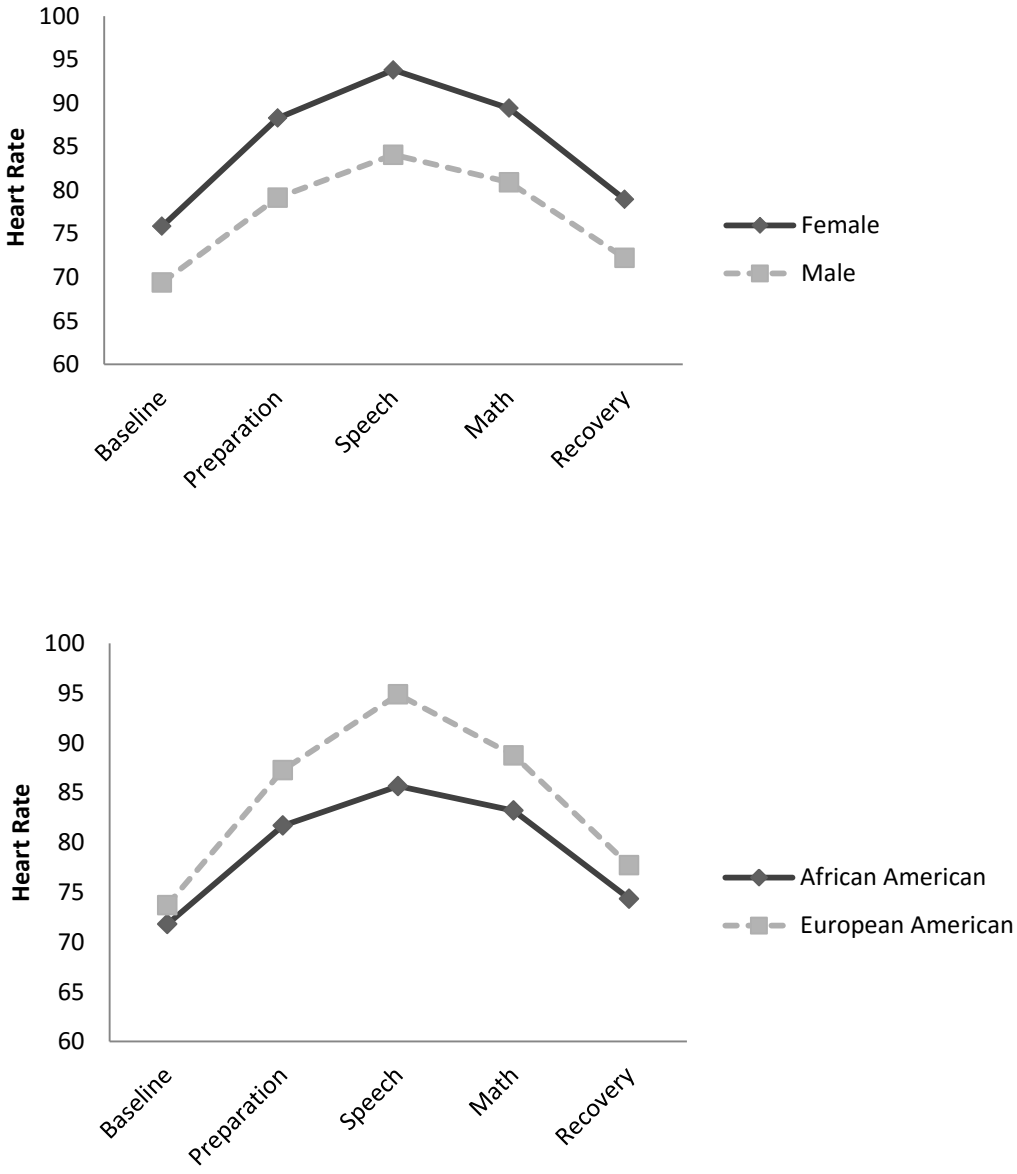
	Intercept		Linear growth		Quadratic growth	
Variable	Estimate	*SE*	Estimate	*SE*	Estimate	*SE*
Heart Rate						
Growth factor mean	64.79***	8.07	31.43***	8.33	-6.91***	1.93
Supportive	0.00	0.03	0.01	0.04	-0.00	0.04
Unsupportive	0.05	0.03	-0.02	0.04	0.01	0.04
Female	0.28***	0.04	0.14***	0.04	-0.15***	0.04
African American	-0.11**	0.04	-0.14**	0.04	0.15**	0.05
Systolic Blood Pressure						
Growth factor mean	139.38***	12.73	50.88***	12.90	-11.41***	2.84
Supportive	-0.03	0.03	0.05	0.04	-0.03	0.04
Unsupportive	-0.03	0.03	-0.05	0.04	0.06	0.05
Female	-0.22***	0.03	-0.18***	0.04	0.20***	0.04
African American	0.06	0.04	-0.09*	0.05	0.10	0.05

	Goodness-of-fit	
	Heart Rate	Systolic Blood Pressure
χ^2 (df = 26)	88.43***	52.08**
CFI	0.98	0.99
RMSEA	0.05	0.03
SRMR	0.01	0.02

Note: Supportive - supportive parental responses to negative emotions; Unsupportive - unsupportive parental responses to negative emotions

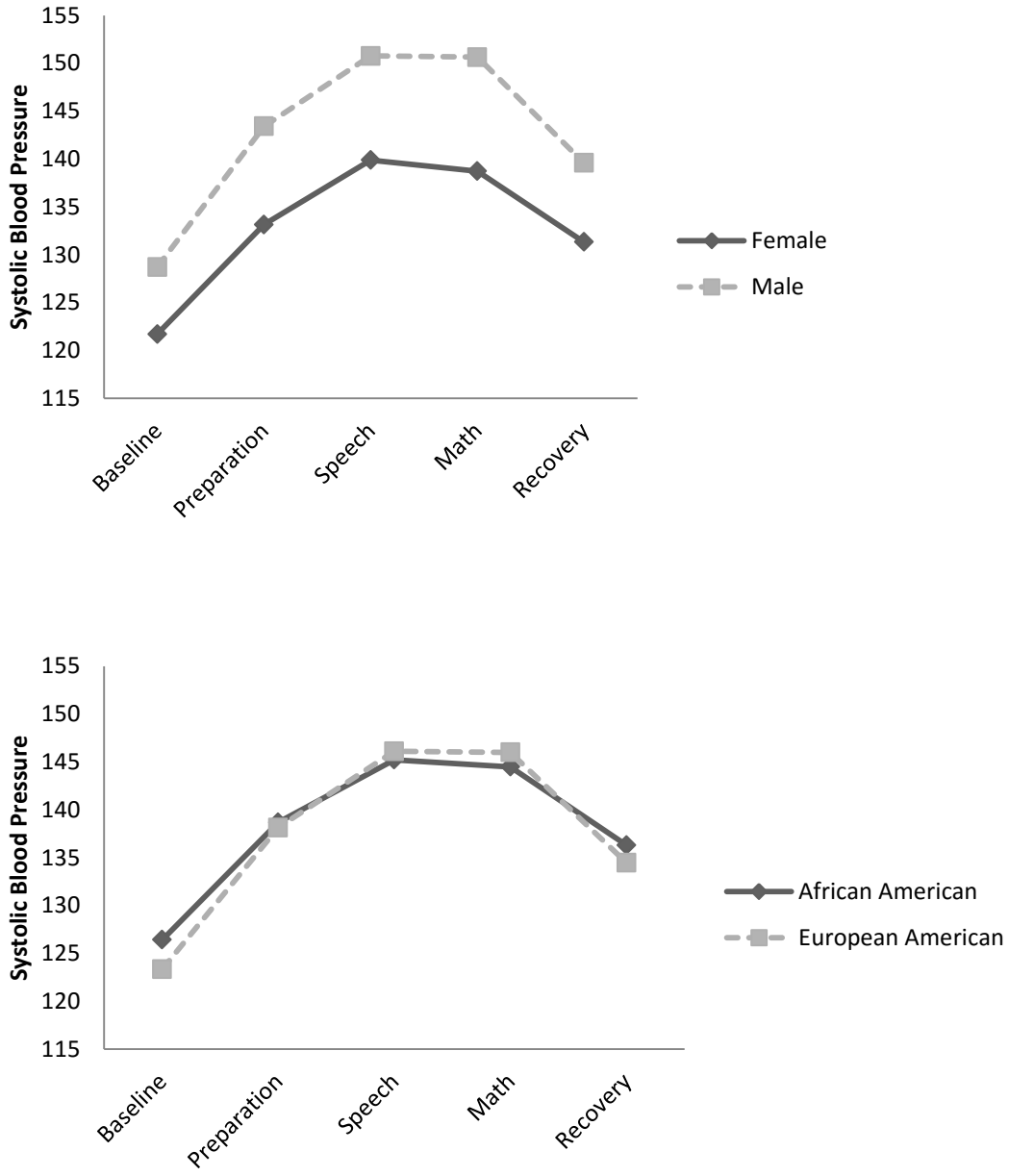
*p < .05,**p <.01, *** P<.001

Figure 1 *Heart Rate Responses to the TSST across Gender and Ethnicity*



Note: Figures are based on model-based estimates.

Figure 2 *Systolic Blood Pressure Responses to the TSST across Gender and Ethnicity*



Note: Figures are based on model-based estimates.

Factor Analysis of the TSST Questionnaire. Factorability of the 16 items was supported by a number of correlations greater than .30, KMO values of .89 (above the recommended value of .60), and significant Bartlett's tests of sphericity ($\chi^2(120) = 6953.86$, $p < .001$). The criterion of eigenvalue greater than 1 suggested the extraction of 3 factors accounting for 33.60%, 19.41%, and 6.62% of the total variance, respectively. However, the eigenvalue of the third factor (1.06) was only slightly greater than 1, making the retention of the third factor an arbitrary decision (Zwick & Velicer, 1986). The scree plot showed a significant slope change after 2 factors, indicating a two-factor solution. For the Velicer's MAP Test, it took 2 steps to get to the lowest average squared partial correlation, also suggesting 2 factors. Finally, parallel analysis showed that only the first two eigenvalues exceeded the 95th percentile eigenvalues from random data, indicating the presence of two factors. Given these results, two factors were retained.

Based on the EFA results, three items were eliminated because of low communalities (<.40; items 15 and 16) and cross-loadings (>.40; item 3) (see Table 6). The EFA was repeated with the remaining 13 items, yielding two factors with 4 and 9 items, respectively. The first factor was named 'effort mobilization', including items 5, 6, 9, and 11 (Cronbach's alpha = .83). The second factor was named 'negative emotions', including items 1, 2, 4, 7, 8, 10, 12, 13, and 14 (Cronbach's alpha = .89). Overall, the two factors accounted for 58.19% of the total variance. All items had factor loadings above .60 and were free from cross-loadings. The factor loadings for the original 16-item solution and the final 13-item solution are presented in Table 6, together with eigenvalues and percentages of variance explained by each factor.

Table 6

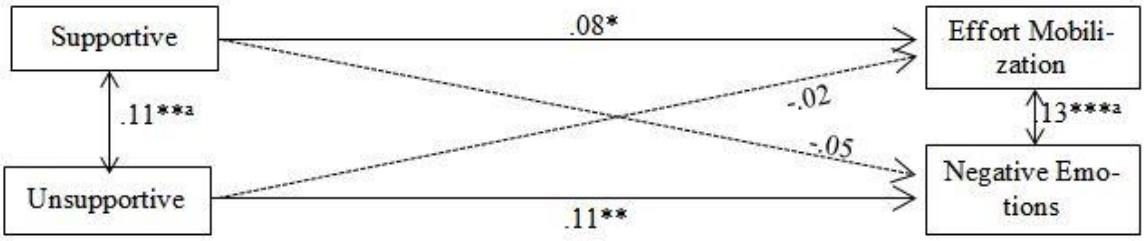
Factor Loadings, Eigenvalues and Variance Explained by Each Factor for the Original TSST Questionnaire (16 items) and the Final Solution (13 items)

Item	16 Items		13 items	
During the tasks,	I	II	I	II
4. I felt angry	.77		.79	
1. I felt upset	.74		.76	
14. I felt hostile	.73		.75	
10. I felt irritated	.74		.75	
12. I gave up trying to do well	.73		.72	
2. I gave up because the tasks were too difficult	.71		.71	
7. I felt ashamed	.70		.69	
8. Trying hard would increase my humiliation	.68		.68	
13. The tasks were very stressful	.65		.66	
16. I performed very well	-.48			
9. I tried hard to make a good impression		.82		.84
6. I did not want to be underestimated so tried my best		.82		.84
5. I tried hard to prove that I can do better than others		.77		.79
11. It was important for me to do well		.76		.77
3. I tried hard not to embarrass myself	.46	.52		
15. The tasks took a lot of effort		.44		
Eigenvalue	5.38	3.11	4.38	2.61
Explained Variance (%)	33.60	19.41	36.48	21.76

Note: Loadings < .40 omitted.

Psychological reactivity model. The results from the psychological responses model (see Figure 3) showed that, after adjusting for all covariates, supportive parental responses to negative emotions predicted higher effort mobilization (β = .08, p = .02), whereas unsupportive parental responses predicted higher negative emotions (β = .11, p = .001).

Figure 3 *Global Emotion Socialization on Psychological Responses to Stress*



Note: [a] correlations between residual
Dashed lines indicate nonsignificant paths
*p<.05, **p<.01, ***p<.001

Multigroup modeling showed significant gender differences in the psychological reactivity model (χ^2 (16) = 60.46, p < .001). Follow up tests using Bonferroni correction indicated that supportive parental responses to negative emotions predicted less negative emotions in males only, whereas unsupportive parental responses predicted more negative emotions in females only (see Table 7). There were no significant gender differences in the links between parental responses and effort mobilization.

Multigroup modeling also showed significant ethnic differences in the psychological reactivity model (χ^2 (16) = 41.43, p < .001). Follow up tests using Bonferroni correction indicated that supportive parental responses to negative emotions predicted less negative emotions in European American participants only, whereas unsupportive parental responses predicted more negative emotions in African American participants only (see

Table 7). There were no significant ethnic differences in the links between parental responses and effort mobilization.

Table 7

Gender and Ethnic Differences in Unstandardized Path Coefficients of the Psychological Reactivity Model

	Male	Female	$\Delta \chi^2(1)$	*p*	European American	African American	$\Delta \chi^2(1)$	*p*
Supportive-Effort	.12*	.10*	1.20	.27	.16**	.12*	3.34	.07
Supportive-Emotion	**-.13****	-.01	52.09	<.001	**-.14****	-.03	26.52	<.001
Unsupportive-Effort	-.02	-.06	2.35	.12	-.01	-.05	1.33	.25
Unsupportive-Emotion	.09	**.28*****	50.95	<.001	.06	**.23*****	26.60	<.001

Note: Supportive - supportive parental responses to child emotions; Unsupportive - unsupportive parental responses to child emotions
Bolded items indicate significantly stronger path coefficients
*p<.05, **p<.01, ***p<.001.

Discussion

This study examined the relationships between parental emotion socialization and physiological and psychological responses to acute stress in late adolescence and emerging adulthood. Although parental emotion socialization strategies were not related to overall physiological reactivity, supportive parental responses predicted higher self-reports of effort mobilization and unsupportive parental responses predicted greater negative emotions during acute social stress. Additional unique effects emerged when examining gender and ethnic differences, indicating the importance of examining the effects of parental emotion socialization from a gender- and culture-specific perspective. Specifically, unsupportive parental responses to negative emotions uniquely predicted lower cortisol reactivity and more negative emotions in females and African American youth,

whereas supportive parental responses predicted higher cortisol reactivity and less negative emotions in European American youth, as well as less negative emotions in males. The differential effects of parental unsupportive and supportive responses to emotions are consistent with prior research documenting the unique roles of supportive and harsh parenting in child developmental outcomes (Krenichyn, Saegert, & Evans, 2001).

Parental Emotion Socialization and Physiological Reactivity to Stress

This study found that unsupportive parental responses to children's negative emotions were related to lower cortisol reactivity to the TSST in females. The association may reflect a physiological habituation effect, wherein repeated exposure to stressful events reduces physiological reactivity to a novel stressor (Groves & Thompson, 1970).There is evidence that stressful early life experience, such as neglect or hostile and harsh parenting, may adversely affect the HPA axis functioning, with hyper-reactive cortisol reactivity to stress in early life (Chorpita & Barlow, 1998). For example, preschool-aged children whose mothers demonstrated hostile parenting behaviors showed greater cortisol reactivity to a laboratory task (Dougherty, Klein, Rose, & Laptook, 2011). However, the repeated or prolonged activation of the HPA axis may compromise its resilience over time, leading to blunted reactivity to acute stressors (Taylor, 2010). For instance, childhood physical abuse was linked to reduced cortisol reactivity to the TSST in adult females (Carpenter, Shattuck, Tyrka, Geracioti, & Price, 2011).

In this case, unsupportive parental responses to children's negative emotions may serve as a chronic stressor that may intensify children's HPA axis reactivity in early life, but reduce these stress responses over time. Because females are more sensitive to social stress (Hampel & Petermann, 2006), they may perceive unsupportive parental responses

to negative emotions as more stressful than males. As a result, unsupportive parental responses may lead to lower cortisol reactivity only in females. This general effect may be strengthened by the nature of the TSST, which involves unsupportive responses from the judges in the TSST that may be similar to the unsupportive parental responses experienced by some participants in their childhood. Importantly, females reported higher negative emotions and similar level of effort mobilization to the TSST than males in the current study, suggesting that the blunted cortisol reactivity in females reporting more unsupportive parental responses is not due to evaluation of the stressor as less stressful or exerting less effort.

Additionally, unsupportive parental responses were associated with blunted cortisol reactivity in African American participants, also indicating a physiological habituation effect. African American individuals are more sensitive to social stress than European American individuals (Sellers, Caldwell, Schmeelk-Cone, & Zimmerman, 2003). Thus, it is possible that they perceive unsupportive parental responses to negative emotions as more stressful, which may over time lead to blunted HPA axis reactivity to social stressors. In general, African American participants reported higher levels of negative emotions and similar levels of effort mobilization to the TSST as European American participants, indicating that the attenuated cortisol response in African American participants endorsing more unsupportive parental responses is not due to evaluating the stressor as less stressful or exerting less effort. Although there has been scarce research on HPA axis reactivity in African American individuals (DeSantis et al., 2007), our study indicates that psychosocial experiences may have different effects on HPA axis functioning in this population.

Finally, parental responses to negative emotions did not predict heart rate or SBP reactivity to the TSST. Although parenting has been associated with youth cardiovascular reactivity in prior research (e.g., Luecken & Lemery, 2004; Taylor, Lerner, Sage, Lehman, & Seeman, 2004), it has been suggested that the influences of parenting is strongest in early years of life and decrease over time (Bell & Belsky, 2008). Thus, any relationships may have dissipated by late adolescence and emerging adulthood, developmental periods included in this study. Longitudinal studies linking parenting with children's cardiovascular responses to stress across childhood and adolescence are needed to better understand these possible developmental changes.

Parental Emotion Socialization and Psychological Reactivity to Stress

Supportive parental responses to negative emotions were associated with higher effort mobilization across gender and ethnic groups, providing evidence for the possibility that emotion socialization influences children's cognitive effort to deal with social stressors. It is possible that supportive parental responses increase problem-solving skills in youth. It is also possible that supportive parental responses foster adaptive attitudes toward social judgments and appraisals. For instance, these youth may be more focused on completing the task rather than the negative evaluations. Indeed, warm and supportive parental behaviors have been linked to better social problem-solving skills and social competence in youth (Domitrovich & Bierman, 2001).

In addition, unsupportive parental responses to negative emotions were associated with higher negative emotions to acute social stressor in females and African American youth, whereas supportive parental responses were linked to lower negative emotions in males and European American youth. These gender and ethnic differences may be related

to female and African American youths' greater sensitivity to social stress discussed above (Hampel & Petermann, 2006; Sellers et al., 2003). This greater sensitivity to social stress, coupled with a history of unsupportive parental responses to negative emotions, may prime these youth to experience more negative emotions when confronted with negative or stressful social situations, perhaps due to poorer emotion regulation skills. On the other hand, supportive parental responses may be more effective in supporting emotion regulation and reducing lower negative emotions in response to stress among individuals less sensitive to social stress, such as males and European American youth.

Considering the physiological and psychological reactivity results together, unsupportive parental response to negative emotions were associated with blunted cortisol reactivity but greater emotional reactivity to a psychosocial stressor in females and African American youth. This pattern of mismatch between physiological and psychological stress responses has been observed in individuals with stressful life experiences. For instance, one study found that females who have been abused during childhood or adolescence showed reduced cortisol reactivity and higher level of perceived stress on the TSST (Pierrehumbert et al., 2009). Similar results were found for adults with fearful attachment (Kidd, Hamer, & Steptoe, 2011). These two empirical studies, as well as our study, failed to find a correlation between subjective and cortisol stress responses, suggesting that these two processes are generally independent.

Limitations and Future Directions

There are several limitations of this study. First, this study used cross-sectional design, thus no causal inferences about the studied relationships could be made. For example, individuals' reactivity to stress may have influenced perceptions of parental re-

sponses to negative emotions. Alternatively, reports of parental responses and stress reactivity may be influenced by a third variable, such as emotional functioning. Longitudinal and intervention research would provide stronger support for the hypothesized directionality of the effects. Second, we relied on retrospective recall of parental emotion socialization from childhood, whose accuracy might be influenced by the linguistic and cognitive skills of the participants (Klimes-Dougan & Zeman, 2007). Third, although multiple indicators of physiological stress response were included, the number of cortisol samples was relatively small. Obtaining more cortisol samples during and after the TSST would provide a more nuanced picture of HPA axis response to stress. Fourth, the average parental education level was high in the current sample, indicating that the sample may not be representative of various socioeconomic backgrounds. It is possible that emotion socialization processes and their associations with stress reactivity may vary by socioeconomic status. Finally, the present study focused on reactivity to a social evaluative stressor. It is possible that physiological and psychological responses vary based on the nature of the stressor. For example, females are more sensitive to interpersonal tasks, whereas males are more motivated by achievement tasks (Kelly et al., 2008). Future research should examine the role of parental emotion socialization in stress reactivity across different types of acute stressors.

Conclusions

This study comprehensively investigated the associations between emotion socialization and physiological and psychological responses to acute psychosocial stress in late adolescence and emerging adulthood. It contributed to the literature by examining both objective and subjective components of stress reactivity in an experimental laboratory

study. Additionally, this study employed multiple indexes of stress reactivity, including salivary cortisol, heart rate, and blood pressure for physiological responses, and negative emotions and effort mobilization for psychological responses. Finally, this study demonstrated the unique roles of emotion socialization practices on stress responses in different gender and ethnic groups. Overall, the findings indicate that unsupportive parental responses were associated with blunted cortisol reactivity and greater negative emotions to a psychosocial stress task in females and African American youth, whereas supportive parental responses predicted greater cortisol reactivity and lower negative emotions to stress in males and European American youth. A better understanding of the underlying mechanisms is needed to inform the development of interventions for specific subgroups of youth.

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CONCLUSIONS

This study systematically examined the relationship between parental emotion socialization and emotional functioning in late adolescence and emerging adulthood. The key aspect of emotion socialization that has been the focus of this study is parental responses to children's negative emotions. Emotional functioning included youth internalizing and externalizing problems, as well as how they responded during an acute social stress task. The results showed that parental responses to children's negative emotions could be categorized into two types – supportive and unsupportive. It was further found that coping styles mediated associations between parental responses and youth internalizing and externalizing problems, with important differences across gender and ethnicity. Finally, unsupportive parental responses to children's negative emotions were associated with blunted cortisol reactivity and greater negative emotions to a psychosocial stress task in females and African American youth, whereas supportive parental responses predicted more adaptive responses to stress in males and European American youth.

The factor structure of the EAC was consistent with prior research characterizing parental responses to children's emotions as supportive or nonsupportive (Root & Denham, 2010). In the present study, warm, focused, and distracting parental responses clustered together and were labeled as 'supportive', whereas punitive and extreme emotional responses were labeled as 'unsupportive'. Next, several interesting findings emerged when examining the predictive utility of the two dimensions in the two empirical studies. First, Paper 2 showed that unsupportive parental responses to fear and sad-

ness were associated with anxiety and depression more strongly in females than in males. These results might be explained by some of the findings from Paper 3: unsupportive parental responses were linked to lower physiological reactivity and higher negative emotions in females only. This mismatch between physiological and psychological responses might lead to the accumulation of higher levels of negative emotions, resulting in more anxiety and depression symptoms in females. In addition, unsupportive parental responses were associated with an absence of task-oriented coping but a higher level of emotion-oriented coping in females. It is possible that the absence of task-oriented coping contributes to the lower physiological reactivity in responses to social stressors in females. Further examination of this hypothesis is warranted.

Another interesting finding that emerged across the two papers is that in Paper 2, unsupportive parental responses to anger were associated with more aggression in African Americans. Similar to the gender differences, in Paper 3 unsupportive parental responses to negative emotions predicted lower physiological reactivity and higher negative emotions in African Americans. This mismatch might also lead to more negative emotions in African Americans. These negative emotions might explain the heightened level of aggression in African American youth who received more unsupportive parental responses to negative emotions. In addition, unsupportive parental responses predicted more distraction coping in African Americans, which may be a possible explanation for the lower physiological reactivity to social stress observed in African Americans.

Several aspects of this project are worth further consideration in future research. First, more research is needed on the associations between coping styles and physiological reactivity to stress across gender and ethnic groups. Second, it should be noted that it

is still unclear why the mismatch between physiological and psychological reactivity would be associated with internalizing problems in females (compared to males) but externalizing behavioral problems in African Americans (compared to European Americans). Finally, the latter two empirical studies are cross-sectional in nature. Longitudinal and intervention research is needed to further identify the directionality of these relationships and better understand parental emotion socialization processes across different developmental stages, from early years of life to young adulthood.

In conclusion, this project furthered our understanding of the relationship between parental emotion socialization and emotional functioning in late adolescence and emerging adulthood. Parental responses to children's negative emotions may contribute to emotional functioning by fostering specific coping strategies. In addition, parental responses may influence how youth respond to acute psychosocial stress. Finally, findings of the present study demonstrated the importance of considering emotion socialization practices and goals from a gender- and culture-specific perspective.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL

Project Revision/Amendment Form

Form version: June 26, 2012

In MS Word, click in the white boxes and type your text; double-click checkboxes to check/uncheck.

- **Federal regulations require IRB approval before implementing proposed changes. See Section 14 of the IRB Guidebook for Investigators for additional information.**
- **Change means any change, in content or form, to the protocol, consent form, or any supportive materials (such as the Investigator's Brochure, questionnaires, surveys, advertisements, etc.). See Item 4 for more examples.**

16396

1. Today's Date	9/3/15

2. Principal Investigator (PI)

Name (with degree)	Sylvie Mrug, PhD	**Blazer ID**	sylva
Department	Psychology	**Division (if applicable)**	
Office Address	HMB 195, zip 2100	**Office Phone**	5-9462
E-mail	smrug@uab.edu	**Fax Number**	5-2295

Contact person who should receive copies of IRB correspondence (Optional)

Name		**E-Mail**	
Phone		**Fax Number**	
	Office Address (if different from PI)		

3. UAB IRB Protocol Identification

3.a. Protocol Number	F120517007
3.b. Protocol Title	Healthy Passages Wave 4 (Neurobiological mechanisms of lower internalizing disorders in Black Americans)

3.c. Current Status of Protocol—Check ONE box at left; provide numbers and dates where applicable

- ☐ **Study has not yet begun** — **No participants, data, or specimens have been entered.**
- ☒ **In progress, open to accrual** — **Number of participants, data, or specimens entered:** 991
- ☐ **Enrollment temporarily suspended by sponsor**
- ☐ **Closed to accrual, but procedures continue as defined in the protocol (therapy, intervention, follow-up visits, etc.)**
  - **Date closed:**
  - **Number of participants receiving interventions:**
  - **Number of participants in long-term follow-up only:**
- ☐ **Closed to accrual, and only data analysis continues**
  - **Date closed:**
  - **Total number of participants entered:**

4. Types of Change

Check all types of change that apply, and describe the changes in Item 5.c. or 5.d. as applicable. To help avoid delay in IRB review, please ensure that you provide the required materials and/or information for each type of change checked.

- ☐ **Protocol revision (change in the IRB-approved protocol)**
  In Item 5.c., if applicable, provide sponsor's protocol version number, amendment number, update number, etc.
- ☐ **Protocol amendment (addition to the IRB-approved protocol)**
  In Item 5.c., if applicable, provide funding application document from sponsor, as well as sponsor's protocol version number, amendment number, update number, etc.
- ☒ **Add or remove personnel**
  In Item 5.c., include name, title/degree, department/division, institutional affiliation, and role(s) in research, and address whether new personnel have any conflict of interest. See "Change in Principal Investigator" in the IRB Guidebook if the principal investigator is being changed.
  - ☒ **Add graduate student(s) or postdoctoral fellow(s) working toward thesis, dissertation, or publication**
    In Item 5.c., (a) identify these individuals by name; (b) provide the working title of the thesis, dissertation, or publication; and (c) indicate whether or not the student's analysis differs in any way from the purpose of the research described in the IRB-approved HSP (e.g., a secondary analysis of data obtained under this HSP).
- ☐ **Change in source of funding; change or add funding**
  In Item 5.c., describe the change or addition in detail, include the applicable OGCA tracking number(s), and provide a copy of the application as funded (or as submitted to the sponsor if pending). Note that some changes in funding may require a new IRB application.

☐ **Add or remove performance sites**
In Item 5.c., identify the site and location, and describe the research-related procedures performed there. If adding site(s), attach notification of permission or IRB approval to perform research there. Also include copy of subcontract, if applicable. If this protocol includes acting as the Coordinating Center for a study, attach IRB approval from any non-UAB site added.

☐ **Add or change a genetic component or storage of samples and/or data component—this could include data submissions for Genome-Wide Association Studies (GWAS)**
To assist you in revising or preparing your submission, please see the IRB Guidebook for Investigators or call the IRB office at 934-3789.

☐ **Suspend, re-open, or permanently close protocol to accrual of individuals, data, or samples (IRB approval to remain active)**
In Item 5.c., indicate the action, provide applicable dates and reasons for action; attach supporting documentation.

☐ **Report being forwarded to IRB (e.g., DSMB, sponsor or other monitor)**
In Item 5.c., include date and source of report, summarize findings, and indicate any recommendations.

☐ **Revise or amend consent, assent form(s)**
Complete Item 5.d.

☐ **Addendum (new) consent form**
Complete Item 5.d.

☐ **Add or revise recruitment materials**
Complete Item 5.d.

☐ **Other (e.g., investigator brochure)**
Indicate the type of change in the space below, and provide details in Item 5.c. or 5.d. as applicable.
Include a copy of all affected documents, with revisions highlighted as applicable.

▶

5. Description and Rationale

In Item 5.a. and 5.b, check Yes **or** No **and see instructions for** Yes **responses.**
In Item 5.c. and 5.d, describe—and explain the reason for—the change(s) noted in Item 4.

☒Yes ☐No **5.a. Are any of the participants enrolled as normal, healthy controls?**
If yes, describe in detail in Item 5.c. how this change will affect those participants.

☐Yes ☒No **5.b. Does the change affect subject participation, such as procedures, risks, costs, location of services, etc.?**
If yes, FAP-designated units complete a FAP submission and send to fap@uab.edu. Identify the FAP-designated unit in Item 5.c.
For more details on the UAB FAP, see www.uab.edu/cto.

5.c. Protocol Changes: In the space below, briefly describe—and explain the reason for—all change(s) to the protocol.

▶ We are adding Jinhong Guo as a co-investigator. Ms. Guo is a doctoral student in developmental psychology and she will be utilizing data from this protocol for her dissertation (working title: Emotion Socialization and Emotional Functioning in Late Adolescence). Her analyses fall under the scope of aims of the study described in the HSP. Ms. Guo has no conflict of interest with this protocol. Please send us a revised approval form that lists Ms. Guo as a co-investigator.

5.d. Consent and Recruitment Changes: In the space below,
(a) describe all changes to IRB-approved forms or recruitment materials and the reasons for them;
(b) describe the reasons for the addition of any materials (e.g., addendum consent, recruitment); and
(c) indicate either how and when you will reconsent enrolled participants or why reconsenting is not necessary (not applicable for recruitment materials).

Also, indicate the number of forms changed or added. For new forms, provide 1 copy. For revised documents, provide 3 copies:
- **a copy of the currently approved document (showing the IRB approval stamp, if applicable)**
- **a revised copy highlighting all proposed changes with "tracked" changes**
- **a revised copy for the IRB approval stamp.**

▶

Signature of Principal Investigator [signature] Date 9/3/15

FOR IRB USE ONLY

☐ Received & Noted ☑ Approved Expedited* ☐ To Convened IRB

Sally Blake Headley CHP — Signature (Chair, Vice-Chair, Designee)

Sept. 8, 2015 — Date

DOLA 4/29/15

Change to Expedited Category **Y / N / NA**

*No change to IRB's previous determination of approval criteria at 45 CFR 46.111 or 21 CFR 56.111