ABSTRACT

LEFEBVRE, EMILY, J. Adverse Childhood Experiences and Emotional Well-being: Evaluating Proactive Coping as a Protective Moderator. (Under the direction of Dr. Shevaun D. Neupert).

Adverse childhood experiences (ACEs) are events or conditions of abuse or dysfunction that occur before the age of 18. A severe and enduring outcome of exposure to ACEs is depression and anxiety. With 45% of the national population facing exposure to one or more ACEs (Child Trends, 2018), it is important to evaluate possible buffering mechanisms to help mitigate the negative effect ACEs exposure has on mental health throughout the lifespan. One such buffer that has lacked investigation is the use of proactive coping strategies, the effortful steps one takes to avoid or modify a stressful event before its occurrence. Patterns of proactive coping as well as depression and anxiety may vary based on age, socioeconomic status and gender. Aim 1 of this study sought to replicate established patterns of association between ACEs exposure, age, socioeconomic status, and gender and the presence of depression and anxiety. Aim 2 of this study sought to evaluate the moderating effect of proactive coping on the association between ACEs exposure and depression and anxiety and how this might differ across age, socioeconomic status, and gender. Participants were recruited as part of the 2018 U.S. Midterm ESCAPED (Election Stress Coping and Prevention Every Day) study. The sample included adults ages 18-77 (Mean = 37, SD = 11.70) who lived in the U.S., 51% were women, 77% were white 10% were African American, and 13% identified as either Native American, Alaska Native or Eskimo, Asian, Native Hawaiian or Pacific Islander, or Other and were categorized as Other for these analyses. Results from Aim 1 indicated that individuals with more ACEs reported higher levels of depression and anxiety and women also reported more depression and anxiety than men. Individuals with high SES and individuals with high proactive coping reported lower depression and anxiety. Age was not significantly associated with depression and anxiety. In addressing Aim 2, results indicated that moderation models including age and socioeconomic status were not significant, however the model including gender was. A significant three-way interaction was found indicating that high proactive coping was especially beneficial for men who had no exposure to ACEs. There was a significant negative association between proactive coping predicting depression and anxiety such that men who reported no ACEs and who were high in proactive coping had significantly lower odds (OR = .51, p = .03) of
depression and anxiety than those who were low in proactive coping. This association was not significant for men who report some ACEs exposure and those who reported five or more ACEs. These findings are based on observational data, so experimental and longitudinal data will be necessary in making conclusions regarding temporal or causal trajectories. We cannot discern whether, over time, rates of depression and anxiety would lower for both women and men higher in ACEs exposure based on their level of proactive coping. The current findings suggest that there are differential benefits to proactive coping based on ACEs exposure and gender with men experiencing no ACEs benefiting the most, however, it is clear that ACEs exposure is detrimental to mental health across age, gender, and socioeconomic status. These findings should be taken into consideration through a developmental perspective such that adverse childhood experiences, regardless of demographic context, have negative and long lasting implications for mental health.
Adverse Childhood Experiences and Emotional Well-being: Evaluating Proactive Coping as a Protective Moderator

by
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BIOGRAPHY

Emily Smith graduated with a B.S. in Psychology from Utica College in 2015. She began her graduate education at North Carolina State University in the Lifespan Developmental Psychology program in fall 2016 under the mentorship of Dr. Shevaun D. Neupert. Emily’s doctoral research examined processes of stress and coping across a variety of contexts and was diversified through her work at the Center for Family and Community Engagement as a research assistant and project manager. Specific to stress and coping processes, she examined how individuals coping with past and current stressors and what factors buffer against the negative effects of stressor exposure.
ACKNOWLEDGEMENTS

I would like to acknowledge the immense support and guidance from Dr. Shevaun Neupert during not only this project’s development but throughout my entire graduate career. Without the sincere passion and dedication that she has shown in supporting my growth as both a researcher and professional, I would not have accomplished all that I have. I would also like to thank my committee members, Dr. Jason Alliare, Dr. Kelly Lynn Mulvey, and Dr. Elizabeth Craig for their feedback and support during this project. I would also like to thank Dr. Sarah Desmarais and Dr. Samantha Cacace for their mentorship and support during my graduate career. To my parents and brother, thank you for teaching me that I can do anything that I set my mind to and that I am always smarter than I think. To my friends, thank you for your constant support and belief in me and reminding me to never sell myself short. And finally, to my husband and partner Christopher J. Smith, without your undying encouragement, love, and sacrifice none of this would have been possible. Thank you for being my rock through everything.
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INTRODUCTION

Adverse childhood experiences (ACEs) are events or conditions of abuse or dysfunction that occur before the age of 18 (Felitti et al., 1998). Previous research has investigated the negative effects of childhood abuse, neglect, and exposure to abuse or harmful household environments and relational dysfunction within the family unit. Such literature has focused on a variety of risk taking behaviors among adolescents including risky sexual behaviors (Cunningham, Stiffman, Doré, & Earls, 1994; Nagy, Adcock, & Nagy, 1994) as well as drug and substance use (Dube, et al., 2003). One severe and enduring outcome of ACEs exposure is depression and anxiety (Infurna, et al., 2016; Jones, Nurius, Song, & Fleming, 2018; Karatekin, 2018; Poole, Dobson, & Pusch, 2017; White, 2011). Emotional disorders can have a long lasting negative impact on both development and quality of life. With 45% of the national population facing exposure to one or more ACEs (Child Trends, 2018), it is important to evaluate possible buffering mechanisms to help mitigate the negative effect ACEs exposure has on mental health throughout the lifespan. One such buffer that has lacked investigation is the use of proactive coping strategies, the effortful steps one takes to avoid or modify a stressful event before its occurrence (Aspinwall & Taylor, 1997). Proactive coping is associated with lower levels of depression, fewer declines in functional disability in aging and larger systems of social support (Greenglass, Fiksenbaum & Eaton, 2006). Proactive coping is linked to positive outcomes across a variety of domains throughout the lifespan and should be evaluated as a possible buffer against the negative effects of ACEs exposure. This dissertation seeks to conduct such an evaluation.

Adverse childhood experiences

Adverse childhood experiences can occur across specific contexts, situations, and environments in which children and adolescents are exposed to stress (Felitti et al., 1998). ACEs research often illustrates situations in which stressors are likely to proliferate resulting in increased probability of negative outcomes. Exposure to these events generates step-dose patterns wherein greater exposure to multiple forms of stressful experiences are associated with a wider range of impaired health outcomes across behavioral, physical and psychological domains (Nurius, Fleming, & Brindle, 2019; Nurius, Green, Logan-Greene, & Borja, 2015).

Exposure to stressful events early in life can have negative effects throughout the lifespan (Hostinar, Lachman, Mroczek, Seeman, & Miller, 2015). Stressors may be
interpreted as both real and/or subjective threats to one’s well-being and may result in both physiological and psychological responses (McEwen, 2000). The variability in stressor exposure and experiences is vast; however, both chronic and acute stressor exposure during childhood and the adolescent developmental period can be particularly harmful to cognitive development (Diamond, 2013) and overall well-being. Although human systems strive to adapt to ACE traumas, the effort of doing so combined with the adverse situation or environment often tax developing biological and psychological systems, which could negatively impact psychological well-being across the lifespan.

Adverse childhood experiences are characterized as early life stress events that could influence development such as physical, sexual, emotional or verbal abuse, neglect, social deprivation, disaster or household dysfunctions (including witnessing of violence, criminal activity, parental incarceration, parental death or illness, poverty, substance abuse) (Brown et al., 2009; Felitti et al., 1998). Although many children may experience isolated stressful events, children who fall into low socioeconomic status (SES) populations have a higher risk of being exposed to multiple stressful life events or chronic conditions of stress (Brown et al., 2009; Taylor & Repetti, 1997) resulting in negative outcomes.

Additionally, differential rates of exposure to adverse childhood experience based on gender have been discussed briefly in the literature. Within an urban minority sample from the Chicago Longitudinal Study, 14.8% of males indicated that they had been exposed to zero ACEs with 25.2% of their female counterparts indicating zero exposure. Additionally, 12.3% of men indicated they had been exposed to 5 or more ACEs whereas only 5% of women indicated an exposure rate of 5 or higher (Mersky, Topitzes, & Reynolds, 2013). Aim 1 of this study will evaluate differences in exposure based on gender to establish whether previous trends are present within our national sample.

**Depression and Anxiety**

Among the multitude of enduring negative outcomes of exposure to adverse childhood experiences are increased rates of depression and anxiety. The association between childhood neglect and maltreatment and depression across the lifespan has been extensively studied and is well supported (Infurna et al., 2016; Jones, Nurius, Song, & Fleming, 2018; Karatekin, 2018; Poole, Dobson, & Pusch, 2017; White, 2011). Meta analyses by Li and colleagues (2016) as well as Gallo and colleagues (2018) indicate that researchers consistently find that higher rates of
neglect and abuse in childhood are positively associated with higher rates of both depression and anxiety for men and women. However, findings regarding gender differences and lifespan trajectories of depression and anxiety as associated with ACEs are mixed.

Gallo and colleagues (2018) in a meta analytic review found that although associations between adult depression and anxiety were trending higher for men than women, gender differences were not significant. Additionally work by Ege and colleagues (2015) found no gender or race differences in the association between ACEs exposure and depression. Chapman and colleagues (2004) have found that women report higher levels of depression than men, following population level trends. Conversely, Cavanaugh, Petras, and Martins (2015) found that women who experienced multiple ACEs had greater odds (18.07) of having a major depressive episode than women with no ACEs, however, men who experienced multiple ACEs showed even greater odds (24.06) of having a major depressive episode than those who experienced no ACEs. In other words men who were exposed to multiple ACEs were more at risk than women who were exposed to multiple ACEs for a major depressive episode. Additionally, among young adults, men were more likely to report higher depressive symptoms than women in association to childhood sexual victimization specifically (Schilling, Aseltine, & Gore, 2007). Most gender differences seem to appear when ACEs are stratified by specific category and not aggregated or summed, with significant gender difference appearing most often in association with childhood sexual abuse or trauma such that males often report greater negative well-being outcomes than women (Cavanaugh, Petras, & Martins, 2015). This could be due to differential availability of social support and social acceptability of support seeking behaviors between men and women as well as stigma related to male disclosure of sexual assault (Allen, Ridgeway, & Swan, 2015).

Although it is important to investigate gender differences in experience specific outcomes, establishing a baseline of gender differences will be an important first step addressed in this study. To establish whether our sample follows national trends of women reporting higher rates of depression and anxiety than men, Aim 1 of this study seeks to evaluate gender differences in the presence of depression and anxiety within our national sample.

Among the general population, rates of depression vary by gender and age. Depressive disorders are more common among women than men with onset usually occurring in conjunction with pubertal shifts (Altemus, Sarvaiya, & Epperson, 2014). Additionally the prevalence of anxiety disorders increases in girls as early as age nine and like depression, is more common in
women than men across the lifespan (Altemus, Sarvaiya, & Epperson, 2014). A meta-analysis by Salk and colleagues (2017) gave insight into both age and gender difference in symptoms and diagnosis of depression. Developmental trends indicate that gender differences in symptoms and diagnoses of depression decrease from adolescence into early adulthood and stabilize in middle adulthood, however, women still have significantly greater odds of having symptoms or a diagnosis of depression than men (Salk, Hyde, & Abramson, 2017). Additionally, among older adults multiple ACEs, a single occurrence of sexual abuse, as well as repeated occurrences of physical and sexual abuse are highly correlated with geriatric depression (Ege et al., 2015).

Taken together, it is important to evaluate differences in age and gender within any evaluation of ACEs and associated outcomes. Specifically, looking into gender and age differences in relation to emotional well-being outcomes will help add a data point for comparison to the preponderance of contradictory evidence, especially while evaluating the effects of a novel protective moderator such as proactive coping. Aim 1 of this study additionally seeks to evaluate age differences in the presence of depression and anxiety within our national sample.

**Proactive Coping as a Moderator**

Main effects of exposure to ACEs are evident throughout life, even into older adulthood. However, these outcomes may be attenuated by protective factors such as social support and access to other coping resources such that outcomes of those with high ACEs exposure mimics patterns found among individuals with low ACEs exposure (Nurius, Green, Logan-Greene, Longhi, & Song, 2016). Although psychological resilience, characterized in part and broadly by the use of active and adaptive coping strategies, has been shown to help buffer the negative effects of ACEs exposure on depression (Poole, Dobson, & Pusch, 2017), the evaluation of a more specific coping such as proactive coping could be useful in narrowing down a construct for intervention.

Proactive coping is the effortful steps one takes to avoid or modify a stressful event before its occurrence (Aspinwall & Taylor, 1997). This involves integrating life management strategies and self-regulatory processes to maximize goal attainment (Aspinwall & Taylor, 1997). Proactive coping differs from anticipatory coping, preparing for the negative effects of probable exposure to a particular stressor, on three important grounds. First, proactive coping is the accumulation of resources across time with the understanding that stressful situations are an inevitability in life. Second, because proactive coping is not directed toward one
specific stressor, it is important to develop skills to identify potential sources of stress. Third, these skills will be different than those required for anticipatory coping, coping in a prospective manner for a specific future stressor, and reactive coping, coping with the aftereffects of stressor exposure (Aspinwall & Taylor, 1997; Schwarzer & Luszczynska, 2008).

Reflecting these distinctions, proactive coping involves five stages. Initially, appraisal of future stressors must occur, however, this does not mean that a particular stressor must be identified. Second, recognition of the future stressor must be made which requires purposeful attention allocation to the surrounding environment and future orientation. Third, initial appraisal takes place which requires considering likelihood, severity, and other significant factors. Fourth, preliminary coping efforts are made to minimize or avoid future stressors. The fifth stage involves obtaining and applying feedback to reappraisal and adjust one’s strategies to optimize positive outcomes (Aspinwall & Taylor, 1997).

These stages of proactive coping rely heavily on cognitive processes to be successfully employed (Aspinwall & Taylor, 1997). The constructs that make up these processes are housed within the larger executive functions branch of cognition. They include constructs such as attention, working memory, and regulatory functions (Diamond, 2013). These mental constructs allow individuals to concentrate, selectively apply attention, problem solve and plan (Diamond, 2013), all skills that are critical to developing and applying proactive coping strategies.

The literature suggests that there are age differences in the levels of proactive coping (Vaillant, 1986). Levels of healthy and mature coping strategies increase from the age of 20 to middle adulthood, indicating that the development of these strategies may take place during adolescence and maturing during emerging adulthood (Skinner & Zimmer-Gembeck, 2007). One mechanism driving the development of these strategies could be the continued maturation of cognitive structures such as executive functions (Arnett, 2007). Adaptive processes of coping are influenced by an individual’s ability to self-regulate, plan for the future, selectively apply attention and resources and problem solve, capacities which fall under the umbrella of executive functions. These skills are developed as the prefrontal cortex matures and executive functions (EF) are established (Diamond, 2013).
Additional work by Sollár and Sollárová (2009) suggests that high schoolers and young university students utilized proactive coping strategies less than older adult samples. An additional mechanism which may explain age discrepancies in proactive coping is life experience. Older adults have more cumulative life experience which could contribute to a more robust repertoire of strategies (Skinner & Zimmer-Gembeck, 2007). Additionally, financial resources could contribute to one’s ability to utilize more diverse and tangible coping strategies (Falconnier, 2009). This suggests that there may be age differences in the protective effect proactive coping may have against the continued proliferation of stressor exposure, which individuals who have been exposed to multiple ACEs could be at risk for. Emerging adulthood, ages 18-25, could be an advantageous period to promote the development of proactive coping strategies. Although increasing financial resources to aid in coping is not a viable point of intervention, educating emerging and young adults on the benefits of utilizing proactive coping strategies could help buffer against the future negative effects of ACEs exposure.

Proactive coping is associated with a number of positive outcomes including overall higher quality of life (Cruz, Cabrera, Hufana, Alquwez, & Almazan, 2018). Higher levels of proactive coping have been associated with fewer symptoms of PTSD among female college students with histories of trauma (Vernon, Dillon & Steiner, 2009). Further research has found that proactive coping is associated with lower levels of depression, fewer declines in functional disability among older adults as well as larger systems of social support (Greenglass, Fiksenbaum & Eaton, 2006). The preponderance of research indicates that proactive coping is linked to positive outcomes across a variety of domains throughout the lifespan including emotional well-being. Therefore, proactive coping may help attenuate the enduring negative effects of exposure to adverse childhood experiences and may prove to be an avenue of intervention. In other words, proactive coping could be a strong protective resource against current and future stressors, particularly within a mental health context and especially for individuals with ACEs exposure. However, patterns of both depression and anxiety as well as proactive coping vary by age, gender, and SES are therefore important to evaluate across these groups.
PRESENT STUDY

The present study seeks to replicate and extend previous findings between ACEs exposure and the presence of depression and anxiety by examining gender, age, SES, and proactive coping as moderators. For the purposes of this study emotional well-being will be evaluated as reported symptoms of, or treatment for, depression or anxiety or any other emotional disorder within the last 12 months.

**Aim 1:** We seek to replicate previous findings by establishing a positive association between ACEs exposure and the presence of depression or anxiety. Additionally, we will establish trends in the presence of depression and anxiety within our sample across age, SES, and gender. We hypothesize that the prevalence of depression and anxiety will be greater among women and younger adults.

**Aim 2:** Three moderation models will systematically evaluate the moderating effects of proactive coping on the association between ACEs exposure and the presence of depression and anxiety while parsing out effects of (a) age, (b) gender, and (c) socioeconomic status. With age incorporated into the model, we expect that older adults will report higher levels of proactive coping which will ameliorate the negative effects of ACEs exposure on emotional well-being over and above their young adult counterparts. Based on inconsistent findings within the existing literature we have made a non-directional hypothesis in regard to gender. With SES incorporated into the model, we expect that individuals with lower SES will have been exposed to more ACES but those with higher SES will have more resources to proactively cope which will result in greater emotional well-being.

METHOD

**Participants**

Participants were recruited as part of a larger daily diary study, 2018 U.S. Midterm ESCAPED (Election Stress Coping and Prevention Every Day). The sample included adults ages 18 - 77 ($Mean = 37$, $SD = 11.70$) in the United States. Participants completed a survey assessing daily mood, health, memory, activities, and events. Online questionnaires were completed using Qualtrics survey software. The current sample for analysis includes 806 participants from all 50 states and American Samoa. Of the participants 51% were women, 77% were European American, 10% were African American, and 13% identified as either Native American, Alaska Native or Eskimo, Asian, Native Hawaiian or Pacific Islander, or Other and were categorized as
Other for these analyses. Socioeconomic status as measured through education by proxy was fairly high with participants on average completing a four year degree.

**Procedure**

Participants were recruited on Amazon’s Mechanical Turk (MTurk) and were directed to Qualtrics to take the study survey. Participants who consented and who indicated that they were not employees of North Carolina State University were advanced to the measures portion of the survey. Those who did not consent or who indicated they were university employees were directed to a screen thanking them for their time and were not allowed to continue the survey. Participants were compensated $1.00.

**Measures** (see Appendix A for all surveys)

*Adverse Childhood Experiences.* The revised Adverse Childhood Experiences measure was used (Finkelhor, Shattuck, Turner, & Hamby, 2015) which includes four additional items to reflect systemic levels of adversity, low socioeconomic status, peer victimization, isolation/rejection, and community violence exposure. These factors are associated with a variety of negative developmental outcomes and risk factors such as mental health symptoms and physical health problems (Finkelhor, Shattuck, Turner, & Hamby, 2015). Participants indicated if they had been exposed to or experienced situations of adversities across a variety of domains including: physical, sexual, emotional or verbal abuse, neglect, social deprivation, disaster or household dysfunctions among others. Scores were dummy coded into categories indicating no exposure, some exposure (1-4 adverse experiences), and high exposure (five or more adverse experiences).

*Depression and Anxiety.* Depression and anxiety was assessed using one item from the chronic conditions checklist from the National Survey of Midlife Development in the United States (MIDUS; Brim at al., 1996; Ryff et al., 2006). Participants were asked to indicate whether they had experienced symptoms of or had been treated for depression, anxiety, or some other emotional disorder within the last 12 months. This measure not only evaluates objective treatment of emotional disorders but also the subjective evaluation of the presence of symptoms which may also have negative consequences for well-being. Similar single item assessments for depression and anxiety have been used reliably (Ayalon, Goldfracht, & Bech, 2010; McCormack, Boldy, Lewin, & McCormack, 2011; Zimmerman et al., 2006).
**Proactive Coping.** The Proactive Coping Scale developed by Aspinwall, Sechrist, and Jones (2005) assesses an individual’s “preference for planning for adverse events and expending resources to prevent them or to reduce their impact”. Items are answered on a 5 point scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Example items include, “I try to take care of little problems before they become big problems” and “Planning only makes a person unhappy, since plans hardly ever work out” (reverse scored). Participants were assigned a sum score for the scale. Higher scores signify higher levels of proactive coping.

*Age.* Participant’s age was measured by matching date of birth and numeric age reported by participants. This method was used as a data quality check as well.

*Gender.* Participants were asked to select, “male”, “female”, “transgender”, “gender variant”, or “other”. For the purposes of these analyses gender was dichotomized (men = 0 and women = 1). Due to the lack of power within transgender, gender variant, and other categories (3% combined), these cases were dropped from any analyses. Of the dichotomized sample, 51% were female.

*Socioeconomic Status.* Due to differences in cost of living across the nation, socioeconomic status was measured using education as a proxy as seen in previous work (see, Grzywacz, Almeida, Neupert, & Ettner, 2004). Participants were asked to indicate the highest level of education they had achieved on a twelve-point scale. Level of education was significantly positively correlated with reported income $r(844) = .30, p < .001$.

*Covariates.* Chronic conditions were measure using the chronic conditions checklist (MIDUS; Brim at al., 1996; Ryff et al., 2006). Individuals indicated whether they had experienced any of 29 chronic conditions within the last year including asthma, diabetes, lack of sleep, heart disease among others, Chronic conditions were controlled for in analyses to avoid confounding effects of variance in depression and anxiety being accounted for by other chronic conditions. By controlling for chronic conditions, the effects of ACEs exposure can be isolated.

**RESULTS**

Descriptive statistics and correlations are reported for all study variables in Table 1. Significant positive associations were found between the presence of depression and anxiety and ACEs exposure in line with Aim 1. Individuals with more ACEs reported higher levels of depression and anxiety and women also reported more depression and anxiety than men.
Depression and anxiety was also significantly positively associated with chronic conditions, more chronic conditions were associated with higher rates of depression and anxiety. Depression and anxiety were significantly negatively associated with SES and proactive coping such that higher levels of both SES and proactive were respectively associated with higher reports of depression and anxiety. Exposure to adverse childhood experiences was significantly negatively associated with proactive coping as well as SES and positively associated with chronic conditions. Older adults reported higher SES than younger adults and there were more older women than men in the sample.

Table 1
*Correlations and descriptive statistics for study variables*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Range</th>
<th>Mean</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Depression and/or Anxiety</td>
<td>0-1</td>
<td>.36</td>
<td>.48</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. ACEs</td>
<td>0-2</td>
<td>0.96</td>
<td>0.80</td>
<td>.31***</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Proactive Coping</td>
<td>1-6</td>
<td>3.36</td>
<td>1.06</td>
<td>-.04</td>
<td>-.12*</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. SES</td>
<td>3-12</td>
<td>8.11</td>
<td>1.94</td>
<td>-.09*</td>
<td>-.08*</td>
<td>-.01</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Gender</td>
<td>0-1</td>
<td>0.51</td>
<td>0.50</td>
<td>.13***</td>
<td>.08</td>
<td>.02</td>
<td>-.03</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>6. Age</td>
<td>18-77</td>
<td>35.42</td>
<td>10.62</td>
<td>-.06</td>
<td>-.03</td>
<td>.06</td>
<td>.11*</td>
<td>.12*</td>
<td>-</td>
</tr>
<tr>
<td>7. Chronic Conditions</td>
<td>0-28</td>
<td>2.86</td>
<td>4.30</td>
<td>.30***</td>
<td>.40***</td>
<td>.15***</td>
<td>.07</td>
<td>.06</td>
<td>.03</td>
</tr>
</tbody>
</table>

*Note.* *p*<.05, **p**<.01, ***p***<.001. Italicized value is Cramer’s V measure of association.

To address **Aim 2**, three multiple logistic regressions were conducted to test the moderating effect proactive coping coupled with (a) age, (b) socioeconomic status, and (c) gender have on the association between ACEs exposure and the presence of depression and anxiety. All continuous variables were centered for these models. All odd ratios and 95% CIs for each model are presented in Table 2.
Table 2.
*Unstandardized Coefficients (and Standard Errors), Odds Ratios (OR), and 95% Confidence Intervals (CI) of Odds Ratios of Models Predicting Depression and Anxiety*

<table>
<thead>
<tr>
<th></th>
<th>Model 1: Interaction with Age</th>
<th></th>
<th>Model 2: Interaction with SES</th>
<th></th>
<th>Model 3: Interaction with Gender</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>OR</td>
<td>95% CI</td>
<td>B</td>
<td>OR</td>
<td>95% CI</td>
</tr>
<tr>
<td>ACEs</td>
<td>.62(.11)***</td>
<td>1.86 [1.49, 2.32]</td>
<td>.62(.11)***</td>
<td>1.90 [1.50, 2.33]</td>
<td>.60(.18)***</td>
<td>1.82 [1.30, 2.56]</td>
</tr>
<tr>
<td>Proactive Coping</td>
<td>-.14(.14)</td>
<td>.87 [.67, 1.14]</td>
<td>-.14(.13)</td>
<td>.87 [.67, 1.14]</td>
<td>-.44(.21)*</td>
<td>.65 [.43, .98]</td>
</tr>
<tr>
<td>Age</td>
<td>-.01(.01)</td>
<td>.87 [.96, 1.02]</td>
<td>-.02(.00)*</td>
<td>.98 [.97, 1.00]</td>
<td>-.02(.01)*</td>
<td>.97 [.97, 1.00]</td>
</tr>
<tr>
<td>SES</td>
<td>-.08(.04)</td>
<td>1.24 [.85, 1.003]</td>
<td>-.06(.07)</td>
<td>.94 [.82, 1.08]</td>
<td>-.08(.04)</td>
<td>.92 [.85, 1.002]</td>
</tr>
<tr>
<td>Gender</td>
<td>.54(1.6)**</td>
<td>1.71 [1.24, 2.37]</td>
<td>.54(1.7)**</td>
<td>1.72 [1.25, 2.0]</td>
<td>.42(.29)</td>
<td>1.52 [.87, 2.70]</td>
</tr>
<tr>
<td>ACEs x PC</td>
<td>.17(.10)</td>
<td>1.18 [.97, 1.45]</td>
<td>.16(.10)</td>
<td>1.17 [.96, 1.43]</td>
<td>.45(.17)**</td>
<td>1.60 [1.13, 2.18]</td>
</tr>
<tr>
<td>ACEs x Age</td>
<td>-.00(.01)</td>
<td>.99 [.98, 1.02]</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>Chronic Conditions</td>
<td>.13(.02)***</td>
<td>1.14 [1.09, 1.19]</td>
<td>.13(.02)***</td>
<td>1.14 [1.09, 1.19]</td>
<td>.13(.02)***</td>
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<td>R²</td>
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*Note.* *p < .05, **p < .01, ***p < .001. Abbreviations are as follows: Adverse Childhood Experiences (ACEs), Proactive Coping (PC), Socioeconomic Status (SES). Nagelkerke’s R² reported. Models were run with and without covariates, pattern of results remained the same.
Model 1 included age and controlled for gender, socioeconomic status, and chronic conditions. Results showed that there were no significant differences in depression and anxiety based on proactive coping and age. A significant main effect of ACEs was found such that individuals who experienced more ACEs were more likely (OR = 1.86, \( p < .001 \)) to report experiencing or being treated for depression and anxiety compared to those with fewer ACEs. There was no significant three-way interaction between ACEs exposure, proactive coping, and age predicting depression and anxiety. The same trend followed for Model 2 revealing no significant differences in depression and anxiety based on levels of proactive coping and socioeconomic status while controlling for chronic conditions, age, and gender. Although the same significant main effect of ACEs exposure was found indicating that individuals who experienced more ACEs were more likely (OR = 1.90, \( p < .001 \)) to report experiencing or being treated for depression and anxiety, there was no significant three-way interaction between ACEs exposure, proactive coping, and socioeconomic status predicting depression and anxiety.

Results from Model 3 revealed a significant main effect of ACEs such that individuals who experienced more ACEs were more likely (OR = 1.82, \( p = .039 \)) to report experiencing or being treated for depression and anxiety than those reporting fewer ACEs. A significant main effect of proactive coping was also found such that individuals with higher levels of proactive coping were less likely (OR = .65, \( p = .04 \)) to report depression and anxiety compared to those with lower levels of proactive coping. There was a significant two-way interaction with ACEs and proactive coping predicting depression and anxiety such that individuals who had experienced more ACEs and engaged highly in proactive coping strategies reported significantly higher (OR = 1.60, \( p = .008 \); see Figure 1) depression and anxiety than those with lower proactive coping. The simple slopes for each ACEs exposure group in Figure 1 were not significant. Although the slope for those with five or more ACEs looks positive, it is not significant.
Additionally, there was a significant three-way interaction between ACEs, proactive coping, and gender while controlling for lifetime chronic conditions, age, and SES, $\chi^2(8, N = 806) = 130.75, p < .001$, Nagelkerke $R^2 = .21$ indicating that the model accounted for 21% of the variance in depression and anxiety (see Figure 2).
To decompose this interaction I evaluated differences in slopes based on ACEs exposure and gender. Dummy codes used to compare levels of ACEs exposure to a referent group, (i.e., comparing no ACEs exposure to 1-4 ACEs while leaving out the group with five or more ACEs). This was done for all combinations of levels of ACEs. There was a significant negative association between proactive coping predicting depression and anxiety such that men who reported no ACEs and who were high in proactive coping had significantly lower odds (OR = .51, \( p = .03 \)) of depression and anxiety than those who were low in proactive coping. This association was not significant for men who report some ACEs exposure and those who reported five or more ACEs. Men who were low in proactive coping and experienced five or more ACEs had significantly greater odds (OR = 1.81, \( p = .01 \)) of reporting depression and anxiety than those who had no ACEs. Although the line representing men with five or more ACEs looks significantly positive, error around the slope renders it not significant. Men who were low in proactive coping and who were exposed to 1-4 ACEs were not significantly different in their odds of reporting depression and anxiety than those high in proactive coping. Men who were high in proactive coping and were exposed to 1-4 ACEs had greater odds (OR = 4.70, \( p = .01 \)) of reporting depression and anxiety than those who reported no ACEs and high proactive coping.
Men who were high in proactive coping and were exposed to five or more ACEs also had greater odds (OR = 1.92, \( p = .05 \)) of reporting depression and anxiety than those who were exposed to no ACEs and had high proactive coping. Men who were high in proactive coping and had been exposed to five or more ACEs were not significantly different from those who were exposed to 1-4 ACEs with high proactive coping.

Among women, simple slopes analyses indicated that the slopes of ACEs exposure were not significant. Among women who were low in proactive coping there was no difference between those who were exposed to no ACEs and those who were exposed to some ACEs and were low in proactive coping. However, women who were low in proactive coping and were exposed to five or more ACEs had greater odds (OR = 2.31, \( p < .001 \)) of depression and anxiety than those who reported no ACEs exposure and were low in proactive coping. Additionally, those women who were low in proactive coping and were exposed to five or more ACEs had greater odds (OR = 2.36, \( p = .04 \)) of reporting depression and anxiety than those who were exposed to 1-4 ACEs and were low in proactive coping. Among women who were high in proactive coping there was a significant difference between those who were exposed to no ACEs and those who were exposed to 1-4 ACEs (OR = 2.15 \( p = .04 \)) and were high in proactive coping. Additionally, women who were high in proactive coping and were exposed to five or more ACEs had greater odds (OR = 1.76, \( p = .006 \)) of depression and anxiety than those who reported no ACEs exposure and were high in proactive coping. However, among women who were high in proactive coping, there was no significant difference between those who were exposed to 1-4 ACEs and five or more ACEs and were high in proactive coping.

There were no significant gender differences among individuals with low proactive coping who were exposed to no ACEs and 1-4 ACEs. However, there were gender differences among those who had low proactive coping and were exposed to five or more ACEs such that women who were low in proactive coping and had experienced five or more ACEs had greater odds (OR = 2.11, \( p = .05 \)) of depression and anxiety than men in the same context. There were no gender differences among individuals with high proactive coping regardless of ACEs exposure.

**DISCUSSION**

In addressing Aim 1, I found significant positive associations between the presence of depression and anxiety and ACEs exposure, replicating previous findings. Greater exposure to
ACEs has often been associated with higher levels of depression and anxiety (Infurna, et al., 2016; Jones, Nurius, Song, & Fleming, 2018; Karatekin, 2018; Poole, Dobson, & Pusch, 2017; White, 2011). The findings from this study support that basic association while controlling for age, and socioeconomic status, gender. This confirms conclusions established in previous work that exposure to adverse childhood experiences has significant negative implications for mental health and should be continually considered as a primary point of intervention in public policy. There was no significant correlational association between age and depression and anxiety.

Within the moderation model age was not a significant predictor of depression and anxiety, indicating that it does not contribute significantly to the predictive variance in probability of depression and anxiety. This could be due to the sample being composed of more younger and middle age adults and fewer older adults with the oldest reported age being 77. Socioeconomic status was significantly negatively correlated with depression and anxiety, such that higher levels of depression and anxiety were reported among individuals of low SES following previous trends (Hackman, Farah, & Meaney, 2010). In line with national trends of women reporting higher rates of depression and anxiety (Altemus, Sarvaiya, & Epperson, 2014; Salk, Hyde, & Abramson, 2017) correlational results indicate that there are significantly high rates of depression and anxiety among women than men. These findings reinforce that there are pervasive gender disparities in individuals struggling with mental health concerns.

To address Aim 2 of the study I conducted three models with 3-way interactions, the first incorporating age into the model of proactive coping moderating the association between ACEs exposure and probability of depression and anxiety. This interaction was not significant, which follows the correlational trends observed while addressing Aim 1. This could be driven by a lack of age differences in levels of proactive coping observed in this sample which has been found in previous work (Skinner & Zimmer-Gembeck, 2007; Sollár & Sollárová, 2009; Vaillant, 1986). Additionally, the age distribution is leptokurtic, indicating less variance than a normal distribution, with the majority of the sample being young and middle-aged adults. I did not conduct a nonlinear transformation to alter the kurtosis due to developmental trends in depression and anxiety increasing in older adults beyond the age range within our sample (Mirowsky & Ross, 1992).

Additionally, Model 2 which incorporated socioeconomic status as a moderator into the moderation of proactive coping and ACEs predicting depression and anxiety was not significant.
This could indicate that although correlational differences were observed across study variables in relation to SES, there could be an underlying mediating or moderating mechanism that was not tested within this model. One such underlying mechanism could be availability of mental health resources or possibly social support resources (Greenglass, Fiksenbaum, & Eaton, 2006). Lower socioeconomic status has been shown to predict emotional and physical reactivity to daily stressors (Grzywacz, Almeida, Neupert, & Ettner, 2004), however the current findings suggest that SES does not interact with a past stressor and future oriented coping to predict mental health. The lack of findings within this model indicate that mental health factors, specifically depression and anxiety, associated with ACEs exposure are not significantly predicted by socioeconomic status or any associated interactions. This indicates that there are possibly more accessible grounds for intervention to ameliorate negative effects of ACEs exposure as SES is not a realistic factor for intervention within most frameworks.

Evaluating gender differences in relation to emotional well-being outcomes was an important step in adding a data point for comparison to the preponderance of contradictory evidence regarding ACEs exposure and mental health outcomes. Significant results were found in Model 3 which incorporated gender into the moderation of proactive coping on the association between ACEs exposure predicting odds of depression and anxiety. Within the context of the two-way interaction, although the line representing individuals with five or more ACEs appears positive it is not significant, indicating that high levels of proactive coping are not always detrimental. This is further evidenced by the main effect of proactive coping such that higher levels of proactive coping are associated with lower levels of depression and anxiety, suggesting that capitalizing on promoting the development of proactive coping strategies would be a good avenue for intervention in decreasing rates of depression and anxiety. Due to this construct being developmental in nature, based on resource acquisition and accumulation of skills (Aspinwall & Taylor, 1997), it provides a realistic and accessible point for intervention. Actively promoting the development of proactive coping strategies in adolescence could help lessen the upward trajectory of rates of depression and anxiety which increase into early adulthood (Greenglass, Fiksenbaum & Eaton, 2006; Salk, Hyde, & Abramson, 2017).

The interaction of exposure to adverse childhood experiences and proactive coping predicting odds of depression and anxiety should not be interpreted within any temporal context, in other words we cannot conclude that higher levels of proactive coping are causing higher
subsequent levels of depression and anxiety. Rather, it appears that individuals who have been exposed to five or more ACEs utilize proactive coping strategies more but also have significant odds of experiencing depression and anxiety. These findings are based on observational data, experimental, longitudinal data will be necessary in making conclusions regarding temporal or causal trajectories.

The literature regarding gender difference significantly varied (Cavanaugh, Petras, & Martin, 2015; Ege et al., 2015; Chapman et al., 2004), thus it is not surprising that the findings from this study do not follow a previously established pattern. Men appear to have differential patterns of association between proactive coping and ACEs exposure predicting depression and anxiety as compared to women. The findings suggest that proactive coping is especially beneficial for men who have no adverse childhood experiences. However, as stated above we cannot draw conclusions regarding temporal trajectories of effect. We cannot discern whether, over time, rates of depression and anxiety would lower for both women and men higher in ACEs exposure based on their level of proactive coping. The current findings suggest that there are differential benefits to proactive coping based on ACEs exposure and gender with men experiencing no ACEs benefiting the most, however, it is clear that ACEs exposure is detrimental to mental health across age, gender, and socioeconomic status.

Limitations and Future Directions

The cross-sectional observational nature of these data limits implications for intervention. Future investigations into the buffering effects of proactive coping on the association between ACEs exposure and depression and anxiety should adopt an experimental and/or longitudinal design, tracking developmental trends in both proactive coping and depression and anxiety over time. Intervention work could target development of diverse proactive coping skills and measure enduring associated outcomes over time. Additionally, findings regarding socioeconomic status may be more relevant within a multinational design. This would allow for comparison between nations with socialized healthcare, which would include equal access to mental health resources, and those nations with private healthcare systems in which SES and access to mental health resources are positively associated. Future work should also include a larger older adult population and one with ages greater than 77. This will allow for cohort comparisons that were not possible within this sample. Finally, a possible extension of this study would be to evaluate gender effects using the ACEs scale in its stratified form rather than an aggregate or dummy
coded model. Doing so will allow researchers to disentangle interaction and outcome trajectories based on experience-specific influences (i.e., outcomes from sexual trauma may be different than those predicted by familial incarceration). This may help to untangle the findings reported here.

**Conclusions**

The results of this study lay the groundwork for future steps in proactive coping research within the context of ACEs. Proactive coping is a dynamic and developmental process, and future studies should evaluate it as such. Additionally, these findings indicate that proactive coping strategies are being utilized by individuals within this context resulting in complex implications for individuals’ well-being. In other words, there are differential benefits to proactive coping based on ACEs exposure and gender within our sample. Finally, the current findings establish that ACEs exposure is detrimental to mental health across age, gender, and socioeconomic status. These findings should be taken into consideration through a developmental perspective such that adverse childhood experiences, regardless of demographic context, have negative and long lasting implications for mental health.


QUESTIONNAIRE

Adverse Childhood Experience (ACE) Questionnaire


0While you were growing up, during your first 18 years of life:

1. Did a parent or other adult in the household often … Swear at you, insult you, put you down, or humiliate you?
   
   or

   Act in a way that made you afraid that you might be physically hurt?

   Yes No

   If yes enter 1 ________

2. Did a parent or other adult in the household often … Push, grab, slap, or throw something at you?

   or

   Ever hit you so hard that you had marks or were injured?

   Yes No

   If yes enter 1 ________

3. Did an adult or person at least 5 years older than you ever… Touch or fondle you or have you touch their body in a sexual way?

   or

   Try to or actually have oral, anal, or vaginal sex with you?

   Yes No

   If yes enter 1 ________

4. Did you often feel that … No one in your family loved you or thought you were important or special?

   or

   Your family didn’t look out for each other, feel close to each other, or support each other?

   Yes No

   If yes enter 1 ________

5. Did you often feel that … You didn’t have enough to eat, had to wear dirty clothes, and had no one to protect you?

   Or
Your parents were too drunk or high to take care of you or take you to the doctor if you needed it?
Yes No
If yes enter 1 ________

6. Were your parents ever separated or divorced?
Yes No
If yes enter 1 ________

7. Was your mother or stepmother: Often pushed, grabbed, slapped, or had something thrown at her?

or

Sometimes or often kicked, bitten, hit with a fist, or hit with something hard?

or

Ever repeatedly hit over at least a few minutes or threatened with a gun or knife?
Yes No
If yes enter 1 ________

8. Did you live with anyone who was a problem drinker or alcoholic or who used street drugs?
Yes No
If yes enter 1 ________

9. Was a household member depressed or mentally ill or did a household member attempt suicide?
Yes No
If yes enter 1 ________

10. Did a household member go to prison?
Yes No
If yes enter 1 ________

11. Did other kids, including brothers or sisters, often or very often hit you, threaten you, pick on you or insult you?
Yes No
If yes enter 1 ________

12. Did you often or very often feel lonely, rejected or that nobody liked you?
Yes No
If yes enter 1 ________

13. Did you live for 2 or more years in a neighborhood that was dangerous, or where you saw people being assaulted?
Yes No
If yes enter 1 ________

14. Was there a period of 2 or more years when your family was very poor or on public assistance?
Yes No
If yes enter 1 ________
Now add up your “Yes” answers: _______ This is your ACE Score

**Proactive Coping - Shortened**

Aspinwall et al., 2005

Please rate your agreement with the following statements from 1 (strongly disagree) to 5 (strongly agree). Please check the box that most accurately describes how much you agree or disagree with each statement.

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<th>3</th>
<th>4</th>
<th>Strongly Agree</th>
<th>5</th>
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I prepare for adverse events.

Rather than spending every cent I make, I like to save for a rainy day.

I like to plan ahead.

Planning only makes a person unhappy, since plans hardly ever work out.

I’m willing to spend time, energy or money now to save a greater amount of time, energy, or money later.

I try to take care of little problems before they become big problems.
Depression and Anxiety - Chronic Health Conditions

(MIDUS; Brim at al., 1996; Ryff et al., 2006)
In the past 12 months, have you experienced or been treated for any of the following?

Single item: Anxiety, depression, or some other emotional disorder

Socioeconomic Status

What is the highest grade of school or year of college your father completed? (Please check one)

No School/Some Grade School (1st-6th)
Eighth Grade/Junior High School (7th – 8th)
Some High School (9th – 12th No Diploma/No GED)
GED
Graduated from High School
1 to 2 Years of College, No Degree Yet
3 or More Years of College, No Degree Yet
Graduated from a Two-Year College or Vocational School, or Associate’s Degree
Graduated from a Four-or Five-Year College, Or Bachelor’s Degree
Some Graduate School
Master’s Degree
PhD, EdD, MD, DDS, LLB, LLD, JD, or Other Professional Degree

Chronic Health Conditions

(MIDUS; Brim at al., 1996; Ryff et al., 2006)
Participants were asked to select “yes” or “no” for 29 listed events that they may or may not have experienced or been treated for in the past 12 months. Items included “hay fever”, “urinary or bladder problems”, “AIDS or HIV infection”, “high blood pressure or hypertension” among others.

Age
As of today's date, how old are you?

Gender
Are you...

Male
Female
Transgender
Gender variant
Other