

Strengths and Struggles: A Study on Moderating Variables of ACEs and Mental Health

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Abstract

Previous research has shown that a relationship exists between ACEs and adult mental health and suggested that behaviors described in the domains of strengths and difficulties may be relevant to this relationship as well (Dánielsdóttir et al., 2024). Despite this, current findings provide little coverage of moderating factors that could enable or forbid this dynamic. Commonly investigated behaviors that have not been popularly utilized in moderation analysis are those measured in the Strengths and Difficulties Questionnaire. The present study sampled adults in the United States (N = 275) and inquired if they had experienced ACEs and if they presented behavior highly correlated to mental health conditions like depression, anxiety, and PTSD. The surveys used to measure these variables were the Adverse Childhood Experience Questionnaire for Adults for ACE score, Depression, Anxiety, and Stress Scale (DASS21) for depression, Generalized Anxiety Disorder 7-Item scale (GAD-7) for anxiety, and Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5) to measure post-traumatic stress. This was analyzed to determine if strengths and difficulties moderated the relationship. Our findings suggest that strengths and difficulties do not moderate the relationship between ACEs and mental health outcomes. These findings are still important, as they highlight the need to better understand what protective factors exist for those who have experienced ACEs, and where strengths and difficulties fit in this relationship. These answers would better inform researchers and healthcare professionals on how to take preventative measures and intervene against poor adult mental health.

1. The Relationship Between Adverse Childhood Experiences and Mental Health

Adverse Childhood Experiences are defined as personal experiences that may result in trauma that occur before 18 years of age (Centers for Disease Control and Prevention, 2023). There are many experiences that can be defined as ACEs, as they are a category of traumatic experiences. Traumatic experiences are events that result in long-term extreme, or chronic, stress (Cleveland Clinic, 2023). A non-exhaustive list of ACEs, but

those that our instrument measures are: extreme poverty, losing a guardian, witnessing mental illness or suicide attempts, witnessing addiction, witnessing abuse between adults, witnessing a family member going to prison, emotional abuse from adults by means of bullying or neglect, and physical abuse from adults, including sexual assault.

The long-term effects of ACEs have been extensively researched. Recent literature has furthered our understanding and shown a clear relationship between ACEs and negative health outcomes, psychological and physical. In an

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incredible study by Daníelsdóttir, in a sample of over 25,000 twins, dizygotic and monozygotic, it was found that ACEs and certain psychiatric disorders were in a dose-response relationship. Specifically, the more ACEs an individual experienced, the higher the likelihood they were to be diagnosed with depression, anxiety, alcohol or drug use disorder, or stress-related disorders. ACEs were measured utilizing the Life Stressor Checklist-Revised and included domains of family violence, emotional abuse or neglect, physical neglect, physical abuse, sexual abuse and assault, and hate crimes experienced (Daníelsdóttir et al., 2024).

In a meta-analysis conducted by Senaratne, the relationship between ACEs and multimorbidity was investigated. In this study, multimorbidity was defined as the presence of more than one long-term health condition (LTC). LTCs were defined as physical or mental health conditions expected to or currently lasting at least one year. This extremely broad definition allowed many studies with many different chronic conditions to be included. This study and others like it help highlight the breadth of ACEs' possible impacts. Common LTC reported were hypertension, diabetes, cancer, heart disease, and more, along with several psychological conditions like depression and anxiety. It was found that for every additional ACE an individual experienced, their risk of experiencing multimorbidity increased by 12.9% (Senaratne et al., 2024).

2. Moderators of the ACEs – Mental Health Relationship

There are several variables that have been found to moderate the relationship between ACEs and mental health. A study found that perceived social support seemed to significantly impact the relationship between ACEs and depression.

Perceived social support (PSS) was measured using the Oslo Social Support Scale, ACEs were measured using the Centre for Disease Control ACE questionnaire, and the CES-D was used to measure depressive symptoms. Specifically, an individual reporting poor PSS, versus moderate or good PSS, and experiencing any ACE had a 2.85 times higher likelihood of reporting significant depressive symptoms, while those reporting specifically abuse-type ACEs had an even higher likelihood of 5.2 times (Cheong et al., 2017).

Another study discovered that perceived control plays a role in moderating ACEs' relationship to depression. Utilizing the ACEs-Q scale for ACE score, the Beck Depression Inventory II for depression score, the Generalized Anxiety Disorder 7-Item scale for anxiety, and the Sense of Control Scale for perceived control. The analysis showed that low perceived control acted as a strong negative predictor in the established relationship between depression and ACE scores. The same results did not show for anxiety (Davis & Burrow, 2024). These results, if replicable, could suggest that more unique factors exist in depression and anxiety's individual relationships with ACEs than previously thought. Depression and anxiety interact with possible moderators in unique ways when observing their findings around perceived control. This matters for our study because it suggests that targeted interventions can weaken the relationship between ACEs and adult mental health. Our goal is to utilize our findings to suggest interventions and behaviors that may have the potential to mitigate the harmful effects of ACEs in adulthood.

3. Strengths and Difficulties

The Strengths and Difficulties Questionnaire (SDQ) is an instrument that has proven useful, but not necessarily for the full diagnosis of

psychological disorders. Rather, the SDQ can show clinicians whether further investigation is advisable. The most rigorous research on the instrument has been validated from ages 7 to 25 (Armitage et al., 2023), though the adult SDQ was created for ages 18 and older. The questionnaire covers five domains: emotional difficulties, conduct difficulties, hyperactivity, peer difficulties, and prosociality. Emotional difficulties refer to one's internal symptoms that affect their quality of life. In the SDQ, these are inquired about directly by asking how often the participant feels depressed, tearful, worried, scared, etc. Conduct difficulties measure participants' tendencies to be uncooperative beyond an interpersonal level, measuring attitudes around authority, stealing, and honesty. Hyperactivity refers to the participants' restless habits, like struggling to focus or sit still. Peer difficulties refer to struggles isolated at an interpersonal level, measuring problematic behaviors like picking fights with others. These all fall into the Difficulties category of behaviors that, in some individuals, reflect mental health issues. Prosociality is the opposite end of peer difficulties, measuring agreeable behaviors like sharing and assisting peers in need. These positive social behaviors are defined as Strengths.

The instrument's usefulness is reflected in its ability to discriminate. By discrimination, we refer to the instrument's ability to distinguish between an individual who does have a disorder of interest vs an individual who does not. A study by Armitage reported this discrimination utilizing an AUC score. In short, the AUC score represents the percentage chance that given two participants, one with MDD or GAD and the other without, the participant with the disorder has a higher difficulty score. Armitage reported an AUC score of 0.73 for MDD (moderate) and a score of 0.80 (high) for GAD. This means there is an 80% chance

a randomly selected person with GAD has a higher SDQ difficulty score than someone without GAD. For MDD, the chance is 73% (Armitage et al., 2023). This benefit further justifies the use of this instrument for our study by indicating that our results could be applicable to populations with a confirmed diagnosis, promoting further investigation.

The relationships that ACEs have with anxiety, depression, and ADHD have been well researched. Previous research has found that domains measured in the SDQ moderate relationships relevant and parallel to ACEs and mental health. Moderators are mainly concerned with the potency of a relationship. If an SDQ domain moderated the relationship between ACEs and mental health, it would mean that an individual's score within a domain could imply how strongly a person's ACEs influence their mental health. Meyer et al. utilized measures directly from the SDQ to measure participants' conduct problems score. The study design utilized a Dialectical Behavioral Therapy-based skill-building group versus a psychoeducational control group as interventions to improve ADHD symptom severity. The conduct problems score measured was proposed as a moderator in investigating ADHD symptom improvement in both groups. It was found that conduct problems were a significant moderator. For the group that received the DBT-based intervention, higher baseline levels of conduct issues were associated with greater improvement in ADHD symptoms (Meyer et al., 2022).

A systematic review sought to explore moderators and mediators in the relationship between bullying victimization and self-harm or suicide attempts in adolescents. Among the significant moderators, prosocial behavior measured by the SDQ was found to be significant in the relationship, according to one of the studies

analyzed. As prosocial behavior increased, the relationship between bullying victimization and self-harm and suicide attempts weakened (Khaki et al., 2022).

4. ACEs, Strengths, and Difficulties

Children seem to have a proportionally higher likelihood of being diagnosed with ADHD the more ACEs they have experienced. Compared to children with zero ACEs, those with two, three, and four or more ACEs had, respectively, 1.7, 1.8, and 2.7 times the odds of receiving an ADHD diagnosis (Hesterman, 2021). An association has been found between ACEs and depression diagnosis as well, with individuals who experienced four or more ACEs presenting a depression diagnosis 4.4 times more often than those with less than four ACEs (Hughes et al., 2017). A study has even found a dose-response relationship between ACEs and anxiety. A dose-response relationship refers to a relationship in which one variable (the dose), when increased, proportionally increases the effect of another (the response). Individuals with one ACE were about 1.7 times more likely to have anxiety than those with no ACEs, two ACEs were about 2.5 times more likely, and three or more ACEs were about 4.5 times more likely (Zarei et al., 2021). As ACEs measure experiences so intense that one's stress response is potentially chronically altered, the distress and dysfunction following the experience can be lifelong. Behaviors highly similar to symptoms of depression, anxiety, and ADHD are measured in the SDQ. These are covered in the domains of emotional difficulties, hyperactivity, and other domains like peer difficulties. Therefore, the SDQ is a reliable measure for our purposes in this study.

5. The Current Study

Previous research has sufficiently shown that ACEs can impact individuals' mental health. Research also shows that strengths and difficulties regulate relationships to poor mental health outcomes like depression, anxiety, and ADHD. We will address how differing levels of strengths and difficulties in the domains of emotional difficulties, conduct difficulties, hyperactivity, peer difficulties, and prosociality affect ACEs known impact on mental health. Future results could allow researchers and clinicians to create treatment plans with strengths and difficulties in mind to increase the effectiveness of psychological interventions.

Prior studies have found evidence of a relationship between ACEs and adult mental health, while indicating that behaviors measured by the strengths and difficulties questionnaire are also present within this relationship. The present study aims to investigate if any strengths and difficulties present any moderating properties on the relationship between ACEs and adult mental health by means of strengthening or weakening the relationship. An example of how this moderation would occur is in individuals who received the same ACE score. The participants with a higher prosociality score and a lower (healthier) mental health score would indicate that prosociality is a protective moderator of poor mental health in individuals with ACEs. This research is important because it will further our understanding of what factors influence trauma's impact on health and may better inform decisions clinicians make in determining treatment plans.

We hypothesized that there is a statistically significant positive relationship between ACEs and negative mental health. Strengths act as a buffer and weaken the

relationship, while difficulties strengthen the relationship.

6. Method

6.1. Sample

A sample of 289 participants was collected, with 275 approved. We decided this was optimal because of an a-priori power analysis recommending a sample of 250. Participants were required to be fluent in English, at least 18 years of age, and based in the United States to allow us to generalize our findings to a specific population. Excluding unfinished responses, all our participants' primary language was English. Sixteen-point-four percent of our samples were between 18 and 25 years old (46 participants), 49.1% fell between 26 and 45 (138 participants), and 34.5% were 45 or older (97 participants). For gender identity, 64.6% (181 participants) identified as female, and 35.4% of participants (99 participants) identified as male. This is despite there being seven other options for gender identity outside of these two answers. In racial identity, participants were allowed to select all answers they believed applied to them. Seventy-three-point-six percent (204 participants) of participants identified as white, 11.6% (32 participants) identified as black, 6.9% (19 participants) identified as Asian, 4.7% (13 participants) identified as mixed, 2.9% (8 participants) identified as other, and 0.4% (1 participant) preferred not to say. For work status, 48.7% (115 participants) were working full-time, 19.5% (46 participants) were working part-time, 14% (33 participants) were in unpaid work, such as a homemaker, caretaker, or retired/disabled. Eleven-point-four percent (27 participants) were unemployed and job seeking, 3.4% (8 participants) identified as other, and 3% (7 participants) were due to begin a job within the next month. Our main

variables measured to answer our research question are Adverse Childhood Experiences, measured by ACE score, and Mental Health, measured by the DASS21 (Depression, Anxiety, and Stress Scale, and Strengths and Difficulties, measured by the SDQ.

6.2. Measures

6.2.1. Adverse Childhood Experience Questionnaire

The ACE scores were collected and determined by the Adverse Childhood Experience Questionnaire for Adults by the California Surgeon General's Clinical Advisory Committee. The value is determined by the number of adverse childhood experiences a participant has experienced. Ten of the 11 questions on the questionnaire directly name an adverse childhood experience and prompt the participant to check yes or no depending on whether the experience is something that has happened to them before 18 years of age. Checking yes adds a point to the participant's total ACE score. The 11th question asks the participant if they believe that those experience(s) they have checked "yes" to impact their health today. We included this question in our study as a possible means of post-hoc analysis. As part of our research question/hypothesis, we predicted that as the ACE score increased, participants' mental health would decrease. As these are not clinically diagnostic questionnaires, no diagnosis can be made. However, as previously mentioned, associations have been made between ACEs and adverse physical and mental health outcomes (Sernaratne et al., 2024; Dánielsdóttir et al., 2024).

This scale is not quantitative and has no anchors present, as it is categorical in the first 10 questions, offering only yes or no. Anchors of an instrument are defined as the endpoints and, at times, midpoints of a scale that help participants

interpret the answers to decide the most accurate one for them. The 11th question offers a three-unit scale answer with not much, some, or a lot. There is research to back this scale or trivially similar ones as a proper one to measure ACEs. A Cronbach's alpha of 0.61 was found for household difficulties and 0.80 for sexual abuse when controlled across gender and age groups (Ford, 2014). Cronbach's alpha measures reliability in a scale; the higher the value, the more consistent the pattern of responses is within the scale. All items on sexual abuse were likely to be rated highly if at least one was rated high, and this effect was less consistent with household difficulties. The reliability of a total ACE score has shown strong results, as well as individual scales specifically measuring abuse or household dysfunction. The model of summing the total ACE score showed an alpha of 0.81 (Michael et al., 2025). Summing the total ACE scores being reliable shows that participants who reported at least one ACE were likely to report multiple.

6.2.2. Strengths and Difficulties Questionnaire

Strengths and Difficulties were measured by the Strengths and Difficulties Questionnaire. This is a 25-item questionnaire presented quantitatively. It is a three-item scale. Participants are directed to choose not true, somewhat true, or certainly true based on how well they feel the prompt aligns with their own behavior/experiences. Thus, not true and certainly true serve as anchors on our scale and in scoring. Not true serves as a 0, somewhat true serves as a 1, and certainly true serves as a 2 in scoring, except for the reverse-coded items, which are items 7, 11, 14, 21, and 25. Reverse-coded items are items that are scored inversely with respect to standard items. Standard items have higher values representing higher alignment with the represented domain. Reverse-coded items, higher values are lower alignment with the

represented domain. The scale can offer three different scores. Each item correlates to a respective domain of emotional, conduct, peer, hyperactivity difficulties, as well as prosociality. The total score is calculated by summing all items except prosociality measures, which are items 1, 4, 9, 17, and 20. Many studies have investigated the SDQ's effectiveness in successfully measuring these behaviors. Researchers have previously found high internal consistency in young adult populations through equivalence style validation (Brann et al., 2018).

6.2.3. Depression, Anxiety, and Stress Scale

Mental health was measured by the Depression, Anxiety, and Stress Scale (DASS21). It is a 21-item scale measuring experiences highly correlated to depression, anxiety, and toxic stress. Like our other instruments, it is built on subjective experiences of psychological disorders rather than methodical categorization and does not serve to replace consulting a licensed clinician. Each question describes an experience related to depression, chronic anxiety, or chronic stress. Participants can choose: did not apply to me at all; applied to me to some degree, or some of the time; applied to me a considerable degree or a good part of the time; or applied to me very much or most of the time. When scoring, each answer is coded 0 through 3 points. The scale yields three scores for each domain it measures: stress, anxiety, and depression. Stress is measured in items 1, 6, 8, 11, 12, 14, and 18. Anxiety is measured in items 2, 4, 7, 9, 15, 19, and 20. Depression is measured in items 3, 5, 10, 13, 16, 17, and 21. Each scale is scored by summing all relevant items and multiplying by 2.

Additionally, each scale has different thresholds of severity/sensitivity defined by participants' scores. For depression, normal was defined as 0–9 points, mild as 10–12, moderate as 13–20, severe as 21–27, and extremely severe as

28+. For anxiety, 0–6 was defined as normal, 7–9 was mild, 10–14 was moderate, 15–19 was severe, and 20+ was extremely severe. For stress, 0–10 was normal, 11–18 was mild, 19–26 was moderate, 27–34 was severe, and 35+ was extremely severe. Research has shown that this is an instrument with strong validity and is effective in investigating these distinct kinds of distress. Studies have found acceptable convergent, discriminant, and nomological validity within the instrument, with variables of greater than 0.70 ($r > 0.70$), lower than 0.85 ($r < 0.85$), and individual yet highly correlated ($0.550 < r < 0.85$), respectively, for each type of validity (Lee, D., 2019). Sinclair found strong item-scale convergence in most items across each domain of anxiety, depression, and stress, with only three items in the instrument dipping below a satisfactory r of $= 0.40$ or more when compared to the SF-8. The Short Form-8 (SF-8) is an 8-item survey made to broadly measure individuals' physical and mental health (Sinclair et al., 2012).

6.2.4. Posttraumatic Stress Disorder Checklist for DSM-5

The PCL-5 or PTSD Checklist for DSM-5 records the prevalence of post-traumatic stress disorder symptomology according to standards set in the DSM-5, short for the Diagnostic and Statistical Manual of Mental Disorders, 5th edition. Similar to our other instruments, it does not serve as a diagnostic tool but measures experiences and behaviors highly correlated with the disorder, and at times is utilized by clinicians to monitor symptoms (Weathers et al., 2013). It is a 20-item scale with each item correlating to a defined symptom of PTSD in the DSM-5. Participants answer each item according to how often they have experienced the listed events in the past month. They can answer not at all, a little bit, moderately, quite a bit, or extremely. This allows answers to be coded as values on a five-point

Likert scale of 0 to 5, from not at all to extremely. The instrument provides a total symptom severity score by adding all items into a total score of 0–80, or specific symptom severity can be analyzed as well. Specific items investigate certain clusters as defined in the DSM-5, and cluster severity can also be analyzed when summing scores from specific items. Cluster B correlates to items 1–5, cluster C to items 6–7, cluster D to items 8–14, and cluster E to items 15–20. This instrument served as our measure for stress score by summing the value of all participants' answers. The instrument has been shown to be reliable and valid in measuring PTSD symptomology in structured interviews in veteran populations (Bliese et al., 2008). The instrument remained highly valid and reliable in undergraduate populations as well (Ashbaugh et al., 2016). In the English versions, a Cronbach's alpha of 0.95 was found along with statistically significant convergent and divergent validity for the overall scale and subscales when compared to the IES-R ($p < .001$) (Ashbaugh et al., 2016).

6.3. Procedures

After receiving approval through Oregon State University's Human Research Protection Program and Institutional Review Board (IRB), participants were found through the online survey platform Prolific. The instruments listed above were replicated in Qualtrics, and participants were granted access through Prolific. A body of research backs Prolific as a superior platform for online surveys. Several recent studies have found that data from Prolific is of a higher quality, more reliable, and less likely to be fabricated when compared to competitors like MTurk or CloudResearch (Peer et al., 2022; Palan & Schitter, 2018; Douglas et al., 2023). Prolific is an online survey platform built for researchers to collect data online. There were 77,316 participants

eligible on Prolific out of 214,639, and we stopped data collection after reaching 289 participants because of the stopping point informed by our power analysis to maximize validity while saving resources. This makes about a 0.4% participation rate. Eligible participants were notified of the study digitally by the platform and accessed it at their own convenience. To be eligible for the study, users were required to be at least 18 years old and fluent in English.

Participant eligibility was checked by Prolific, and participants were paid \$12.30 per hour with a median time of 11 minutes and 27 seconds to complete the study, making an average reward per hour of \$10.74. Prolific does not allow a time limit, and we did not control for time to complete the survey, as we did not predict any effect.

When participating in the study, participants were presented with a preliminary consent form in order to understand what would be done with their answers and that they were confidential. After giving consent to participate in the study, they were presented with demographic questions, the DESS 21, the ACEs questionnaire, the SDQ, and the PCL-5. The survey maintained this exact order for all participants, as we did not predict any order effects.

6.4. Research Design

This study operated on a cross-sectional non-experimental design, as we sought to examine the relationship between ACEs, SDQ scores, and adult mental health at one point in time without a long-term follow up. This framework allowed for efficient data collection and analysis. Participants completed self-report measures evaluating ACE, SDQ, DESS-21, and PCL-5 scores. This framework was optimal for our purposes of moderation analysis by means of standard linear regression to

gain insight into the risks and preventative factors present in the relationship between ACEs and adult mental health. Our hierarchical regression tested total ACE scores against total scores for each measured domain in the SDQ. This analysis is the most fitting for our research question, as our interaction term produced after controlling for demographics and testing for ACEs' main effects reveals SDQ's moderating properties, if they exist.

7. Results

Standard linear regression was conducted to investigate the main effects and the moderation between our variables. As hypothesized, ACEs score was a statistically significant predictor of depression ($B = 1.343$, $p < .001$), anxiety ($B = 1.049$, $p < .001$), and stress ($B = 1.135$, $p < .001$). These findings suggest that as ACEs increases, so does endorsement of psychological distress symptoms (see Tables A–C), aligning with previous research. Hierarchical regression best answered our research question, as step 1 controlled for demographics to eliminate confounding variables. Step 2 allowed us to establish the strength of the relationship between ACEs and SDQs to depression, anxiety, and stress. Step 3 finally added the interaction term between ACEs and each SDQ domain to measure moderation. The analysis was done through JASP. JASP is a free, open-source statistical software created by the University of Amsterdam. Table 1 presents the correlation matrix from our sample ($n = 275$), with ages ranging from 18 to 84 years ($M = 40.04$, $SD = 14.22$). All reported results should be interpreted with the understanding that age, income, gender, and sexual orientation variables were held constant (Table 1).

Table 1. Correlation Matrix of Demographic Variables Across ACEs Score and SDQ Measures.

	1	2	3	4	5	6	7	8	9	10	11	12	13
1	-												
2	.01	-											
3	.02	.056	-										
4	-.27***	-.025***	.059	-									
5	-.20**	.082	.126	.668	-								
6	-.25**	.061	.072	.743	.755	-							
7	-.02*	.151	.051	.633	.531	.656	-						
8	.002*	.133	-.016*	.145	.251	.198	.388	-					
9	.213	.314	-.028*	-.10**	.035	.019*	.304	.576	-				
10	-.219***	.133	.049*	.596	.567	.68	.827	.713	.524	-			
11	-.051***	.015*	.024*	.383	.333	.36	.269	.036*	.013*	.288	-		
12	-.035***	.087	-.074***	.052	.076	.046*	.028*	.021	.09	.010*	-.088***	-	
13	-.075***	-.036***	.08	-.223***	-.171***	-.203***	-.218***	-.02***	-.003***	-.145***	-.195***	-.17***	-

Note: *** $p < .001$; ** $p < .01$; * $p < .05$; Note: Age = 1, Gender = 2, Sexual Orientation = 3, Depression = 4, Anxiety = 5, Stress = 6, Emotional Difficulties = 7, Peer Difficulties = 8, Prosociality = 9, Total Difficulties = 10, ACEs Total = 11, Employment = 12, Income = 13

7.1. Analyzing Domains of Strengths and Difficulties as Moderators Between ACE Score and Depression Score

To test our hypothesis that strengths and difficulties moderated the relationship between ACEs and Depression, six hierarchical regression analyses were conducted. In each model, Depression was the outcome variable and ACEs score was the predictor, with each analysis having a domain of strengths and difficulties as a moderator, with total difficulties being the sixth moderator. Total difficulties was calculated by summing all of the participants' answers on the SDQ, excluding the prosociality items. The interaction term in step 3 of each regression model captures moderation, because step 2 establishes the relationship between ACEs and a domain in isolation. This allows us to capture moderation by analyzing if this interaction between variables significantly changes the slope. The domains were conduct difficulties, emotional difficulties, peer difficulties, prosociality, and hyperactivity. In step 1 of all regressions, age and income were found to

be significant ($B = -0.219$, $p < .001$), ($B = -1.411$, $p < .001$). This suggests that younger individuals and individuals with lower income report higher levels of depression. In step 3 of each model attempting to predict depression score, we observed that no interaction term made from any of the 5 domains or the total difficulty score was significant. The analysis yielded no evidence that any domain of the SDQ or the total difficulties an individual experiences have a moderating effect on the established relationship between ACEs and depression. An example of our analysis with total difficulties is presented in Table 2. All other domain analyses can be found in the appendix in tables D1 through D5.

Table 2. Moderation Predicting Depression from ACE Score and Total Difficulties Score.

	B	SE	β	t
Model 1				
Age	-0.219***	0.047	-0.276	-4.666
Gender	-0.386	0.439	-0.052	-0.880
SO	1.010	0.641	0.094	1.575
Income	-1.411***	0.393	-0.214	-3.593
Model 2				
Age	-0.114**	0.038	-0.143	-2.969
Gender	-0.801*	0.351	-0.108	-2.284
SO	0.846	0.509	0.078	1.663
Income	-0.694*	0.319	-0.105	-2.177
ACEs	0.882***	0.198	0.218	4.444
TD	1.032***	0.103	0.505	10.017
Model 3				
Age	-0.114**	0.038	-0.143	-2.963
Gender	-0.802*	0.352	-0.108	-2.277
SO	0.848	0.511	0.079	1.659
Income	-0.695*	0.320	-0.105	-2.173
ACEs	0.853	0.614	0.211	1.390
TD	1.025***	0.162	0.502	6.311
Interaction	0.002	0.033	0.009	0.049

Note: SO = Sexual Orientation, TD = Total Difficulties, ACEs = Total ACEs, p value $< .001$, ** $p < .01$, * p value $< .05$. The hierarchical regression model presented above was used to test whether total difficulties moderate the relationship between ACEs scores and depression (Table 2 in step 2, ACEs score and total difficulties were found to be significant ($B = 0.882$, $p < .001$; $B = 1.032$, $p < .001$). This denotes that individuals with higher ACEs scores or reporting higher total difficulties scores report higher levels of depression. In step 3, ACEs score was no longer significant while total difficulties remained significant ($B = 0.853$, $p = .166$; $B = 1.025$, $p < .001$).

7.2. Analyzing Domains of Strengths and Difficulties as Moderators Between ACE Score and Anxiety Score

To test our hypothesis that strengths and difficulties moderated the relationship between ACEs and Anxiety, we conducted six hierarchical regression analyses. In each model, Anxiety was now the outcome variable, and ACEs score was the predictor, with each analysis having a domain of strengths and difficulties as a moderator, with total difficulties being the sixth moderator. The domains were conduct difficulties, emotional difficulties, peer difficulties, prosociality, and hyperactivity. In step 1 of each regression, age, orientation, and income were found to be significant ($B = -0.150, p < .001$; $B = 1.291, p = .016$; $B = -0.988, p = .004$). In step 3 of each model, there was no significant interaction term observed. The analysis did not show that any domain of the SDQ or the total difficulties any individual experiences have a moderating effect on the established relationship between ACEs and anxiety. The analysis measuring total difficulties moderating properties on this relationship is presented below. The regression testing all other domains moderating properties to anxiety can be found in the appendix in tables E1 through E5.

Table 3. Moderation Predicting Anxiety from ACE Score and Total Difficulties Score.

	B	SE	β	t
Model 1				
Age	-0.150***	0.042	-0.216	-3.611
Gender	0.433	0.388	0.067	1.116
SO	1.291*	0.530	0.146	2.435
Income	-0.988**	0.342	-0.173	-2.887
Model 2				
Age	-0.067	0.035	-0.097	-1.890
Gender	0.121	0.323	0.019	0.374
SO	0.936*	0.441	0.106	2.123
Income	-0.341	0.293	-0.060	-1.163
ACEs	0.633***	0.182	0.184	3.488
TD	0.850***	0.095	0.483	8.990
Model 3				
Age	-0.067	0.036	-0.097	-1.887
Gender	0.120	0.324	0.019	0.370
SO	0.935*	0.442	0.106	2.117
Income	-0.341	0.293	-0.060	-1.161
ACEs	0.611	0.557	0.177	1.096
TD	0.846***	0.148	0.481	5.698
Interaction	0.001	0.030	0.008	0.043

Note: SO = Sexual Orientation, TD = Total Difficulties, ACEs = Total ACEs, *** = p value $< .001$, ** = $p < .01$, * = p value $< .05$.

The above hierarchical regression model was used to test whether total difficulties moderate the relationship between ACEs scores and anxiety (Table 3). In step 2, ACEs score and total difficulties were found to be significant ($B = 0.633, p < .001$; $B = 0.850, p < .001$). This hints that those with higher ACEs scores or total difficulties scores report higher levels of anxiety. In step 3, ACEs score was no longer significant ($B = 0.611, p = .274$). Total difficulties remained significant ($B = 0.846, p < .001$).

7.3. Analyzing Domains of Strengths and Difficulties as Moderators Between ACE Score and Stress Score

To test our hypothesis that strengths and difficulties moderated the relationship between ACEs and Stress, we conducted six hierarchical regression analyses. In each model, Stress was now the outcome variable, and ACE score was the predictor, with each analysis having a domain of strengths and difficulties as a moderator, with total difficulties being the sixth moderator. The domains were conduct difficulties, emotional difficulties, peer difficulties, prosociality, and hyperactivity. In step 1 of each regression, age and income were found to be significant ($B = -0.183, p < .001$), ($B = -1.226, p < .001$). This suggests that younger individuals and individuals with lower incomes report higher levels of stress. Within the models predicting stress score, there was no

notable effect from all interaction terms created from the domains of the SDQ and total difficulties. We observed no evidence that any domain of the SDQ or total difficulties has any moderating effect on the acknowledged relationship between ACEs and stress. An example of the model testing the total difficulties moderating effect is shown below. The analysis investigating each domain's moderating properties between ACEs and stress can be found in the appendix in tables F1 through F5.

Table 4. Moderation Predicting Stress from ACE score and Total Difficulties score.

	B	SE	β	t
Model 1				
Age	-0.183***	0.043	-0.255	-4.297
Gender	0.315	0.403	0.046	0.782
SO	0.879	0.566	0.092	1.553
Income	-1.226***	0.357	-0.204	-3.432
Model 2				
Age	-0.079*	0.033	-0.110	-2.430
Gender	-0.118	0.301	-0.017	-0.393
SO	0.512	0.421	0.054	1.218
Income	-0.471	0.273	-0.078	-1.723
ACEs	0.607***	0.169	0.167	3.599
TD	1.108***	0.088	0.600	12.599
Model 3				
Age	-0.079*	0.033	-0.109	-2.410
Gender	-0.106	0.301	-0.016	-0.351
SO	0.516	0.421	0.054	1.226
Income	-0.467	0.273	-0.078	-1.709
ACEs	0.966	0.515	0.266	1.876
TD	1.186***	0.138	0.642	8.600
Interaction	-0.020	0.027	-0.122	-0.738

Note: SO = Sexual Orientation, TD = Total Difficulties, ACEs = Total ACEs, *** = p value < .001, ** = p < .01, * = p value < .05. The sixth and final hierarchical regression model was used to test whether total difficulties moderate the relationship between ACEs and Stress (Table 4). In step 2, the relationship between ACEs score and total difficulties was found to be significant ($B = 0.607$, $p < .001$), ($B = 1.108$, $p < .001$). This supports that those with higher ACEs and total difficulties scores tend to report higher levels of stress. In step 3, ACEs score was no longer significant, while total difficulties remained significant ($B = 0.966$, $p = 0.062$), ($B = 1.186$, $p < .001$).

8. Discussion

The goal of this study was to investigate whether strengths and difficulties had any moderating effects on the relationship between ACEs and adult mental health. We hypothesized that as individuals exhibited more strengths, the

relationship would be weakened; with the opposite effect occurring as more difficulties were experienced, the relationship would be further amplified. The results of our regression analyses suggested that higher ACEs scores predicted more psychological distress (see Tables A–C). These findings align with previous research that has consistently shown that ACEs and psychological distress have a statistically significant positive relationship (e.g., Cheong et al., 2018; Davis & Burrow, 2024; Sernaratne et al., 2024). These findings suggest that trauma, even when experienced in childhood, can lead to mental and physical health consequences as an adult. Specifically, the findings in our study suggest that between 17–24% of the variance in adult psychopathology was accounted for by childhood trauma.

These findings are important because recognizing ACEs as possible determinants of health conditions allows clinicians and educators to intervene earlier and more effectively, potentially weakening the development or severity of health conditions. Additionally, it emphasizes that treatment for mental health conditions should take into account the environment in which they develop and not treat them in isolation. Interventions that are built around a trauma-informed approach may be more effective and deserve further research. Beyond the interpersonal level, results from the present study and previously cited literature call for policymakers to implement measures to prevent and recognize ACEs early to prevent adverse health outcomes in the populations they represent. Early recognition can be introduced into communities by normalizing ACEs examinations in pediatric care within primary and community healthcare settings. As ACEs may occur outside of the home or be caused by bullying, advocacy in schools could be a major

benefit as well. Including training to recognize and work with children who may have experienced ACEs for teachers and school administrators could yield system-wide changes.

Despite this, there were no significant findings in strength and difficulties moderating properties in the relationship, contradicting our alternative hypothesis. Previous studies investigating behaviors and measures similar to domains of the SDQ suggested this moderation relationship may exist (Meyer et al., 2022; Khaki et al., 2022). We accept our null hypothesis and recognize that this study may give us further insight into different means to weaken the relationship between ACEs and psychological distress. While we found domains of the SDQ do not moderate the relationship between ACEs and mental health, continued research may find unforeseen connections. For example, the peer difficulties domain may be a strong mediator of the relationship between ACEs and mental health. This would inform us of a strong mechanism behind how ACEs can lead to mental health issues like depression and anxiety, and inform preventative measures around building strong support groups and prosocial habits. Further, many potential moderators may exist that are similar to domains measured by the SDQ. Variables that could be used include help-seeking behaviors, self-image, risk-taking behaviors, and more.

9. Limitations

There are two main limitations to this study. The first is within one of our primary instruments, the ACEs questionnaire. Research conducted by McLennan and colleagues (2020) discusses valid points critiquing a highly similar ACEs questionnaire. Among the most prominent critiques, one stands out as the most impactful to

consider for this study, given our goals for applying our potential findings. The scoring is oversimplified; as ACEs score is found by simply adding up the non-nuanced yes or no, this total score may not actually reflect the individual impact of each ACE. McLennan cites that research has shown that not all ACEs have an equal impact on all people. An individual may have experienced more than one ACE, but we do not know the scale of each one's impact. Therefore, it could be unequal between them. This suggests an instrument with a wider range of answer options may allow participants to better show how much each ACE they have experienced actively impacts them and better inform clinicians and researchers when forming treatment plans (McLennan et al., 2020). Creating and validating such an instrument could serve as a meaningful project in itself; at the time of this paper's writing, there does not seem to be a validated instrument that can measure this. This, in turn, could also help form research questions and projects formatted around weakening the impact of specific categories of ACEs individually.

Secondly, several limitations and risks are inherent when using online recruiting methods, specifically Prolific. Research backs Prolific as a superior platform for online studies with its data quality and representativeness. Despite this, Prolific itself has recognized that it overrepresents female, educated, and younger individuals in its sampling. Given that these users are more privileged than other American populations, our sample may not be entirely representative of the adult American population (Douglas et al., 2023; Moss et al., 2022). It is likely not fully representative of the populations we are targeting in this research: individuals who have experienced ACEs and could benefit from better-developed trauma-informed care. This is backed by research suggesting that ACEs are more

prevalent in lower SES populations of color (Giano et al., 2020; Mersky et al., 2021). Given this research and observing the demographics of our data, our sample was mostly socioeconomically privileged white individuals. This harms our ability to claim our results are generalizable, or at the very least, generalizable to populations ACEs are most prevalent in (Giano et al., 2020; Mersky et al., 2021).

10. Future Research

Considering our limitations and results concerning moderation, this study could lead to further research in a few different ways, trying to address our ability to generalize our results and account for the possibility of different ACEs having different impacts. What could have the most potential is the development of an instrument for measuring ACEs, or traumatic experiences in general, that considers the proportion of each experience's contribution to the individual's current psychopathology. As our goal in this research is to contribute to the improvement of trauma-informed care and better understand protective and enabling factors around them, understanding each experience's proportional contribution could help understand which experiences lead to which health outcomes. This knowledge would further our understanding of how trauma manifests in the human body and contribute greatly to the field of psychology.

Our results also allow us to hypothesize about other potential moderators to investigate. As strengths and difficulties were not shown to be significant moderators, this could suggest that ACEs and Mental Health's relationship is more robust across these emotional and behavioral functions than initially predicted. These findings can serve as a foundation to further explore the role of strengths and difficulties in the

relationship between ACEs and adult mental health, or for investigating alternative moderators. Future research could examine variables such as basic health behaviors (e.g., sleep habits, diet) as potential moderators, or consider strengths and difficulties in other roles, such as outcomes or mediators instead of moderators. This project investigated moderating properties, which impact the potency and reveal the direction of an established relationship. Specifically, how domains of strengths and difficulties affected the strength and direction of ACEs and mental health's relationship. If we were to investigate them as mediators instead, this would study whether any domains of the SDQ explained the relationship.

Mediators essentially act as bridges. If peer difficulties mediated ACEs and stress, this would mean that peer difficulties partially account for ACEs, causing an increase in people's stress. This hypothetical could point to peer difficulty-oriented interventions to alleviate stress in individuals who experienced ACEs. An additional venue of research moving away from moderation and addressing possibly varying levels of impact across different categories of ACEs could be the application of nonlinear models. Depending on which ACE or combination of ACEs an individual experienced may specifically influence their mental health outcomes, not simply affect the potency of the relationship to poor mental health. A nonlinear analysis could detect relationships that a moderation analysis could not or even compensate for the lack of an instrument to measure the potency of ACE categories.

11. Conclusions

This study achieved two main goals: to further support the relationship between ACEs and adult mental health, and to investigate, if significant,

the moderating role of strengths and difficulties. The findings suggest that the relationship between ACEs and mental health is significant, with more ACEs leading to poorer mental health. Higher scores on the ACEs questionnaire appeared associated with higher scores on the DESS21 and the PCL-5, implying higher levels of depression, anxiety, and stress. The findings also suggest that strengths and difficulties have no significant moderating role in this relationship. This supports the stance that there is a need to investigate what factors have an impact and moderate this relationship, and what role strengths and difficulties have within it. Further research into what factors impact the relationship between ACEs and mental health could be highly valuable for healthcare professionals, policymakers, and researchers, as it would allow better developed methods of intervention and prevention of poor adult mental health. This study highlights the importance of a supportive and safe upbringing and being aware of trauma's long-term impacts on health.

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Appendices

Direct Relationship Between ACEs and Psychological Distress

Table A. Regression of ACE score and Depression Score.

	B	SE	β	t
age	-0.205***	0.044	-0.258	-4.648
gender	-0.376	0.412	-0.051	-0.913
orientation	0.978	0.602	0.091	1.624
income	-0.975*	0.376	-0.148	-2.594
ACES Total	1.343***	0.228	0.333	5.883

Table B. Regression of ACE score and Anxiety Scores.

	B	SE	β	t
age	-0.141***	0.040	-0.203	-3.566
gender	0.427	0.369	0.066	1.156
orientation	1.159*	0.505	0.131	2.292
income	-0.590	0.335	-0.104	-1.763
ACES Total	1.049***	0.202	0.304	5.200

Table C. Regression of ACE score and Stress.

	B	SE	β	t
age	-0.174***	0.040	-0.241	-4.289
gender	-0.319	0.382	0.047	0.837
orientation	0.785	0.536	0.082	1.463
income	-0.814*	0.347	-0.135	-2.345
ACES Total	1.135***	0.209	0.313	5.439

Strengths and Difficulties as a Moderator of the ACEs-Psychological Distress Relationship

Table D. Moderation predicting Depression from ACE score and Conduct difficulties.

		B	SE	β	t
Model 1	Age	-0.219***	0.047	-0.276	-4.666
	Gender	-0.386***	0.439	-0.052	-0.880
	SO	1.010	0.641	0.094	1.575
	Income	-1.411***	0.393	-0.214	-3.593
Model 2	Age	-0.125**	0.043	-0.158	-2.881
	Gender	-0.393	0.386	-0.053	-1.017
	SO	1.130*	0.565	0.105	1.999
	Income	-1.005	0.353	-0.152	-2.850
	ACES	1.069***	0.219	0.265	4.879
	CD	2.293***	0.388	0.331	5.913
Model 3	Age	-0.125**	0.043	-0.158	-2.885
	Gender	-0.383	0.387	-0.052	0.990
	SO	1.155*	0.567	0.107	2.037
	Income	-1.019*	0.354	-0.154	-2.882
	ACES	0.895**	0.240	0.222	2.637
	CD	1.992***	0.594	0.288	3.354
	Interaction	0.074	0.111	0.076	0.670

Note: SO = Sexual Orientation, CD = Conduct Difficulties, ACES = Total ACES, *** = p value < .001, ** = p < .01, * = p value < .05.

Table D2. Moderation Predicting Depression from ACE Score and Emotional Difficulties

		B	SE	β	t
Model 1	Age	-0.219***	0.047	-0.276	-4.666
	Gender	-0.386	0.439	-0.052	-0.880
	SO	1.010	0.641	0.094	1.575
	Income	-1.411***	0.393	-0.214	-3.593
Model 2	Age	-0.119***	0.037	-0.150	-3.251
	Gender	-0.922**	0.338	-0.124	-2.727
	SO	0.802	0.489	0.074	1.639
	Income	-0.406	0.310	-0.062	-1.311
	ACES	0.861***	0.190	0.213	4.523
	ED	2.273***	0.200	0.553	11.339
Model 3	Age	-0.119***	0.037	-0.150	-3.249
	Gender	-0.927**	0.339	-0.125	-2.731
	SO	0.807	0.491	0.075	1.644
	Income	-0.406	0.310	-0.062	-1.310
	ACES	0.789*	0.363	0.195	2.174
	ED	2.214***	0.322	0.539	6.870
	Interaction	0.016	0.067	0.028	0.234

Note: SO = Sexual Orientation, ED = Emotional Difficulties, ACES = Total ACES, *** = p value < .001, ** = p < .01, * = p value < .05.

Table D3. Moderation Predicting Depression from ACE score and Peer Difficulties.

		B	SE	β	t
Model 1	Age	-0.219***	0.047	-0.276	-4.666
	Gender	-0.386	0.439	-0.052	-0.880
	SO	1.010	0.641	0.094	1.575
	Income	-1.411***	0.393	-0.214	-3.593
Model 2	Age	-0.203***	0.044	-0.256	-4.650
	Gender	-0.497	0.412	-0.067	-1.207
	SO	0.999	0.597	0.093	1.673
	Income	-0.987**	0.373	-0.150	-2.648
	ACES	1.338***	0.226	0.331	5.910
	PD	0.957*	0.418	0.127	2.290
Model 3	Age	-0.204***	0.044	-0.257	-4.665
	Gender	-0.474	0.413	-0.064	-1.147
	SO	0.943	0.601	0.087	1.571
	Income	-0.967*	0.374	-0.147	-2.588
	ACES	2.001*	0.784	0.495	2.552
	PD	1.489*	0.734	0.197	2.028
	ACES *	-0.131	0.149	-0.185	-0.882
	PD				

Note: SO = Sexual Orientation, PD = Peer Difficulties, ACES = Total ACES, *** = p value < .001, ** = p < .01, * = p value < .05.

Table D4. Moderation Predicting Depression from ACE score and Prosociality

		B	SE	β	t
Model 1	Age	-0.219***	0.047	-0.276	-4.666
	Gender	-0.386	0.439	-0.052	-0.880
	SO	1.010	0.641	0.094	1.575
	Income	-1.411***	0.393	-0.214	-3.593
Model 2	Age	-0.196***	0.045	-0.247	-4.343
	Gender	-0.250	0.435	-0.034	-0.576
	SO	0.947	0.603	0.088	1.570
	Income	-0.979*	0.376	-0.148	-2.602
	ACES	1.339***	0.228	0.332	5.860
	Prosocial	-0.305	0.337	-0.054	-0.905
Model 3	Age	-0.192***	0.045	-0.242	-4.253
	Gender	-0.260	0.434	-0.035	-0.598
	SO	0.895	0.604	0.083	1.482
	Income	-0.983**	0.376	-0.149	-2.616
	ACES	0.389	0.814	0.096	0.478
	Prosocial	-0.796	0.526	-0.141	-1.513
	ACES *	0.127	0.104	0.257	1.215
	Prosocial				

Note: SO = Sexual Orientation, ACES = Total ACES, *** = p value < .001, ** = p < .01, * = p value < .05.

Table D5. Moderation Predicting Depression from ACE score and Hyperactivity

		B	SE	β	t
Model 1	Age	-0.219***	0.047	-0.276	-4.666
	Gender	-0.386	0.439	-0.052	-0.880
	SO	1.010	0.641	0.094	1.575
	Income	-1.411***	0.393	-0.214	-3.593
Model 2	Age	-0.179***	0.043	-0.226	-4.157
	Gender	-0.425	0.399	-0.057	-1.064
	SO	0.796	0.585	0.074	1.361
	Income	-0.967**	0.364	-0.147	-2.655
	ACES	1.181***	0.225	0.292	5.253
	HA	1.603***	0.388	0.228	4.130
Model 3	Age	-0.179***	0.043	-0.226	-4.146
	Gender	-0.433	0.401	-0.058	-1.080
	SO	0.794	0.586	0.074	1.355
	Income	-0.974**	0.366	-0.148	-2.663
	ACES	0.966	0.742	0.239	1.302
	HA	1.443*	0.654	0.206	2.208
	Interaction	0.042	0.138	0.064	0.303

Note: SO = Sexual Orientation, HA = Hyperactivity, ACES = Total ACES, *** = p value < .001, ** = p < .01, * = p value < .05.

Table E1. Moderation Predicting Anxiety from ACE score and Conduct Difficulties

		B	SE	β	t
Model 1	Age	-0.150***	0.042	-0.216	-3.611
	Gender	0.433	0.388	0.067	1.116
	SO	1.291*	0.530	0.146	2.435
	Income	-0.988**	0.342	-0.173	-2.887
Model 2	Age	-0.069	0.039	-0.100	-1.771
	Gender	0.412	0.347	0.064	1.187
	SO	1.306**	0.475	0.148	2.749
	Income	-0.602	0.314	-0.106	-1.917
	ACES	0.798***	0.194	0.232	4.113
	CD	2.024***	0.344	0.340	5.882
Model 3	Age	-0.069	0.039	-0.100	-1.773
	Gender	0.421	0.348	0.065	1.211
	SO	1.325**	0.477	0.150	2.778
	Income	-0.612	0.315	-0.107	-1.941
	ACES	0.672*	0.301	0.195	2.231
	CD	1.802***	0.531	0.303	3.395
	Interaction	0.053	0.097	0.065	0.551

Note: SO = Sexual Orientation, CD = Conduct Difficulties, ACES = Total ACES, *** = p value < .001, ** = p < .01, * = p value < .05.

Table E2. Moderation Predicting Anxiety from ACE score and Emotional Difficulties

	B	SE	β	t
Model 1				
Age	-0.150***	0.042	-0.216	-3.611
Gender	0.433	0.388	0.067	1.116
SO	1.291*	0.530	0.146	2.435
Income	-0.988**	0.342	-0.173	-2.887
Model 2				
Age	-0.084*	0.036	-0.122	-2.348
Gender	0.090	0.332	0.014	0.272
SO	0.944*	0.451	0.107	2.093
Income	-0.195	0.302	-0.034	-0.644
ACES	0.693***	0.185	0.201	3.746
ED	1.595***	0.197	0.447	8.116
Model 3				
Age	-0.085*	0.036	-0.123	-2.369
Gender	0.079	0.332	0.012	0.237
SO	0.934*	0.452	0.106	2.068
Income	-0.193	0.303	-0.034	-0.639
ACES	0.482	0.358	0.140	1.347
ED	1.426***	0.314	0.400	4.547
Interaction	0.045	0.065	0.094	0.691

Note: SO = Sexual Orientation, ED = Emotional Difficulties, ACES = Total ACES, *** = p value < .001, ** = p < .01, * = p value < .05.

Table E3. Moderation Predicting Anxiety from ACE score and Peer Difficulties

	B	SE	β	t
Model 1				
Age	-0.150***	0.042	-0.216	-3.611
Gender	0.433	0.388	0.067	1.116
SO	1.291*	0.530	0.146	2.435
Income	-0.988**	0.342	-0.173	-2.887
Model 2				
Age	-0.136***	0.038	-0.197	-3.547
Gender	0.269	0.361	0.041	0.745
SO	1.188*	0.491	0.135	2.421
Income	-0.606	0.325	-0.106	-1.863
ACES	1.021***	0.196	0.296	5.210
PD	1.461***	0.362	0.224	4.032
Model 3				
Age	-0.138***	0.038	-0.199	-3.598
Gender	0.284	0.360	0.044	0.790
SO	1.113*	0.491	0.126	2.265
Income	-0.580	0.324	-0.102	-1.789
ACES	2.074*	0.667	0.602	3.111
PD	2.325***	0.636	0.357	3.658
Interaction	-0.206	0.125	-0.349	-1.652

Note: SO = Sexual Orientation, PD = Peer Difficulties, ACES = Total ACES, ACES*PD = Interaction term of ACES and PD, *** = p value < .001, ** = p < .01, * = p value < .05.

Table E4. Moderation Predicting Anxiety from ACE score and Prosociality

	B	SE	β	t
Model 1				
Age	-0.150***	0.042	-0.216	-3.611
Gender	0.433	0.388	0.067	1.116
SO	1.291*	0.530	0.146	2.435
Income	-0.988**	0.342	-0.173	-2.887
Model 2				
Age	-0.148***	0.041	-0.214	-3.654
Gender	0.332	0.388	0.051	0.885
SO	1.179*	0.506	0.134	2.329
Income	-0.584	0.335	-0.102	-1.743
ACES	1.049***	0.202	0.305	5.197
Prosocial	0.243	0.300	0.050	0.811
Model 3				
Age	-0.147***	0.041	-0.211	-3.596
Gender	0.327	0.388	0.050	0.842
SO	1.150*	0.509	0.130	2.257
Income	-0.584	0.336	-0.102	-1.740
ACES	0.629	0.731	0.182	0.860
Prosocial	0.025	0.472	0.005	0.054
Interaction	0.056	0.093	0.134	0.599

Note: SO = Sexual Orientation, ACES = Total ACES, *** = p value < .001, ** = p < .01, * = p value < .05.

Table E5. Moderation Predicting Anxiety from ACE score and Hyperactivity

	B	SE	β	t
Model 1				
Age	-0.150***	0.042	-0.216	-3.611
Gender	0.433	0.388	0.067	1.116
SO	1.291*	0.530	0.146	2.435
Income	-0.988**	0.342	-0.173	-2.887
Model 2				
Age	-0.121**	0.039	-0.175	-3.107
Gender	0.405	0.361	0.063	1.123
SO	0.936	0.497	0.106	1.884
Income	-0.570	0.327	-0.100	-1.743
ACES	0.904***	0.201	0.283	4.505
HA	1.287***	0.351	0.212	3.669
Model 3				
Age	-0.121**	0.039	-0.175	-3.106
Gender	0.396	0.362	0.061	1.094
SO	0.912	0.501	0.103	1.820
Income	-0.573	0.327	-0.101	-1.751
ACES	0.644	0.652	0.187	0.987
HA	1.093	0.580	0.180	1.885
ACES * HA	0.050	0.119	0.091	0.420

Note: SO = Sexual Orientation, HA = Hyperactivity, ACES = Total ACES, *** = p value < .001, ** = p < .01, * = p value < .05.

Table F1. Moderation Predicting Stress from ACE score and Conduct Difficulties score.

	B	SE	β	t
Model 1				
Age	-0.183***	0.043	-0.255	-4.297
Gender	0.315	0.403	0.046	0.782
SO	0.879	0.566	0.092	1.553
Income	-1.226***	0.357	-0.204	-3.432
Model 2				
Age	-0.086*	0.039	-0.120	-2.201
Gender	0.336	0.351	0.050	0.959
SO	0.903	0.493	0.095	1.831
Income	-0.842**	0.319	-0.140	-2.640
ACES	0.829***	0.197	0.229	4.211
CD	2.396***	0.350	0.384	6.855
Model 3				
Age	-0.086*	0.039	-0.120	-2.194
Gender	0.327	0.352	0.048	0.931
SO	0.889	0.495	0.093	1.797
Income	-0.834*	0.320	-0.139	-2.609
ACES	0.942**	0.307	0.260	3.072
CD	2.593***	0.539	0.416	4.811
Interaction	-0.047	0.099	-0.055	-0.480

Note: SO = Sexual Orientation, CD = Conduct Difficulties, ACES = Total ACES, *** = p value < .001, ** = p < .01, * = p value < .05.

Table F2. Moderation Predicting Stress from ACE score and Emotional Difficulties score.

	B	SE	β	t
Model 1				
Age	-0.183***	0.043	-0.255	-4.297
Gender	0.315	0.403	0.046	0.782
SO	0.879	0.566	0.092	1.553
Income	-1.226***	0.357	-0.204	-3.432
Model 2				
Age	-0.093**	0.033	-0.129	-2.809
Gender	-0.180	0.307	-0.027	-0.587
SO	0.535	0.428	0.056	1.250
Income	-0.244	0.281	-0.041	-0.869
ACES	0.679***	0.171	0.187	3.978
ED	2.179***	0.181	0.584	12.024
Model 3				
Age	-0.092**	0.033	-0.127	-2.777
Gender	-0.166	0.308	-0.024	-0.540
SO	0.542	0.429	0.057	1.264
Income	-0.248	0.281	-0.041	-0.884
ACES	0.883**	0.327	0.243	2.701
ED	2.345***	0.291	0.628	8.065
Interaction	-0.044	0.060	-0.087	-0.733

Note: SO = Sexual Orientation, ED = Emotional Difficulties, ACES = Total ACES, *** = p value < .001, ** = p < .01, * = p value < .05.

Table F3. Moderation Predicting Stress from ACE score and Peer Difficulties score

		B	SE	β	t
Model 1					
	Age	-0.183***	0.043	-0.255	-4.297
	Gender	0.315	0.403	0.046	0.782
	SO	0.879	0.566	0.092	1.553
	Income	-1.226***	0.357	-0.204	-3.432
Model 2					
	Age	-0.172***	0.040	-0.239	-4.325
	Gender	0.177	0.377	0.026	0.468
	SO	0.812	0.527	0.085	1.541
	Income	-0.826*	0.341	-0.138	-2.425
	ACES	1.116	0.205	0.308	5.444
	PD	1.204**	0.376	0.178	3.201
Model 3					
	Age	-0.173***	0.040	-0.240	-4.336
	Gender	0.186	0.378	0.027	0.491
	SO	0.779	0.530	0.082	1.471
	Income	-0.816*	0.341	-0.136	-2.390
	ACES	1.559*	0.698	0.430	2.233
	PD	1.569*	0.667	0.231	2.354
	Interaction	-0.087	0.131	-0.139	-0.664

Note: SO = Sexual Orientation, PD = Peer Difficulties, ACES = Total ACES, *** = p value < .001, ** = p < .01, * = p value < .05.

Table F4. Moderation Predicting Stress from ACE score and Prosociality score

		B	SE	β	t
Model 1					
	Age	-0.183***	0.043	-0.255	-4.297
	Gender	0.315	0.403	0.046	0.782
	SO	0.879	0.566	0.092	1.553
	Income	-1.226***	0.357	-0.204	-3.432
Model 2					
	Age	-0.180***	0.041	-0.251	-4.351
	Gender	0.219	0.403	0.032	0.544
	SO	0.813	0.538	0.085	1.511
	Income	-0.807*	0.347	-0.134	-2.324
	ACES	1.137***	0.209	0.314	5.446
	Prosocial	0.244	0.311	0.047	0.783
Model 3					
	Age	-0.176***	0.041	-0.245	-4.258
	Gender	0.199	0.401	0.029	0.497
	SO	0.731	0.538	0.077	1.358
	Income	-0.799*	0.346	-0.133	-2.309
	ACES	-0.097	0.753	-0.027	-0.129
	Prosocial	-0.399	0.488	-0.078	-0.818
	Interaction	0.163	0.096	0.373	1.705

Note: SO = Sexual Orientation, ACES = Total ACES, *** = p value < .001, ** = p < .01, * = p value < .05.

Table F5. Moderation Predicting Stress from ACE score and Hyperactivity score

		B	SE	β	t
Model 1					
	Age	-0.183***	0.043	-0.255	-4.297
	Gender	0.315	0.403	0.046	0.782
	SO	0.879	0.566	0.092	1.553
	Income	-1.226***	0.357	-0.204	-3.432
Model 2					
	Age	-0.147***	0.038	-0.204	-3.817
	Gender	0.250	0.360	0.037	0.694
	SO	0.471	0.509	0.049	0.924
	Income	-0.775*	0.328	-0.129	-2.365
	ACES	0.918***	0.201	0.253	4.576
	HA	1.956***	0.348	0.308	5.616
Model 3					
	Age	-0.147***	0.039	-0.205	-3.814
	Gender	0.244	0.362	0.036	0.675
	SO	0.457	0.513	0.048	0.891
	Income	-0.777*	0.328	-0.129	-2.336
	ACES	0.759	0.648	0.209	1.170
	HA	1.835**	0.582	0.289	3.155
	Interaction	0.031	0.119	0.053	0.259

Note: SO = Sexual Orientation, HA = Hyperactivity, ACES = Total ACES, *** = p value < .001, ** = p < .01, * = p value < .05.