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The Mediation of Mental Health between Adverse Childhood Experiences and Risky Sexual Behavior

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Abstract

Risky sexual behaviors (RSB) have the potential to negatively impact individuals by increasing the risk of mental health issues, sexually transmitted infections (STIs), and unwanted pregnancies. Adverse childhood experiences (ACEs) and mental health disorders, such as anxiety, PTSD, and depression, have been known to increase RSB. The purpose of this study was to see if these mental health disorders mediate the relationship between ACEs and RSB. Participants (n = 342, mean age = 32) were recruited through social media to complete an online questionnaire. While history of ACEs significantly predicted engagement in RSB as well as all three of the mental health measures, none of the three measures of mental health emerged as a significant mediator of the relationship between ACEs and engagement in RSB (depression: b = .0060, SE = .0568, 95% CI[-.1175, .1148]; anxiety: (b = -.0136, SE = .0565, 95% CI[-.1393, .0904]; PTSD: (b = .1131, SE = .0807, 95% CI[-.0313, .2867]. Ultimately, this research showed that the history of ACEs exerts a strong, direct effect on engaging in RSB, and that in this sample, mental health symptoms are not sufficient to explain this relationship. Therefore, other factors should be explored as possible mechanisms maintaining this relationship. Furthermore, future research efforts should extend this exploration to young participants that may be more likely to participate in RSB.

Keywords: Risky sexual behaviors, adverse childhood experiences, depression, anxiety, PTSD

The Mediation of Mental Health between Adverse Childhood Experiences and Risky Sexual Behavior

Risky sexual behaviors (RSB) can impact adolescents' and young adults' wellbeing by increasing the likelihood of experiencing negative consequences, such as unexpected pregnancy, mental health issues, and sexually transmitted infections (STIs; Mirzaei, et al., 2016). It is important for medical and psychological professionals to understand the underlying experiences that may lead to individuals to engage in RSB. Adverse childhood experiences (ACEs) are known to have a significant relationship with RSB (Song & Qian, 2020). Given the previously identified relationships between ACEs, mental health concerns, and RSB, research into potential mediating factors, such as depression, anxiety, and posttraumatic stress, may be helpful in identifying specific ways mental health disorders help to explain the relationship.

Adverse Childhood Experiences

Experiencing or being in the presence of emotional, physical, or sexual abuse during the first 18 years of one's life is known as having endured adverse childhood experiences (ACEs; Felitti, et al., 1998). Felitti and colleagues (1998) focused on the lifelong health effects of ACEs in adulthood leading to early death. The authors best describe the lifelong risk of experiencing ACEs as a pyramid effect; experiencing ACEs can result in socioemotional impairment, which puts individuals at risk for adopting risky health behaviors that could later result in disability, disease, social issues, or other medical problems. Finally, the top of the pyramid represents the culmination of life experiences that start with ACEs, which is early death (Figure 1; Felitti, et al., 1998).

In a more recent study, Weems and colleagues (2021) aimed to expand the original pyramid by broadening the experiences of ACEs, as well as the outcomes that may follow

experiencing ACEs. Within this idea, pre-existing factors, such as resilience, are taken into consideration as intervention and prevention measures to mitigate the development of risky health behaviors, such as RSB (Weems, et al., 2021). The recognition of resilience as a protective factor may mitigate some effects of experienced ACEs, resulting in the development of effective emotion regulation skills and adoption of healthy coping mechanisms, rather than risky health behaviors . Also, these healthy coping mechanisms are reinforced by adequate support systems, such as family and friends (Weems, et al., 2021).

Risky Sexual Behavior (RSB)

According to Mirzaei and colleagues (2016), risky sexual behaviors (RSB) are defined as any sexual behavior that may lead to a negative outcome. Although much of the research on RSB defines negative outcomes as health risks, like STIs and unplanned pregnancy, these outcomes can also include familial issues, legal disputes, or relationship problems (Mirzaei, et al., 2016). RSB can include having a high number of sexual partners, failure to use sexual protection methods, and being intoxicated during sexual activity (Grossman & Markowitz, 2002).

Previous research with adolescents in Ghana who are engaging in RSB found that the majority did not perceive themselves as being at risk for negative health outcomes, such as human immunodeficiency viruse (HIV; Afriyie & Essilfie, 2019). When considering the ACEs pyramid, RSB are health risk behaviors that can lead to lifelong, chronic diseases, like HIV, which has been linked to long-term health problems, and in some cases, mortality (Fetilliti et al., 1998)

Relationship Between ACEs and RSB

There is a strong, positive relationship present between ACEs and RSB (Song & Qian, 2020). Song and Qian (2020) reported that for each ACE reported, adolescents were more likely

to engage in RSB such as having multiple sexual partners, not using protection during sex, and higher rate of unplanned pregnancy. Zhang and colleagues (2020) recognized similar correlations between some ACEs and RSB in college students in Zambia. Specifically, the individual ACEs that correlated with RSB were parent substance abuse, physical abuse, verbal abuse, and sexual abuse (Zhang, et al., 2020). Sexual abuse showed the strongest correlation with engagement in RSB.

Relationship Between Mental Health Disorders and Adverse Childhood Experiences

Major depressive disorder (MDD) is a mental health disorder characterized by a consistently depressed mood over a two week period (American Psychiatric Association, 2013). Features of MDD can include weight change, suicidal ideation, fatigue, loss of interest, and somatization. Research has shown experiencing a high number of ACEs (i.e. more than 4 increases the likelihood that an individual may become depressed as compared to individuals who do not experience a high amount of ACEs (i.e. less than 4; Fetilliti et al., 1998).

Generalized anxiety disorder (GAD) is excessive anxiety or worry over a variety of events or activities that causes significant distress and/or impairment in daily life (American Psychiatric Association, 2013). Some examples of stress inducing events are everyday social events, work, chores, health, and finances. Common symptoms include restlessness, being on edge, fatigue, irritability, and muscle tension. Similar to depression, ACEs have been positively correlated with anxiety, but this relationship has not been established to be causal in nature (Lee, et al., 2020).

Adult women who reported childhood sexual abuse were more likely to have depression and social anxiety symptoms later in life (Nelson, et al., 2002). Poole and colleagues (2017) found that ACEs increased the likelihood of experiencing depression symptoms; however,

resilience mediated this relationship. This study also supported the idea of resilience being a proactive factor from experiencing psychopathology in adulthood, as Weems and colleagues (2021) described. High personal resilience, therefore, may be able to help those who have experienced ACEs to not be as susceptible to adverse lifelong health effects, such as depression and anxiety.

Post traumatic stress disorder (PTSD) can sometimes result after the exposure to a traumatic event (American Psychiatric Association, 2013). The characteristics of PTSD can vary widely based on how the event affects the individual; however, general features include fear-based reexperiencing and emotional and behavioral reactions. Commonly experienced symptoms of PTSD include reexperiencing, hypervigilance, avoidance, and hyperarousal (Weathers, et al., 2014). Given the potentially traumatic nature of ACEs, PTSD is another negative mental health outcomes that has been associated with experiencing ACEs. Indeed, Cambron and colleagues (2014) recognized the association between self-reported ACEs and mental health disorders, including PTSD. Childhood emotional maltreatment (CEM) was studied and revealed that the presence of CEM directly effects PTSD (Watts, et al., 2021). Intrusive rumination, or reexperiencing, and centrality of the event mediated the relationship between CEM and PTSD. Other studies have also shown child sexual abuse to be directly correlated with PTSD (Narvaez, et al., 2019). In sum, ACEs and multiple mental health disorders are significantly correlated.

Relationship Between RSB and Mental Health Disorders

RSB are more likely to occur in youth who deal with psychiatric disorders, such as MDD, GAD, and PTSD (Brown, et al., 2010). Depressed mood has been associated with an increase in reported RSB, such as having sex while intoxicated, and positive STI results (Costa, et al., 2017).

The prevalence of RSB is high when an individual is experiencing PTSD symptoms (Narvaez, et al., 2019).

Mental health disorders and RSB have a significant relationship. For example, a longitudinal study recruited participants presenting with PTSD symptoms and measured their tendency to participate in RSB (Weiss, et al., 2019). Results revealed higher rate of RSB in trauma survivors, with or without PTSD (Smith, et al., 2004; Weiss, et al., 2019). Thus, engaging in RSB could predict PTSD symptoms.

After explaining mental health disorders, RSB, and ACEs, it is important to begin looking at the possible interconnectedness of these factors. Exploring these relationships further would allow mental health professionals to better understand patients' backgrounds and possible risks. The first hypothesis is that this study will continue to show that ACEs will increase the risk of mental disorder symptomology: depression, anxiety, and posttraumatic (Cambron, et al., 2014; Fetilliti et al., 1998; Lee, et al., 2020). The second hypothesis is that ACEs will increase the chance of RSB (Song & Qian, 2020). The third hypothesis is that mental health disorders will increase the chance of RSB (Brown, et al., 2010). The final hypothesis is that mental health disorders will mediate the established relationship between ACEs and RSB.

Method

Participants and Procedure

For this study, the participants were recruited from Reddit and directed to the REDCap platform to complete the survey. The target population included males and females, along with folks who identify with the LGBTQ+ community.

Participants will access this study through a link posted on Redditt. The link redirected them to the REDCap platform to complete the survey. To begin, they had to indicate that they

read and agreed with the consent form that states the general purpose of the survey, warnings on the sensitive subjects, and information on how to complete the study. Each participant had the option to skip any questions they did not wish to answer or discontinue the survey. Those who completed the study entered into a drawing for a chance to win a $25 Amazon gift card.

This survey will cover the mental health scales first, followed by the SRS, and will end with the ACEs measurement. The independent variable will be measured by the ACE survey. The dependent variable will be covered by the SRS, looking at risky sexual behaviors. The mediation variables will be the mental health disorders covered in the PHQ-9, GAD-7, and PCL-5.

Measures

Basic demographic questions were completed and included gender identity, relationship status, and race/ ethnicity. Each of these questions were important because it will help understand the goal of inclusivity within the study.

The Adverse Childhood Experiences (ACEs; Felitti et al., 1998) survey was used to measure childhood trauma, including physical, sexual, and emotional abuse, physical and emotional neglect, divorce, and household member mental illness or substance abuse. This measure is a self-report survey that includes 10 yes-no questions about childhood maltreatment. For example, one item asks, “Was a household member depressed or mentally ill or did a household member attempt suicide?”

The Sexual Risky Survey (SRS; Turchik & Garske, 2011; $\alpha = .83$) was used to measure risky sexual behaviors. This is a 13-question measurement that assesses the number of RSB that

have occurred in the past 6 months. The participants responded to each item by reporting how frequently they have participated in behaviors, such as “How many times have you had sex with someone you don’t know well or just met?” Higher scores indicate greater engagement in RSB.

The Patient Health Questionnaire (PHQ-9: Kroenke et al., 2001; $\alpha = .89$) is a self-report scale used to measure the severity of depression symptomology over the past two weeks. PHQ-9 consists of 10-items and utilizes a 4-point Likert scale, ranging from 0-not at all to 3-nearly everyday. Depressive symptoms measured include lack of interest, poor concentration, and suicidal ideation. The final question, which will assess impairment related to depressive symptomology, also includes a 4-point Likert scale; however, it ranges from 0-not difficult at all to 3-extremely difficult. Higher scores indicate greater depressive symptomology.

The Generalized Anxiety Disorder (GAD-7; Spitzer et al. 2006; $\alpha = .92$) self-report scale measures the severity of generalized anxiety within an individual over the past 2 weeks. This measure contains 8 items that are answered on a 4-point Likert scale ranging from 0-not at all to 3-nearly everyday. Anxiety symptoms, such as excessive worrying and trouble relaxing, are measured. The final question, which assesses impairment related to anxiety symptomology, also consists of a 4-point Likert scale from 0-not difficult at all to 3-extremely difficult. Higher scores indicate more symptoms of anxiety.

The Post Traumatic Stress Disorder Checklist (PCL-5: Blevins, et al., 2015; $\alpha = .94$) is a self-report scale used to evaluate the symptoms of PTSD over the past month. This measure contains 20 questions. Participants respond using a 5-point Likert scale ranging from 0-not at all to 4-extremely. Symptoms of PTSD , such as rumination and avoidance, are measured. For example, “How much were you bothered by avoiding memories, thoughts, or feelings related to

the stressful experience?" is asked to measure the individual's experience of avoidance. Higher scores indicate greater endorsement of post-traumatic symptomology

Analytic Strategy

The statistical analysis looked for patterns that show mental illness mediating the relationship between ACEs and RSB. Specifically, analyses were conducted within SPSS version XX. The Hayes PROCESS macro was used to conduct mediational analyses, using Model 4. Specific ACEs were examined to determine whether the most common forms of maltreatment forms in this sample. Overall, this study will help understand if there is a mediating correlation between these variables.

Results

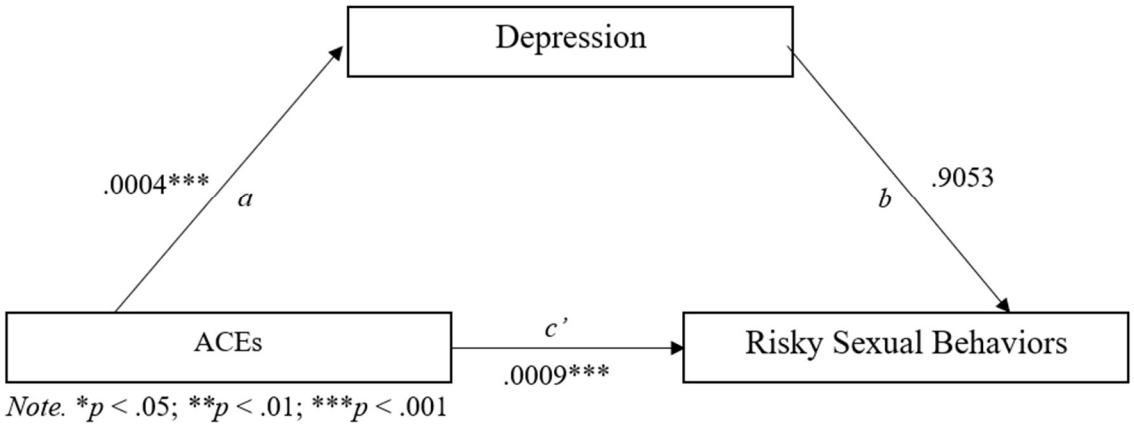
Participants

Participants in this study were primarily female (58.7%) and Caucasian (69.6%) with an average age of 31.96 (SD= 10.27), ranging from 18-60. Many individuals identified as LGBTQ+ (47.1%) and either single (30.8%), or married (26.8%). For further descriptive statistics of this sample, refer to Tables 1 and 2.

Study Outcomes

Figure 1

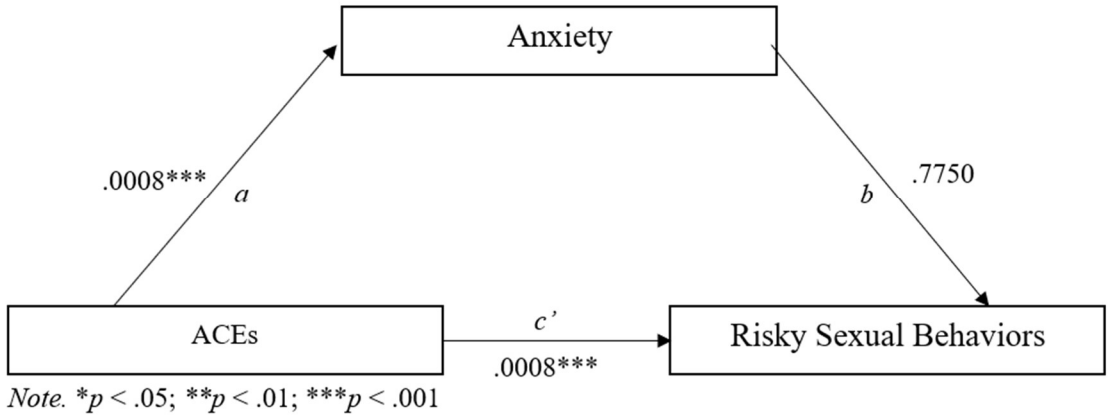
Results of Mediation Analysis (Depression)



The overall model for depression as a mediator between ACEs and RSB was not statistically significant (p< .05). Breaking down model 1, path a shows that there is a significant relationship between ACEs and experiencing depression, p<.05. Path b is not statistically significant in representing a relationship between depression and RSB, p>.05. Path c' represents a significant relationship between ACEs increasing the risk of RSB, p<.05. The mediation is statistically nonsignificant due to the confidence intervals crossing zero. The bootstrapped indirect effects were not significant (*b* = .0060, *SE* = .0568, 95% *CI*[-.1175, .1148].

Figure 2

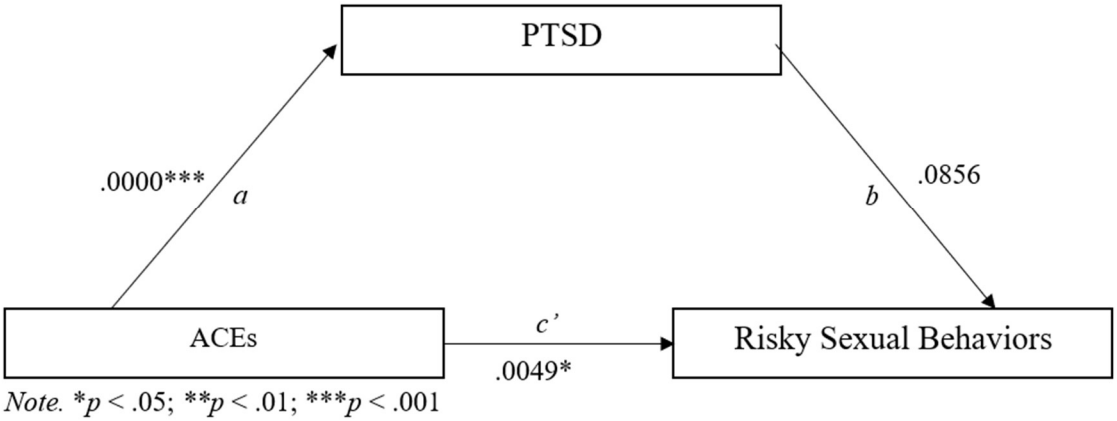
Results of Mediation Analysis (Anxiety)



The outcomes for the mediation model including anxiety are similar to the depression mediation, since both are nonsignificant. Path a represents a significant relationship between ACEs and experiencing anxiety, p<.05. Path b is nonsignificant, which shows that anxiety does not increase the risk of RSB, p>.05. Again, path c' contains a significant relationship between ACEs leading to increased risk of RSB, p<.05. The mediation model is found to be nonsignificant due to the confidence interval crossing over zero. The bootstrapped indirect effects were found to be not significant (*b* = -.0136, *SE* = .0565, 95% *CI*[-.1393, .0904].

Figure 3

Results Model of Mediation Analysis (PTSD)



Similar to the previous models, Figure 3 represents a mediation model that is not statistically significant. Path a shows a significant relationship between ACEs and experiencing PTSD, p<.05. Path b does not show a significant relationship between PTSD resulting in RSB, p>.05. Yet again, path c' shows a significant relationship between ACEs leading to increased risk of RSB, p<.05. The mediation model is insignificant due to the confidence interval crossing over zero. The bootstrapped indirect effects were found to be not significant (*b* = .1131, *SE* = .0807, 95% *CI*[-.0313, .2867].

Discussion

RSB are a consistent problem in today's youth that can lead to various negative factors, such as unexpected pregnancy, STIs, and relationships problems (Mirzaei, et al., 2016). ACEs have frequently been viewed as a predictor of RSB (Song & Qian, 2020; Zhang, et al., 2020). Another predictor for RSB in youth has been mental health disorders, such as MDD, GAD, and PTSD (Brown, et al., 2010). Also, studies have presented positive relationships between ACEs and depression, anxiety, and posttraumatic symptomology (Cambron, et al., 2014; Fetilliti et al., 1998; Lee, et al., 2020). This study sought to understand the relationship of these factors by evaluating if MDD, GAD, and PTSD would mediate the already established relationship between ACEs and RSB.

The results reinforced that there was a consistent positive relationship between ACEs and RSB. Also, positive relationships were shown between ACEs and the mental health symptomology of depression, anxiety, and posttraumatic. However, each of the hypotheses of mental health disorders mediating the relationship between ACEs and RSB were not supported. There was insignificant reporting between the mental health symptomatology and RSB. Therefore, this contradicts the previous studies that represented significant, positive relationships between MDD, GAD, and PTSD with RSB.

Limitations

The results of this study are thought to be explained by the major limitation; that it was pulled from a larger data set that included a higher percentage of chronically ill individuals. People with chronic illness are more likely to limit their sexual activity due to negative symptoms (e.g. chronic pain; Nusbaum, et al., 2003). With this in mind, it is possible that

participants from this sample were less likely to engage in sexual behaviors, and especially RSB.

Also, online survey research comes with it's own set of limitations. For example, individuals may have unique characteristics that contributed to them participating in the survey, known as self-selection bias. With this study, it was advertised toward individuals with chronic illness, so this increased this population in this study and potentially decreased other potential participants. Also, with all self-reports, there may be inaccurate reporting due to bias.

Another limitation is the average age of individuals in this study is 31.96. The average age range of individuals who engage in risky sexual behaviors is 18-24 (Sullivan, 2023). Therefore, based on the average age, this data sample was significantly less likely to include individuals who more frequently engage in RSB.

Given these limitations, future studies should target participants whose ages are statistically recognized as being at a greater risk for engaging in RSB, (i.e., ages 18-24; Sullivan, 2023). Being selective in participant demographics may allow the research to be more conclusive of whether mental illness mediates ACEs and RSB. Furthermore, researchers should be cautious of physical health concerns, such as chronically ill participants, that may influence the engagement of RSB. Finally, longitudinal studies could test the model to see if change occurs over time.

Conclusions

Overall, this study was able to reiterate the previously identified relationship between ACEs and mental health disorders, such as depression, anxiety, and posttraumatic stress. Also, results support prior studies' findings by demonstrating the positive relationship between ACEs and RSB. However, relationships between RSB and certain mental health disorders were not

statistically significant. Therefore, mental health conditions did not mediate the relationship between ACEs and RSB in this study.

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Figure 1

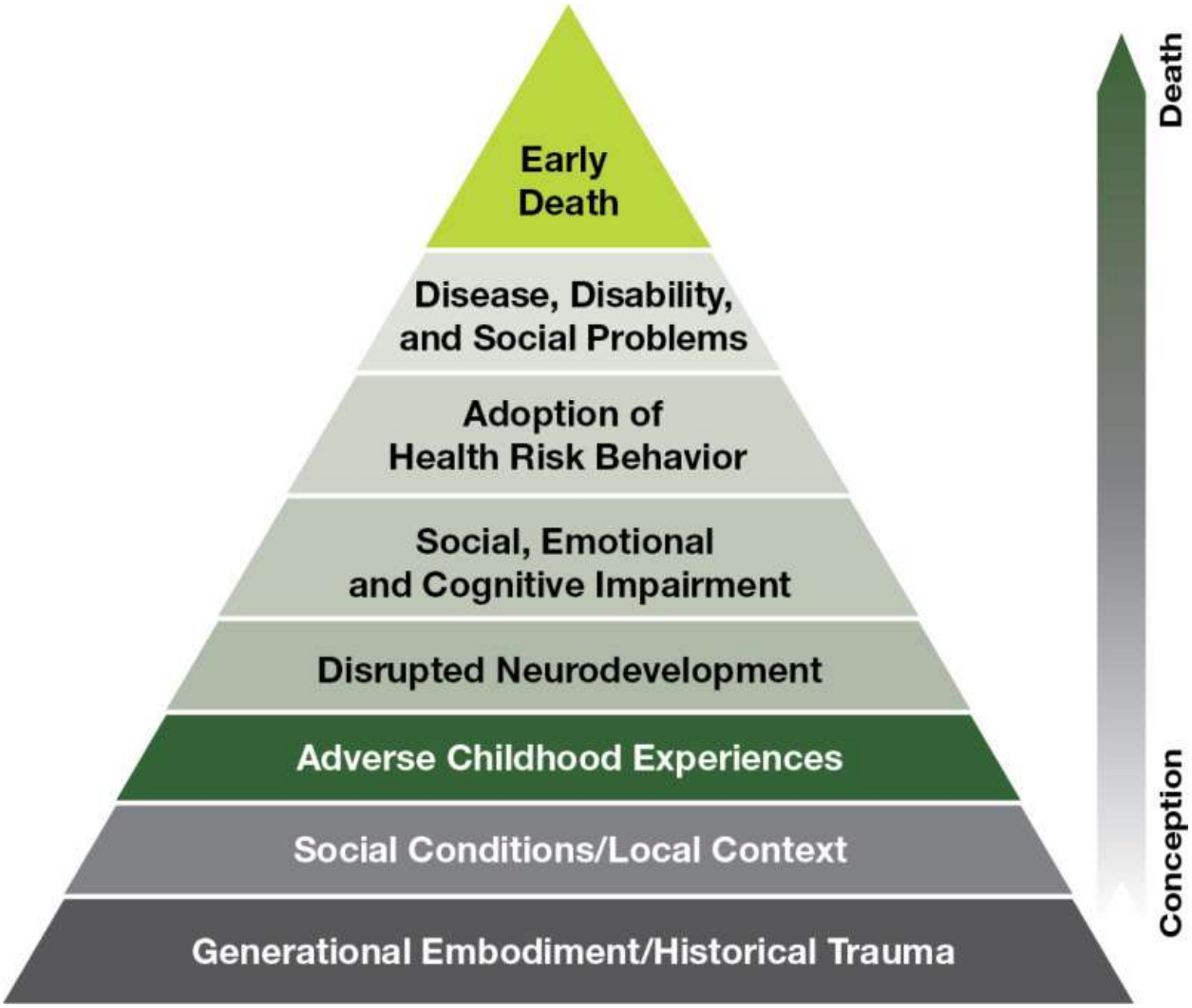

Table 1

Descriptive Statistics of Continuous Study Variables

	N	*M*	*SD*	*Min*	*Max*
Age	530	31.96	10.27	18	60
SRS	335	6.88	11.02	0	52
PHQ-9	341	13.17	6.81	0	27
GAD-7	342	10.57	7.54	0	21
PCL-5	335	33.69	19.64	0	80
ACE	303	4.50	2.56	0	10

Table 2

Descriptive Statistics of Categorical Study Variables

		N	*%*
Gender	Female	337	58.7
	Male	96	15.4
	Trans Female	12	1.9
	Trans Male	14	2.2
	Non-Binary	57	9.1
	Other	8	1.3
Race/Ethnicity	Caucasian	434	69.6
	Asian or Pacific Islander	21	3.4
	Latino/a	21	3.4
	Black	16	2.6
	Native American	2	0.3
	Multi-Ethnic	23	3,7
	Other	9	1.4
Sexual Orientation	Heterosexual	251	40.2
	Gay	15	2.4
	Lesbian	39	6.3
	Bisexual	114	18.3
	Pansexual	43	6.9
	Asexual	46	7.4
	Queer	36	5.8
	Questioning	31	5
	Other	6	1
Education	Married	167	26.8
	Engaged	17	2.7
	Dating	103	16.5
	Single	192	30.8
	Divorced	28	4.5
	Widowed	4	.6
	Other	16	2.6