

RISKY EARLY FAMILY ENVIRONMENT AND PSYCHOSOCIAL
ADJUSTMENT IN ADULTHOOD: DOES PARENTAL
INCOME MATTER?

by

CHRISTOPHER J. WENDEL

JENNY M. CUNDIFF, COMMITTEE CHAIR
MATTHEW CRIBETT
BLAKE BERRYHILL
ANSLEY GILPIN

A THESIS

Submitted in partial fulfillment of the requirements
for the degree of Master of Arts
in the Department of Psychology
in the Graduate School of
The University of Alabama

TUSCALOOSA, ALABAMA

2019

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ABSTRACT

Early family environments that increase risk for poor mental and physical health are characterized by conflict, aggression, and relationships that are unsupportive, neglectful, and lacking in warmth. These family characteristics are more common at lower socioeconomic status (SES). As such, most research on risky family environments has exclusively examined low SES families, a strategy that does not allow researchers to examine potential independent or joint effects of these two risk factors. The current study examines associations between parental income, risk factors in the early family environment, and negative affect (hostility, anger and shame and guilt) in young adulthood. The interaction between parental income and early risky family environment was significant for each of the three outcomes tested (hostility, anger, and shame & guilt). Those from high-income environments experienced significantly more negative affect when exposed to higher family risk levels. Those who reported average levels of parental income showed no association between negative affect and risky early family environment, suggesting they are less sensitive to their environmental context. Moderated mediation analyses revealed that self-criticism mediated the moderated relationship between parental income and early family environment on negative affect in a similar fashion. Those who reported higher levels of parental income *and* higher family risk also reported higher levels of self-criticism, which mediated associations with negative affect. Results are interpreted as consistent with the Biological Sensitivity to Context Theory, which states that individuals whose environments are characterized as highly supportive and rewarding (e.g., high socioeconomic status) or highly stressful and threatening (e.g., low socioeconomic status) should be the most reactive to

stressors, with moderate stress environments (e.g., moderate socioeconomic status) associated with little reactivity to environmental stressors.

LIST OF ABBREVIATIONS AND SYMBOLS

n	Number
p	probability associated with the occurrence under the null hypothesis of a value as extreme as or more extreme than the observed value
=	Equal to
<	Less than
>	Greater than
%	Percent

ACKNOWLEDGEMENTS

I am very pleased to have this opportunity to thank the faculty members who helped me with this research project. I would like to thank Jenny Cundiff for helping develop this project with me and sharing her excellent feedback, expertise, and support. I would also like to thank my committee members Matthew Cribbet, Blake Berryhill and Ansley Gilpin for their time, effort, and wonderful feedback

CONTENTS

ABSTRACT.....	ii
LIST OF ABBREVIATIONS AND SYMBOLS.....	iv
ACKNOWLEDGEMENTS.....	v
LIST OF TABLES.....	viii
LIST OF FIGURES.....	ix
INTRODUCTION.....	1
Negative Affect as a Pathway to Poor Health.....	3
The Roots of Negative Affect.....	4
The Current Study.....	4
METHOD.....	5
Participants.....	5
Measures.....	5
Overview of Analyses.....	8
RESULTS.....	10
Does Parental Income Moderate the Link Between Early Family Risk and Later Negative Affect?.....	10
Are Families “Risky” in Different Ways Across SES?.....	10
Does Self-Criticism Help Explain the Link Between Family Risk and Negative Affect Among High-Income Participants?.....	11
DISCUSSION.....	13
REFERENCES.....	19

ENDNOTES.....26
APPENDIX.....27

LIST OF TABLES

1. Summary statistics and zero-order correlations for predictor and psychological outcome variables.....	27
2. Results of regression analyses examining independent and interactive associations of parental income and the early family environments on negative affect.....	28
3. Results of regression analyses examining the association between centered, winsorized parental income and individual Risky Family Questionnaire items.....	29
4. Self-criticism as a mediator between early family environment and hostility moderated by parental income levels.....	30
5. Self-criticism as a mediator between early family environment and shame and guilt, moderated by parental income levels.....	31

LIST OF FIGURES

1. Hypothetical results we would expect to find if any one of the theoretical frameworks match the results of data analyses.....	32
2A. Ratings of anger by centered parental income and centered early risky family environment. Higher scores represent worse psychological outcomes.....	33
2B. Ratings of hostility by centered parental income and centered early risky family environment. Higher scores represent worse psychological outcomes.....	34
2C. Ratings of shame and guilt by centered parental income and centered early risky family environment. Higher scores represent worse psychological outcomes.....	35
3. Full item content of the 10-item Risky Family Questionnaire.....	36
4. Depiction of the moderated mediation relationship between early risky family environment, self-criticism, parental income, and hostility.....	37
5. Depiction of the moderated mediation relationship between early risky family environment, self-criticism, parental income, and shame and guilt.....	38

INTRODUCTION

Early family environments that are characterized by conflict, aggression, chaos, and relationships that are unsupportive and neglectful can put children at risk for a variety of mental and physical health problems (Centers for Disease Control and Prevention, 2013; Repetti, Taylor, Seeman, 2002; Shonkoff, Boyce, & McEwan, 2009). These same risky family characteristics are also more common at lower levels of socioeconomic status (SES) (Chen & Miller, 2013; Repetti et al., 2002; Taylor, Lerner, Sage, Lehman & Lehman 2004). For example, lower family income is associated with a less supportive and more aggressive parenting style (Kotchick, & Forehand, 2002; Shumow, Vandell, & Posner, 1998) and fewer displays of affection (Bradley, Corwyn, McAdoo, and Garcia Coll, 2001). Perhaps due to this overlap between risky family characteristics and SES, most research on risky family environments has exclusively examined low SES families (e.g., Hakulinen et al., 2013). This sampling method increases the chances of obtaining a sample with more risky family characteristics. However, lower SES itself is a well-established predictor of many of the same mental and physical health problems as risky characteristics of the early family environment (e.g., Adler, 2009; Chetty et al., 2016; Danese et al., 2009; Dohrenwend et al., 1992; Galobardes, Lynch, & Davey Smith, 2008). Hence, this sampling method is problematic for disentangling independent or interactive effects of exposure to risky family characteristics and exposure to low SES, as SES is sampled within a restricted (low) range.

Understanding whether risky early family environments show similar associations across different levels of SES has both practical and theoretical significance. Practically, for example,

could interventions that reduce risky characteristics of the home environment improve outcomes across levels of SES? If so, efforts currently targeting primarily low-income families may be more widely applicable. Theoretically, there are multiple competing hypotheses. An independent additive risk factor model would suggest that both low SES and a risky early family environment each represent a unique risk factor for poor health and that the risk associated with each is not influenced by the other (e.g., each would show similar risk across levels of the other).

Alternatively, there are at least *three* different frameworks describing how early risky family environments and SES may interact. The *first* is often referred to as the “double jeopardy” or “double disadvantage” hypothesis, which suggests that the combination of two forms of social disadvantage may be particularly detrimental (e.g., Barber, Hickson, Kawachi, Subramanian, & Earls, 2016; Beale, 1970; Mendelson, Kubzansky, Datta, & Buka, 2008). Therefore, the combination of low SES and a risky early family environment would be associated with the worst outcomes, each showing a poorer outcome in the presence of the other (a potentiated effect)(Figure 1, Panel A). The *second* interaction framework is a resilience framework, which suggests that high SES may protect against the detrimental outcomes otherwise associated with risky families or, alternatively, that low risk families may protect against the detrimental outcomes otherwise associated with low SES (e.g., Masten & Coatsworth, 1998)(Figure 1, Panel B). *Lastly*, the theory of Biological Sensitivity to Context suggests an interaction in which high SES would lead individuals to be highly stress-reactive and experience worse outcomes when faced with additional stressors. Being highly reactive in these resource rich, supportive environments is theorized to be both potentially beneficial and detrimental, better allowing individuals to take advantage of these positive characteristics but exacerbating the effects of additional stressors (Ellis, Essex, & Boyce, 2005). However, moderate levels of SES would lead

individuals to be minimally stress-reactive and experience more salubrious outcomes in the face of stress (Ellis & Boyce, 2008)(Figure 1, Panel C).

Negative Affect as a Pathway to Poor Health

Negative emotions appear to be a consistent correlate and outcome of both lower SES and risky family environments. Negative emotions can be organized into two broad categories: internalized and externalized negative emotions (Martin & Dahlen, 2005). When examined independently, both lower SES and characteristics of a risky family environment have been associated with greater anger and hostility which are externalized negative affects (Costello, Compton, Keeler, & Angold, 2003; Greitemeyer & Sagioglou, 2016; Matthews, Gallo, & Taylor, 2010; Woodall and Matthews, 1989) as well as greater withdrawal and shame and guilt, which are internalized negative affects (Wight, Botticello, & Aneshensel, 2006; Vollebergh, Dorsselaer, Monshouwer, Verdurmen, Ende, & Bogt, 2006; Steuwig, & McCloskey, 2005). There is strong evidence for each of these links. For example, recently a large prospective cohort study found that both low parental SES and a conflictual early family environment (examined separately) each predicted increasing trajectories of hostility and anger over 15 years (Hakulinen et al. 2013).

Theoretical and statistical models linking both the early family environment and low SES with poor health consistently evoke negative emotions as a causal pathway (Chen & Miller, 2013). For example, the risky families model which was based on a review of the empirical literature, proposes that chaos, lack of warmth, and conflict in the home predict both mental and physical health in part through changes in cognitive and emotional processing and social competence, which in turn increase negative emotionality leading to poor health outcomes (Repetti et al, 2002, p.345). Similarly, multiple empirical reviews linking lower SES to poor health also find strong support for the mediating role of negative emotions (e.g., Gallo &

Matthews, 2003; Matthews, Gallo, & Taylor, 2010; Wickrama et al., 2008). Hence, in causal models of both low SES and risky family environments on health, negative emotionality is an important mediator.

The Roots of Negative Affect

Negative emotionality may be associated with early family environment due to the internalization of early exposure to harsh parenting (Koestner, Zuroff, & Powers, 1991), and inconsistent displays of affection (McCranie, & Bass, 1984), which manifests as higher levels of self-criticism in adolescence and early adulthood. Self-criticism has been shown to be a unique pathway to negative affect (Prud'homme, Dunkley, Bernier, Berg, Ghelerter, & Starrs, 2017; Dunkley, Zuroff, & Blankenstein, 2003), independent of early family environments or parental income. Given these relationships, self-criticism may mediate the relationship between the early family environment and negative affect.

The Current Study

The current study examines whether there are independent and/or interactive effects of parental income and risky early family environments on negative emotions in young adulthood. As described above, there are various patterns of results one could reasonably expect given differing theoretical frameworks in the literature and the dearth of previously published results examining the influence of risky family environments across a broad range of SES. Thus, exploratory analyses of a previously collected dataset were conducted to determine which, if any, of these theoretical frameworks is supported. Here, we examine the negative emotions of anger, hostility and guilt and shame as outcomes.

METHOD

Participants

Participants in this study were 180 young adult undergraduates (52% female, mean age =21) enrolled in the University of Utah's Department of Psychology research participation pool. The majority identified as White (73.6%), with 10.7% Hispanic and 7.9% Asian American. Average paternal education was a bachelor's degree and average maternal education was an associate degree.

Measures

Parental income. Family socioeconomic status was assessed using self-reported annual parental income. Response options represented income ranges, with the lowest bracket ranging from zero to \$4,999 and the highest bracket indicating \$500,000 or more in annual family income. Average parental income for the sample was between \$75,000 and \$125,000, which is considerably higher than the 2015 median household income (\$56,516) (U.S Census Bureau, 2016). Thus, those who reported having relatively lower parental income in this sample are more accurately described as having moderate parental income relative to the national average. There were four outliers on this variable, which were winsorized (reduced from their raw value to three standard deviations above the mean) in order to meet distributional assumptions of regression analyses.

Early family environment. Risky family characteristics were assessed using the 10-item version of the Risky Families Questionnaire (Taylor et al., 2004). Participants rated aspects of

their early family environment on a 5-point scale from 1 (not at all) to 5 (very often). Higher scores indicate the presence of more risk factors in the early family environment. Example items include “How often did a parent or other adult in the household make you feel that you were loved, supported, and cared for?”; “How often did a parent or other adult in the household push, grab, shove, or slap you?”; and “Would you say that the household you grew up in was well-organized and well-managed?” (Taylor, Lehman, Kiefe, & Seeman, 2006). The original 13-item scale assessed conflict across family relationships in separate items (conflict between parents, parents and you, parent and sibling(s), and sibling(s) and you). The 10-item version used here assesses conflict in the home generally, rather than assessing different combinations of family members separately (e.g., Loucks et al., 2014). The 13-item Risky Family Questionnaire has established construct validity and shows significant associations with family dynamics as assessed by clinical interview (Taylor, Lerner, Sage, Lehman, & Seeman, 2004; Taylor, Way, Welch, Hilmert, Lehman, & Eisenberger, 2006). Past studies indicate good internal consistency (Cronbach’s α ranges from 0.77 – 0.85) (Coelho, Viola, Walss-Bass, Brietzke, & Grassi-Oliveira, 2014). Cronbach’s alpha for our sample was .71.

Trait shame and guilt. The Trait Shame and Guilt Scale (TSGS) is a modification of the State Shame and Guilt Scale (SSGS; Rohleder, Chen, Wolf, & Miller, 2008) and assesses the experience of shame, guilt, and pride over the past few months (Lupis, Sabik, & Wolf, 2016).¹ Participants rated the 15 items of the TSGS on a 5-point scale from 1 (not feeling this way at all) to 5 (feeling this way very strongly). Example items include “I’ve wanted to sink into the floor and disappear,” “I’ve felt like I am a bad person,” “I’ve felt tension about something I did,” and “I’ve felt like apologizing, confessing.” Test-retest correlations for the TSGS were previously estimated at $r = .49$ ($p < .001$) for both the shame and guilt subscales (Rohleder et al., 2008) and

this scale has good internal reliability with Cronbach's alphas ranging from .74 to .76 across the subscales (Lupis, Sabik, & Wolf, 2016). Cronbach's alpha for our sample was .86. Higher scores indicate higher levels of shame and guilt.

Trait anger and hostility. To assess trait anger and hostility, participants completed the Buss-Perry Aggression Questionnaire (BPAQ) (Buss & Perry, 1992).¹ Although all subscales were administered, only the anger and hostility scales were analyzed for this study. The anger subscale consists of seven items, including "I sometimes feel like a powder keg ready to explode" and "My friends say that I am argumentative." The hostility subscale consists of eight items, including "At times I feel I have gotten a raw deal out of life" and "When people are especially nice, I wonder what they want". Participants rated items on a 5-point Likert scale, ranging from 1 (extremely uncharacteristic of me) to 5 (extremely characteristic of me). Previous work establishing the construct validity of the BPAQ found 3- month test-retest values of .88 and .83 for the anger and hostility scales respectively (Harris, 1997). Both subscales have shown good internal consistency in previous work (Cronbach's alpha = .83 and .77, for anger and hostility respectively) (Buss & Perry, 1992) as well as in our sample (Cronbach's alpha = .83 for both subscales). Higher scores indicate higher levels of trait anger and hostility.

Self-criticism To assess the extent of self-criticism in our sample, participants completed the Introject self-report form (medium version) (Critchfield & Benjamin, 2010; Benjamin, 1995). This measure was originally developed for use in clinical settings and is a behaviorally anchored self-report measure of how one behaves toward the self based on Benjamin's Structural Analysis of Social Behavior (SASB) (Benjamin, 1974). The SASB introject model, on which this self-report measure is based, is organized around two orthogonal dimensions: Affiliation (love self vs. attack self) and Interdependence (free self vs. control self). This study focuses on the affiliation

axis only in order to capture negative affect directed at the self. Response options ranged from 0 (not at all characteristic, never applied) to 100 (perfectly characteristic, always applied) in 10-point increments (Critchfield, & Benjamin, 2008). Example items include “I punish myself by blaming myself and putting myself down” and “I put energy into providing for, looking after, developing myself.” Split-half reliability assessments of this measure report average correlations of .82 within clusters, and .84 between clusters located on and between the axes (dimensions) (Canate, 2012). This instrument has demonstrated construct validity (Benjamin, 2000; Pincus, Gurtman, & Ruiz, 1998), including appropriate discriminant and convergent relationships with measures of the five-factor model of personality and the interpersonal circumplex (Pincus, Gurtman, et al., 1998; Pincus & Ruiz, 1997; Erickson & Pincus, 2005). This scale was reverse scored so that higher scores indicate greater self-criticism.

Overview of Analyses

All correlational and regression analyses were performed using SPSS version 25 (IBM Corp. Released 2017). Bivariate correlations were examined among all primary study variables. Multiple linear regression analyses were performed to determine whether parental income and early risky family environment were associated with negative emotions in young adulthood. We examined main effects of both parental income and risky early family environment as well as their interaction. Both predictor variables were centered at the mean prior to creation of their interaction term and examination of interaction effects. InterActiv plots were used to visually represent the trends including confidence bands (McCabe, Kim, & King, 2018). These plots display raw data of the association between the early family environment (predictor) and negative affects (outcomes) across multiple levels of parental income (the moderator), allowing for easy visual inspection of the interaction pattern.

As mentioned previously, self-criticism may mediate any effect of risky early family environment on negative affect. To determine if a mediated or moderated mediation effect is present, regression analyses were performed using SPSS macro PROCESS (Hayes, 2017)(model 8). This macro was developed specifically for testing complex mediation and moderation models and has been used widely (e.g., Chardon et al. 2016). More specifically, PROCESS allows us to test direct effects of both the predictor (early family environment) and moderating variable (parental income) on the mediating variable (self-criticism). To examine whether the mediator is significant at different levels of the moderator (parental income) this association is tested at the 16th, 50th, and 84th percentile (roughly one standard deviation above and below the mean). The conditional indirect (mediated) effect of X on Y is then tested across levels of the moderator to determine if differences in mediation across different values of the moderator are statistically significant (e.g., is there moderated mediation). Lastly, the index of moderated mediation provides a general test of whether a moderated mediation effect is present.

Lastly, given the Risky Family Questionnaire's range of content areas (parental warmth, physical affection, violence, substance use, etc.) it is possible that sources of family risk vary across levels of parental income. Hence, as a supplemental analysis, we also examine correlations between parental income and the individual items assessed on the Risky Family Questionnaire.

RESULTS

Table 1 displays the zero-order correlations and descriptive statistics for the primary study variables. As expected, lower parental income was correlated with a more risky early family environment ($r = -.24, p < .001$). Not surprisingly, higher hostility was associated with higher anger ($r = .48, p < .001$) and with higher levels of shame and guilt ($r = .37, p < .001$). Lastly, higher ratings of self-criticism were significantly correlated with higher levels of both hostility ($r = .38, p < .001$) and shame and guilt ($r = .70, p < .001$), but not anger.

Does Parental Income Moderate the Link Between Early Family Risk and Later Negative Affect?

Results of regression models are presented in Table 2. These results revealed no main effects. However, the interaction between parental income and early risky family environment was significant for each of the three outcomes tested (hostility, anger, and shame and guilt). Models were also run controlling for gender, and results were virtually unchanged from those reported in Table 2 (all $\Delta\beta < .001$).

All three significant interactions revealed a consistent pattern of findings (Figure 2, panels A through C). In each case, individuals who reported both high parental income and high family risk reported the highest levels of negative affect. Additionally, for all three negative affect outcomes, there was no association between high family risk and outcomes at moderate levels of parental income.

Are Families “Risky” in Different Ways Across SES?

Correlations between Risky Family Questionnaire items and parental income are displayed in Table 3, and the full item content of the Risky Family Questionnaire can be seen in Figure 3. Significant correlations suggest that lower parental income is associated with significantly higher risk, including more experiences of physical ($r = -.26, p < .001$) and verbal aggression ($r = -.20, p = .007$), quarreling ($r = -.30, p < .001$) as well as a more chaotic ($r = -.17, p = .03$) and less organized home ($r = -.20, p = .01$). However, one item – lack of love and support ($r = .16, p = .04$) – was more strongly endorsed at higher levels of parental income.

Does Self-Criticism Help Explain the Link Between Family Risk and Negative Affect Among High-Income Participants?

Regression analyses performed to determine if self-criticism mediates the moderated relationship between parental income and risky early family environment on later negative affect revealed a significant moderated mediation effect for hostility (see Figure 4) and shame and guilt (see Figure 5), but not anger.

For hostility, both the overall mediator variable [$F(3, 172) = 3.2745, p = .023, R^2 = .054$] and the dependent variable models [$F(4, 171) = 8.1979, p < .0000, R^2 = .161$] were significant, suggesting self-criticism mediates the relationship between early family environment and hostility, and parental income moderates this mediated relationship. In the mediator variable model, risky early family environment ($B = .73, p = .04$), and the interaction of risky early family environment and parental income ($B = .26, p = .01$) were positively associated with self-criticism. In the dependent variable model, self-criticism was positively associated with hostility ($B = .08, p < .000$), providing evidence that self-criticism is playing a mediating role. Additionally, this mediational effect was stronger at higher levels of parental income (a moderated mediation effect) as evidenced by increased effect sizes at higher levels of parental income tested by the conditional indirect effects of X on Y in Table 4. The pattern of effects

reveal that those who reported higher levels of parental income and a riskier early family environment also experienced higher levels of self-criticism, which is related to higher levels of hostility (see Figure 4.).

For shame and guilt, both the overall mediator variable [$F(3, 172) = 3.2745, p = .023, R^2 = .05$] and the dependent variable models [$F(4, 171) = 42.49, p < .001, R^2 = .50$] were also significant, suggesting self-criticism mediates the relationship between early family environment and shame and guilt, and parental income moderates this mediated relationship. In the mediator variable model, risky early family environment was positively associated with self-criticism ($B = .73, p = .04$), and the interaction of risky early family environment and parental income ($B = .26, p = .01$) were positively associated with self-criticism. In the dependent variable model, self-criticism was associated with shame and guilt ($B = .20, p < .000$) providing evidence that self-criticism is playing a mediating role. This mediational effect was stronger at higher levels of parental income (a moderated mediation effect) as evidenced by increased effect sizes at higher levels of parental income tested by the conditional indirect effects of X on Y in Table 5. The pattern of effects reveal that those who reported higher levels of parental income and a riskier early family environment also experienced higher levels of self-criticism, which is related to higher levels of shame and guilt (see Figure 5).

DISCUSSION

Families characterized by aggression, conflict, and relationships that are neglectful, unsupportive, and lack warmth increase the risk for poor mental and physical health in offspring, likely in part through increased negative affect. High-risk early environments are more common at lower SES and the bulk of the current literature examines these family characteristics in low SES samples. The goal of this study was to determine how risky early family environments are associated with later negative affect across a broader range of SES, in order to assess whether income may protect or exacerbate the effects of a high-risk early family environment.

Results revealed a significant interaction between parental income and family risk for each of the outcomes examined here (anger, hostility, and shame and guilt). All interactions showed a similar pattern, such that individuals who reported both high parental income and high family risk reported the highest levels of negative affect. When early risky family environment characteristics are low, those in the high parental income group show the best outcomes (i.e., lower levels of shame and guilt, anger, and hostility) in our sample. However, when this group of individuals experiences higher levels of early risky family environment characteristics, mainly in the form of less parental warmth, they show the worst outcomes in our sample. However, in the moderate parental income group, increases in early risky family environment characteristics result in little change in our outcomes of interest.

This pattern of results is not consistent with the double disadvantage or resilience frameworks presented in the introduction. The combination of lower parental income and a risky early family environment is not particularly detrimental (double disadvantage) and low levels of

risk on one of these factors does not protect against high levels of risk on the other (resilience/buffering).

Instead, results appear most consistent with the Biological Sensitivity to Context theory. According to the Biological Sensitivity to Context theory, individuals who report both high and low parental income should be more affected by risky family characteristics than individuals who report moderate income as they are more sensitive to their environment. More specifically, the theory states that environments with high amounts of available resources (e.g., high income) evoke greater reactivity to stressors (e.g., stress in the family), because high sensitivity to the environment is beneficial in a high resource environment in order to capitalize on available rewards. Similarly, environments with low amounts of resources (e.g., low income/poverty) also evoke greater reactivity to stressors (e.g., stress in the family), because high sensitivity to the environment is also beneficial in a high threat environment in order to avoid harm. However, environments with moderate amounts of resources (e.g., moderate income) are proposed to evoke minimal reactivity to stressors, because individuals in these environments are less likely to benefit from learning to be sensitive to environmental cues, either in the form of gains (rewards) or losses (threats). Thus, individuals at both high and low SES would be expected to display the best outcomes in the face of a low-risk early environment, but the worst outcomes in the face of a high-risk early environment. An additional explanation may be that individuals whose environments are particularly high or low stress may have fewer opportunities to develop skills necessary to cope with stressors. Previous work suggests that individuals with moderate levels of adversity display better coping abilities than those with no history of adversity, or high adversity (Seery, Leo, Lupien, Kondrak, & Almonte, 2013).

Previous evidence in low SES samples has shown associations between risky early family environments and negative affect. Results in our sample show associations between these same

risky environments and negative affect in high-income participants but not in moderate-income participants. Interestingly, risky characteristics of the early family environment did not increase risk for negative affect at moderate levels of parental income.

Hence, our results suggest that individuals from well-resourced backgrounds may be more sensitive to risk factors in the early family environment compared to individuals from moderately well-off families, at least inasmuch as they report higher levels of negative affect in young adulthood. This relationship may be due in part to these individuals experiencing higher levels of self-criticism, which was related to higher levels of hostility and shame and guilt, but not anger. Additionally, when the early family environment was lower risk, parental income was not significantly associated with negative affect. Hence, family resources were not associated with negative affect when little to no risk was reported in the early family environment. One possible explanation for this finding is that when associations between parental income and negative affect are observed they are due in part to an overlap with risky early family environment. Replicating this study with a less affluent sample would help to determine the independent and overlapping effects of income level, early risky family environment and negative affect.

Limitations

As all of the variables in this study are self-reported the results may be influenced by common method variance; associations may be inflated due to the fact that variables have a common reporter and method of reporting. Results may also be influenced by response bias. For example, participants may have responded to questionnaires in a socially desirable manner, endorsing fewer risky early family environment characteristics or negative affect than they actually experienced (Demetriou, Ozer, & Essaue, 2015). If participants did underreport the amount of family risk it is possible then that the true association between the early environment

and later negative affect is inaccurate. Additionally, although early risky family environment was reported for a previous time point in the participant's development, the correlational nature of this study does not allow for any causal inferences to be made. We did not examine other common and potentially influential forms of negative affect (e.g., sadness, depression, anxiety), and other negative affects may show different associations with risky family characteristics across levels of SES.

The current study's methodology also varies somewhat from previous work investigating the Biological Sensitivity to Context model. Previous work has exposed individuals to a stress manipulation task to assess their biological reactivity levels directly, assessed for additional stressors in the early environment, and assessed for negative affect (Obradovic, Bush, Stamperdahl, Adler, & Boyce, 2011; Somers, Ibrahim, & Luecken, 2017). We are using parental income as a proxy for support to suggest an individual's level of biological reactivity, assessing for additional stressors in their early environment, and assessing for later negative affect. There is some support for hypothesizing an individual's level of biological reactivity using reports of support in this way (Ellis, Essex & Boyce, 2005). Further, although the Biological Sensitivity to Context model postulates a curvilinear relationship, we are able to examine only one arm of this relationship due to the income levels of our sample. A more economically diverse sample that included individuals with low levels of parental income would have better allowed us to test the full curvilinear model. Although we would expect the results of the latter comparison to look similar based on previous research, future studies should test these expectations directly.

Lastly, given our sample predominantly identifying as White, we cannot be certain if the results of this specific study would generalize to a more diverse sample. However, previous research investigating the Biological Sensitivity to Context model with more diverse samples

have not reported racial or ethnic differences in outcomes, suggesting that these results may generalize (Obradovic, Bush, Stamperdahl, Adler, & Boyce, 2011).

Conclusions

This study suggests that high-income environments may not buffer individuals from experiencing negative affect associated with risky early family environments. Using an evolutionary-developmental lens, the results of this study argue against a ubiquitous protective effect of income. Although low SES and poverty have long been known to be disadvantageous to child development and later mental and physical health outcomes, this study suggests that increases in parental income are not associated with a negative linear decrease in negative affect.

Moderate levels of parental income may help children be less susceptible to additional stressors in their environments. Both high and low income appears to place children at increased risk for negative affect, perhaps because these children are more sensitive to additional stressors; high income due to attention to rewards in the environment and fewer opportunities to build coping skills and low income due to attention to threats in the environment and few resources available to cope with those threats. If the results of this study can be replicated in diverse populations and supported by designs that allow for stronger causal inference, both high- and low-income families may benefit from existing early intervention programs focused on reducing these family risk factors. Currently, such programs tend to focus exclusively on low-income families, perhaps conflating socioeconomic resources with family behavior.

These results may also shed light on some of the detrimental effects related to growing income inequality. Broadly, income inequality drives individuals out of moderate-income levels towards income extremes, either relegating them to much lower, or promoting them to much higher income levels. The results of this study suggest migrations away from moderate income levels may confer higher levels of risk for developing negative affect in young adulthood. The

biological sensitivity to context model suggests the magnitude of change, not simply the displacement from moderate income levels is important as well. Within this theory individuals would be expected to develop higher levels of sensitivity the farther from moderate their income levels become. This sensitivity would lead individuals to be more impacted by stressors in their environments, potentially leading to higher levels of negative affect. Taken together, the results of this study and the biological sensitivity to context theory suggest income inequality may lead to more individuals being at risk of developing negative affect, and the degree of negative affect may be greater.

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ENDNOTES

¹ The distinction between shame and guilt or anger and hostility may not be obvious. Partridge and Wiggins (2008) have conceptualized shame as being a self-directed, highly social emotion that occurs as a product of being devalued in the eyes of others. Likewise, guilt is a dysphoric emotion associated with recognizing the violation of a personal moral or social standard (Kugler, & Jones, 1992). Trait hostility has been defined as an enduring personality trait that is most closely associated with cognition. These cognitions reflect the belief that others are unworthy and likely to be sources of aggression and frustration (Smith, 1992). Those who exhibit trait hostility are often suspicious, cynical, resentful, bitter, and jealous individuals (Guyll & Madon, 2003). Whereas trait hostility is associated with cognition, trait anger is related to unpleasant emotions ranging in intensity. As a stable personality trait, anger refers to the tendency to frequently experience pronounced episodes of this emotion (Smith, Glazer, Ruiz & Gallo, 2004).

APPENDIX

Table 1. *Summary Statistics and Zero-Order Correlations for Predictor and Psychological Outcome Variables.*

Variable Name	1	2	3	4	5	6
1. Parental Income	-					
2. Early Risky Family Environment	-0.24**	-				
3. Self-Criticism	0.04	0.12	-			
4. Trait Anger	0.03	0.09	0.11	-		
5. Trait Hostility	0.05	0.10	0.38**	0.48**	-	
6. Trait Shame and Guilt	-0.05	0.12	0.70**	0.14	0.37**	-
<i>M</i>	6.90	21.71	-49.07	14.26	19.01	28.37
<i>SD</i>	2.74	6.12	28.35	5.46	6.56	8.19

Note. Data displayed for parental income is presented after winsorizing ** $p < .01$

Table 2. Results of regression analyses examining independent and interactive associations of parental income and the early family environment on negative affect.

Variable	Risky Early Family Environment			Parental Income			Risky Family Environment X Parental Income		
	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β
Trait Anger	0.11	0.07	0.13	0.11	0.15	0.05	0.05	0.02	0.17*
Trait Hostility	0.15	0.08	0.14	0.167	0.18	0.07	0.06	0.02	0.19*
Trait Shame & Guilt	0.17	0.10	0.13	-0.09	0.23	-0.03	0.06	0.03	0.15*

Note. All variables are centered. * $p < .05$.

Table 3. Results of regression analyses examining the association between centered, winsorized parental income and individual Risky Family Questionnaire items.

Content	Parental Income <i>r</i>
Loved and Supported	.16*
Verbal Aggression	-.20**
Physical Affection	-.10
Physical Aggression	-.26**
Alcohol or Substance Use	-.01
Well-Organized Home	-.20**
Violence	-.18*
Quarreling or Arguing	-.30**
Chaotic Home	-.17*
Neglect	-.13

Note. Items 1, 3, and 6 are reverse coded. * $p < .05$, ** $p < .01$.

Table 4. *Self-criticism as a mediator between early family environment and hostility, moderated by parental income levels.*

	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>
<i>Mediator variable model</i> Early				
family environment	0.73*	0.36	2.06	0.04
Parental Income	0.69	0.79	0.87	0.39
Early family environment x Parental Income	0.26*	0.10	2.55	0.01
Conditional Effects of the focal predictor at values of the moderator				
	<i>B</i>	<i>SE</i>	<i>LLCI</i>	<i>ULCI</i>
16%	-.17	0.43	-0.869	0.836
50%	0.76*	0.36	0.055	1.468
84%	1.28*	0.44	0.414	2.147
<i>Dependent variable model</i>				
Early family environment	0.09	0.08	1.18	0.24
Self-Criticism	0.08**	0.02	4.77	.000
Parental Income	0.10	0.17	0.59	0.56
Early family environment x Parental Income	0.04	0.02	1.71	0.09
Conditional indirect effects of X on Y:				
	<i>B</i>	<i>BootSE</i>	<i>BootLLCI</i>	<i>BootULCI</i>
16%	-0.00	0.03	-0.061	0.07
50%	0.06*	0.03	0.003	0.131
84%	0.10*	0.05	0.024	0.205
Index of moderated mediation				
	<i>Index</i>	<i>BootSE</i>	<i>BootLLCI</i>	<i>BootULCI</i>
Parental Income	0.02*	0.01	0.003	0.044

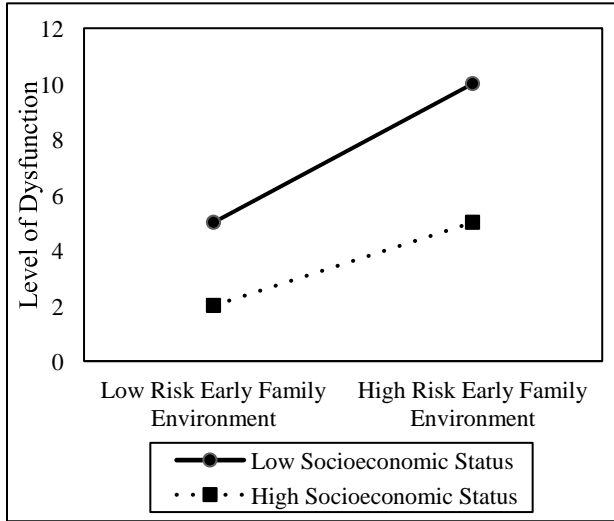
Note. n=176. Bootstrap sample size = 5000. *LL* = lower limit, *CI* = confidence interval, *UL* = upper limit, *BootLLCI* = lower limit of bootstrapped confidence interval, *BootULCI* = upper limit of bootstrapped confidence interval, *BootSE* = standard error of bootstrapped confidence interval, 16% = -1 SD of parental income, 50% = mean of parental income, 84% = +1 SD of parental income. **p* < 0.05, ***p* < .000

Table 5. *Self-criticism as a mediator between early family environment and shame and guilt, moderated by parental income levels.*

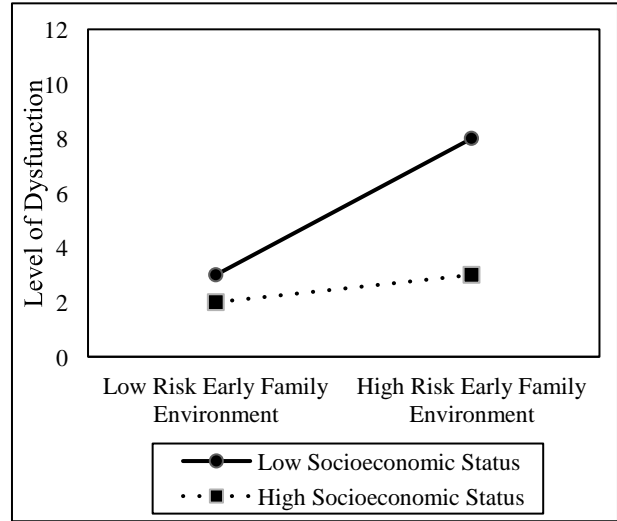
	B	SE	t	p
Mediator variable model				
Risky early family environment	0.73*	0.36	2.06	0.04
Parental Income	0.69	0.79	0.87	0.39
Early family environment x Parental Income	0.26*	0.10	2.55	0.01
Conditional Effects of the focal predictor at values of the moderator	B	SE	LLCI	ULCI
16%	-.02	0.43	-.869	0.836
50%	0.76*	0.36	0.055	1.468
84%	1.28*	0.44	0.414	2.147
Dependent variable model				
Early family environment	0.00	0.08	0.06	0.95
Self-Criticism	0.2**	0.02	12.58	.000
Parental Income	-0.25	0.16	-1.49	0.138
Early family environment x Parental Income	0.01	0.02	0.31	0.76
Conditional indirect effects of X on Y:	B	BootSE	BootLLCI	BootULCI
16%	0.00	0.08	-0.145	0.184
50%	0.15*	0.08	0.008	0.334
84%	0.26*	0.12	0.065	0.53
Index of moderated mediation	Index	BootSE	BootLLCI	BootULCI
Parental Income	0.05*	0.03	0.006	0.109

Note. n=176. Bootstrap sample size = 5000. *LL* = lower limit, *CI* = confidence interval, *UL* = upper limit, *BootLLCI* = lower limit of bootstrapped confidence interval, *BootULCI* = upper limit of bootstrapped confidence interval, *BootSE* = standard error of bootstrapped confidence interval 16% = -1 SD of parental income, 50% = mean of parental income, 84% = +1 SD of parental income. * $p < 0.05$, ** $p < .000$

Panel A: Double Jeopardy Framework



Panel B: Resilience Framework



Panel C: Biological Sensitivity to Context Framework

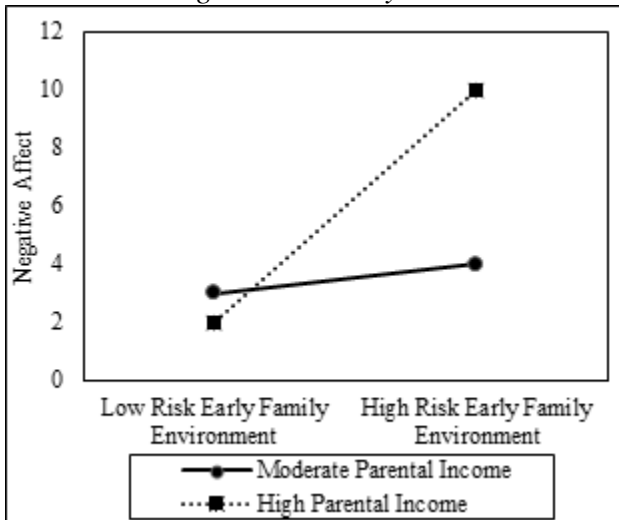


Figure 1. Hypothetical results we would expect to find if any one of the theoretical frameworks match the results of data analyses.

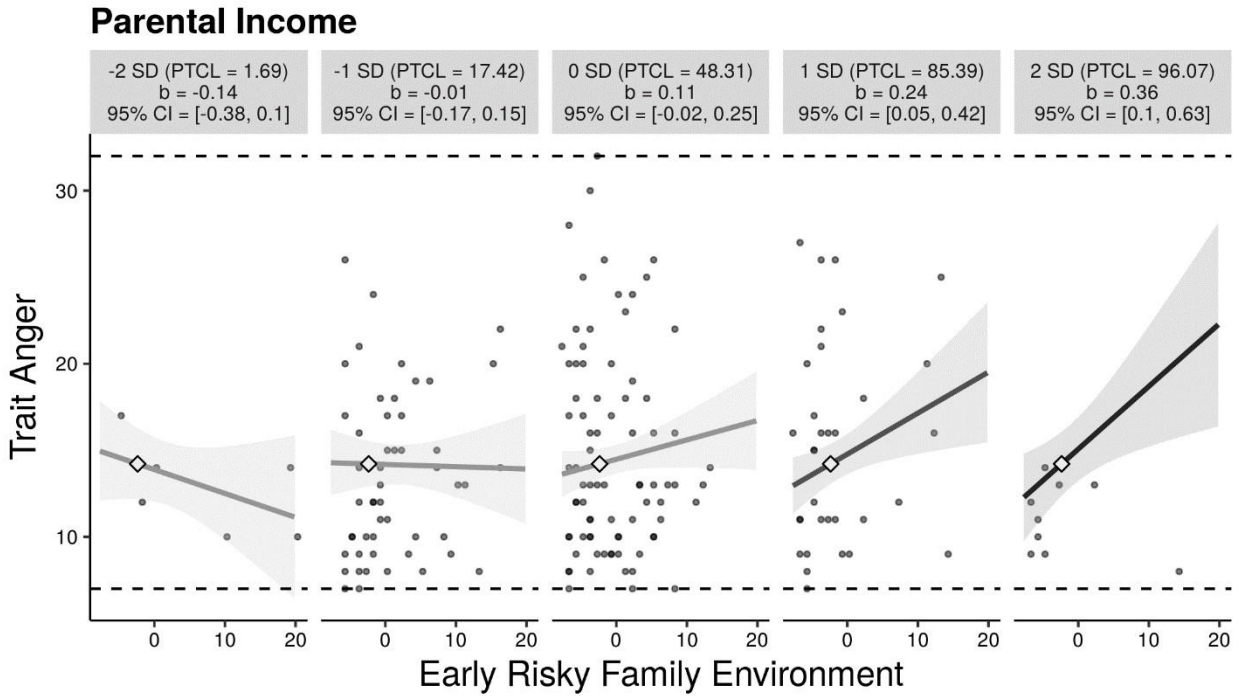


Figure 2A. Ratings of anger by centered parental income and centered early risky family environment. Higher scores represent worse psychological outcomes. *Note.* PTCL = percentile. n at -2 SD = 6, n at -1 SD = 51, n at 0 SD = 79, n at +1 SD = 33, n at +2 SD = 9.

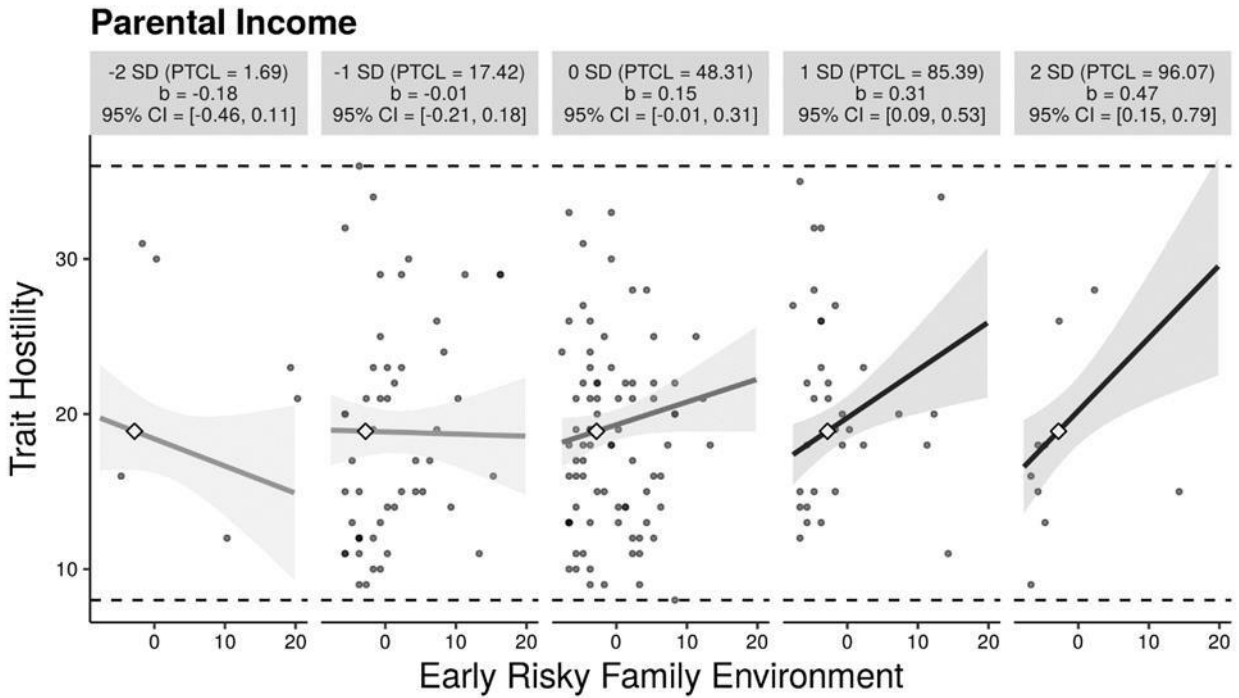


Figure 2B. Ratings of hostility by centered parental income and centered early risky family environment. Higher scores represent worse psychological outcomes. *Note.* PTCL = percentile. n at -2 SD = 6, n at -1 SD = 51, n at 0 SD = 81, n at +1 SD = 33, n at +2 SD = 9.

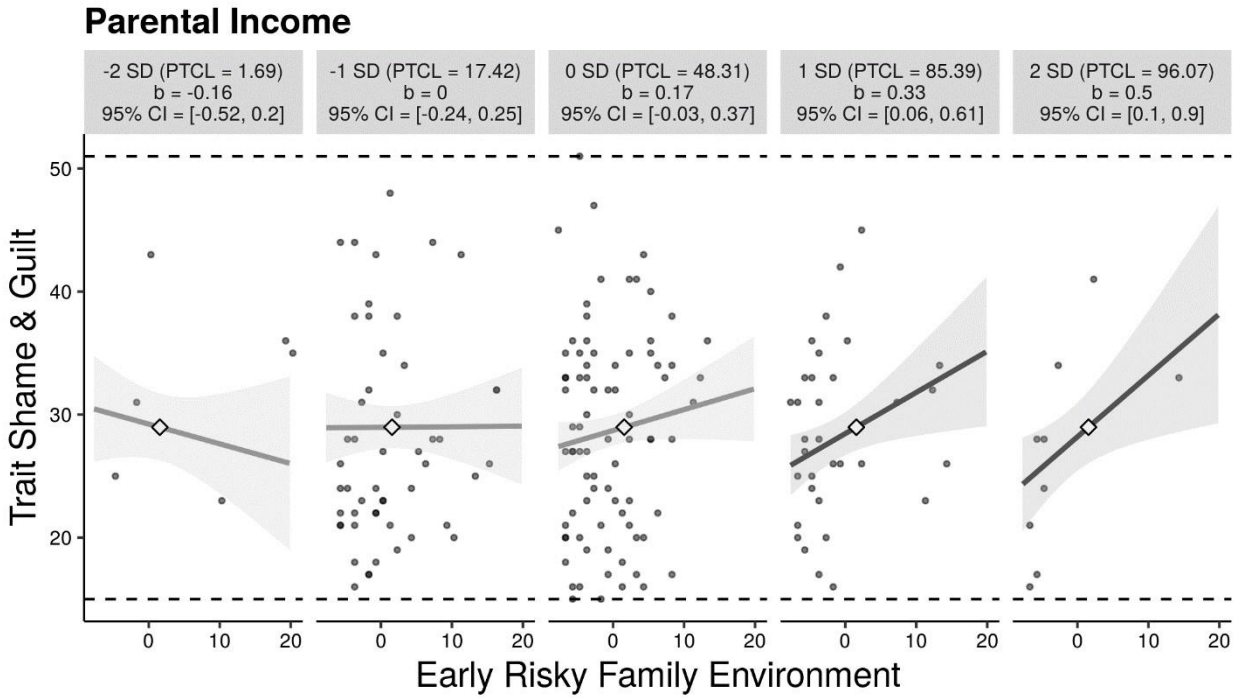


Figure 2C. Ratings of shame and guilt by centered parental income and centered early risky family environment. Higher scores represent worse psychological outcomes. *Note.* PTCL = percentile. n at -2 SD = 6, n at -1 SD = 51, n at 0 SD = 81, n at +1 SD = 33, n at +2 SD = 9.

Risky Family Questionnaire Items

- 1 How often did a parent or other adult in the household make you feel that you were loved, supported, and cared for?
- 2 How often did a parent or other adult in the household swear at you, insult you, put you down, or act in a way that made you feel threatened?
- 3 How often did a parent or other adult in the household express physical affection for you, such as hugging, or other physical gestures of warmth and affection?
- 4 How often did a parent or other adult in the household push, grab, shove, or slap you?
- 5 In your childhood, did you live with anyone who was a problem drinker or alcoholic, or who used street drugs?
- 6 Would you say that the household you grew up in was well-organized and well-managed?
- 7 How often would you say that a parent or other adult in the household behaved violently toward a family member or visitor in your home?
- 8 How often would you say there was quarreling, arguing, or shouting in your home?
- 9 Would you say that the household you grew up in was chaotic and disorganized?
- 10 How often would you say you were neglected while you were growing up, that is, left on your own to fend for yourself?

Figure 3. Full item content of the 10-item Risky Family Questionnaire.

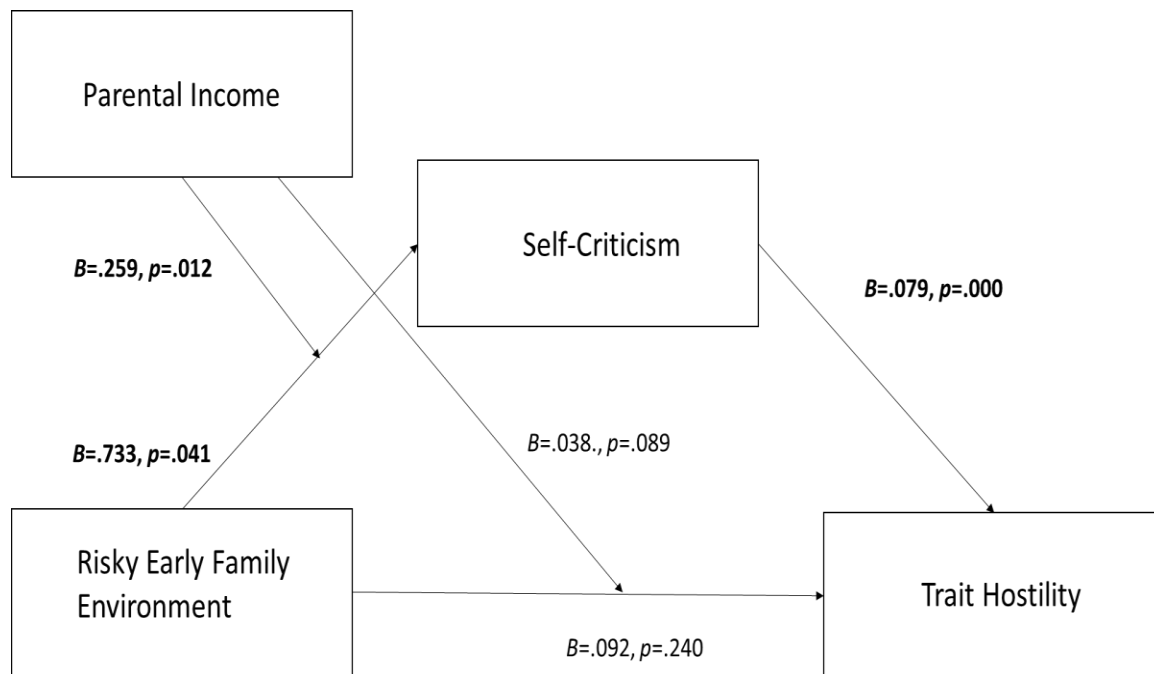


Figure 4. Depiction of the moderated mediation relationship between early risky family environment, self-criticism, parental income, and hostility.

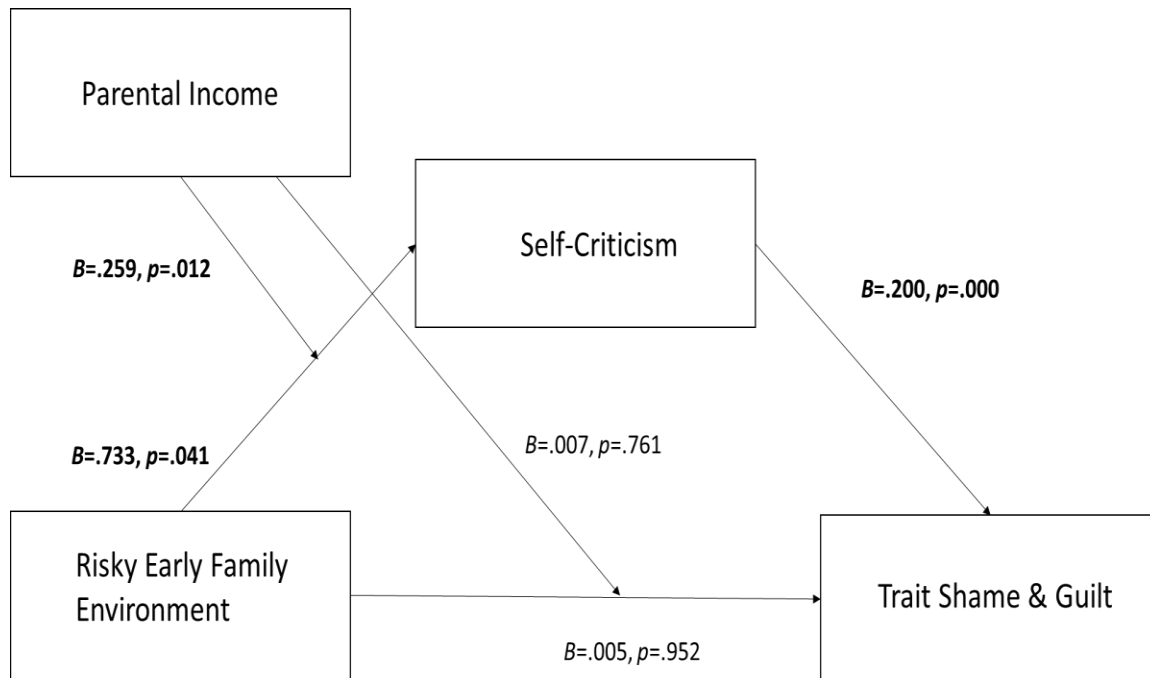


Figure 5. Depiction of the moderated mediation relationship between early risky family environment, self-criticism, parental income, and shame and guilt.

October 14, 2019

Mr. Christopher Wendel
Department of Psychology
College of Arts & Sciences
The University of Alabama
Box 870348

Dear Mr. Wendel:

The University of Alabama Office for Research Compliance (ORC) has reviewed your request pertaining to work performed for the completion of the requirements for your graduate degree (Title of Research: Risky Early Family Environment and Psychosocial Adjustment in Adulthood: Does Parental Income Matter?).

At this time, the ORC has determined that the application does not meet the criteria for IRB review and therefore cannot be reviewed by the IRB for the following reason:

The information provided indicates that data analysis has been conducted and a final report has been submitted as a result of the data analysis.

The ORC cannot provide a formal written determination after a project has been initiated. Although a formal written determination cannot be issued, it has been confirmed that this is not a reportable event since the activity would not constitute human subjects research according to the Office for Human Research Protection (OHRP) under policy 45 CFR 46.102(e). As a result, there should be no need for further involvement of the ORC in this matter.

If I can be of further assistance please feel free to contact me.

Sincerely,

Carmitato T. Myles, MSM, CFM, CIP
Director & Research Compliance Officer