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Sociodemographic Moderators of The Relationship Between Adverse Childhood Experiences (ACEs) and Mental Health in University Students

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Abstract

Background: Adverse childhood experiences (ACEs) are persistent harmful events that occur in a child's familial or social environment that disturbs normal physical and/or psychological health and development. Studies have shown a significant link between ACEs and the high prevalence of mental disorders among university students.

Objective: This present study aims to fill the gap in the literature by investigating whether gender, sexual orientation and childhood SES are associated with exposure to specific ACEs, and with cumulative ACE exposure in an international sample of university students and whether these sociodemographic factors moderate the relationship between cumulative ACE exposure and current mental health.

Participants and Setting: We used a sample of 5,945 university students from seven countries.

Methods: The sociodemographic questionnaire, the Adverse Childhood Experiences International Questionnaire (ACE-IQ), and the Inventory of Depression and Anxiety Symptoms (IDAS) were used to collect data for this study.

Results: Of the sample, 46.53% of students experienced more than one type of ACE. The three most common ACE types were parental separation (30.82%), household violence (29.99%) and emotional neglect (26.88%).

Conclusions: Our findings reported that gender, sexual orientation and childhood SES are associated with exposure to specific ACEs, and with cumulative ACE exposure. Furthermore, gender and sexual orientation were found to not moderate the relationship between cumulative ACE exposure and mental health symptoms while childhood SES did.

KEYWORDS

Adverse childhood experiences, mental health, university students

Sociodemographic Moderators of The Relationship Between Adverse Childhood Experiences (ACEs) and Mental Health in University Students

Mental health symptoms are prevalent among university students (Auerbach et al., 2018). There is increasing evidence that a history of adverse childhood experiences (ACEs) increases the risk for mental health symptoms in university students (Karatekin, 2018; Kim, 2017; Lee & Feng, 2021) but it is currently unclear whether sociodemographic factors influence this relationship. Understanding which ACE-exposed students are at a higher risk for negative mental health outcomes can inform university student support services. Auerbach et al. (2018) studied the prevalence of mental health symptoms among university students from nineteen institutions across eight countries. These disorders included major depressive disorder, mania/hypomania, generalised anxiety disorder, panic disorder, alcohol abuse disorder and substance use disorder (Auerbach et al., 2018). The study found that 35% of students reported one or more lifetime mental disorder and 31% reported one or more 12-month disorder. Furthermore, the study reported a prevalence rate of lifetime mental disorders among university students ranging from 48.3% in Australia to 22.4% in Belgium. The prevalence rate of 12-month disorders ranged from 43.3% in Australia to 19.1% in Belgium (Auerbach et al., 2018). Thus, the prevalence was concerning across countries. Moreover, Ballester et al. (2020) reported similar prevalence rates among Spanish university students: 41.3% for lifetime mental disorders, and 35.7% for 12-month disorders. Comparably, Bantjes et al.'s (2019) study with South African university students reported a 38.5 % and 31.8% prevalence for lifetime and 12-month disorders, respectively. Thus, it has become evident that mental health symptoms are affecting university students across the globe, in both high-income countries as well as low- and middle-income countries. Furthermore, this prevalence is higher than that of the general population which is estimated to be between 18.1% and 36.1% for lifetime disorders and between 9.8% and 19.1% for 12-month disorders (Kessler et al., 2009).

The need for effective intervention and treatment of student mental

health has thus become increasingly apparent. Most university students' ages correspond to the age of onset for many mental disorders (de Girolamo et al., 2012). Auerbach et al. (2018) found that students often develop lifetime mental disorders before entering university and these disorders persist through the university years. Therefore, intervention during early university years appears to be crucial. However, most university campuses do not have sufficient mental healthcare resources to accommodate all students with mental health symptoms (Auerbach et al., 2018). Thus, finding effective ways to identify students who are at the most risk of having mental health symptoms will assist in directing treatment and support to those students who need it most.

Studies have found that exposure to ACEs increases the risk of developing mental health symptoms in the general population (Alhowaymel et al., 2020; Kessler et al., 2010) as well as among university students specifically (Karatekin, 2018; Kim, 2017; Lee & Feng, 2021). ACEs are defined as events that persist in a child's familial or social environment that harm or distress the child, causing disruption to their physical or psychological health and development (Kalmakis & Chandler, 2014). Alhowaymel et al. (2020) further note the influence of different cultures and economic factors in determining the health impacts of ACEs. Examples of ACEs include household substance abuse, psychological abuse and physical neglect (Lee & Feng, 2021). Studies have shown that among university students, exposure to ACEs significantly increases the risk of developing mental health symptoms such as major depressive disorder, substance abuse, alcohol abuse, anxiety disorders, suicide ideation and attempts, as well as bipolar spectrum disorder (Bantjes et al., 2019; Karatekin, 2018; Kim, 2017; Lee & Feng, 2021). Kim (2017) found that university students who were exposed to ACEs were four times as likely to report depression or alcohol abuse as students who were not exposed to ACEs. Furthermore, the study found supporting evidence that cumulative ACEs lead to cumulative dysfunctions. That is, students who experience more forms of ACEs are more likely to develop several mental health symptoms. The study also

found exposure to four or more categories of ACEs increased the likelihood of developing symptoms of depression and substance abuse comorbidly by more than six times. Other studies have repeatedly found that cumulative ACEs predict depression (Kim, 2017; Lee & Feng, 2021; Sciolla et al., 2019) and suicidality (Clements-Nolle et al., 2018; Grigsby et al., 2020; Miranda-Mendizabal et al., 2019). The prevalence of ACEs has been associated with several sociodemographic factors including gender, sexual orientation, and socio-economic status (SES). Sciolla et al. (2019) reported a higher prevalence of ACEs in female university students than their male counterparts. Higher ACE scores and experiencing more categories of ACE have also been found among female students in studies by Kim (2017) and Dorvil et al. (2020). The gendered difference in reporting ACE exposure may be due to society's approval and encouragement of females to recognise and disclose ACEs while males are not encouraged to do so (Bynum et al., 2010). However, it may also reflect that female children are more vulnerable to experiencing a range of ACEs due to gender-based violence and/or cultural preference of male children over female children (Kim, 2017). Furthermore, Dorvil et al. (2020) reported a higher prevalence of ACEs among non-heterosexual students. Walsh et al. (2019) reviewed multiple studies investigating the relationship between SES and ACEs and found that lower SES during childhood increased the risk of experiencing ACEs consistently across countries. Education in low SES communities may account for these differences as a lack of parental higher education has been found to predict risk of ACEs (Dorvil et al., 2020). It is also possible that financial stress can increase parenting stress, creating a greater risk for punitive parenting and other family adversities (Bywaters et al., 2015). These sociodemographic factors (gender, sexual orientation, and SES) have also been associated with mental health symptoms in university students. In their global survey, Auerbach et al. (2018) found that female university students and non-heterosexual students were at increased risk of a mental disorder diagnosis. Females had a 1.4 times greater risk of both lifetime and 12-month disorders

compared to males and non-heterosexual students were two to three times as likely to develop a lifetime or 12-month disorder than heterosexual students. Furthermore, Bantjes et al. (2019) found female students, non-heterosexual students, and students with disabilities to be at an increased risk of developing a lifetime or 12-month disorder. These three groups of students had an increased risk of internalising disorders while non-heterosexual students and students with disabilities were at increased risk of developing bipolar spectrum disorder. This may be explained by the minority stress theory that has been found to affect females as well as sexual minorities (Borgogna et al., 2018; Smyth et al. 2008). Minority stress theory claims that experiences of discrimination and disempowerment due to devalued social positionings brings about external and internal stressors (Lefevor et al., 2019; Meyer, 2003). It is thus evident that ACEs and mental health symptoms are independently associated with sociodemographic factors. However, there is a dearth of research on how sociodemographic factors may moderate the relationship between ACEs and mental health symptoms in university students. One study has found that female students who experienced ACEs report more mental health symptoms and suicidal ideation than male students exposed to ACEs (Grigsby et al., 2020). It is possible that females develop coping mechanisms to manage ACEs while males do not, causing males to develop mental health symptoms more frequently (Meléndez et al., 2012). As yet, there has been no replication of these findings in university samples. With regard to sexual orientation, some studies have found that non-heterosexual high school students exposed to ACEs are at increased risk of suicidal ideation, suicide attempts and non-suicidal self-injury than their heterosexual peers (Clements-Nolle et al., 2018; Li et al., 2019), but this has not yet been examined in young adults. Taken together, these few studies indicate that sociodemographic factors may play a role in moderating the relationship between ACE exposure and mental health symptoms among university students, but further research is needed to develop a clearer sense of which students may be most vulnerable and in need of targeted support. There is also little evidence regarding the role of

childhood SES in moderating the long-term relationship between ACEs and mental health in young adulthood. It is possible that lower SES in childhood may create additional vulnerabilities or stressors that increase the risk that ACE exposure will result in mental health difficulties in adulthood.

Research Aims

The current study aimed to examine 1) whether gender, sexual orientation and childhood SES are associated with exposure to specific ACEs, and with cumulative ACE exposure, in an international sample of university students and 2) whether these sociodemographic variables moderate the relationship between cumulative ACE exposure and current mental health.

Method

Study Design

The study conducted a secondary data analysis from a cross-country survey of university students conducted in 2019. The study was the Project Cross-cultural Addictive Behaviours Study (Project CABS), conducted by the Cross-cultural Addiction Study Team (CAST). The purpose of Project CABS was to examine cross-cultural differences in prevalence, patterns, risk factors and protective factors for a range of addictive behaviours amongst university students. As part of the survey, data on adverse childhood experiences and mental health were collected from a sub-sample of participants in each country. The study used a cross-sectional correlational survey design.

Because data is collected at one single point in time, cross-sectional studies are less costly and take less time than other methods (Thomas, 2020). These studies allow you to gather data from a large pool of subjects and compare differences between groups in order to achieve good statistical power and examine whether and how variables of interest are related to each other (Thomas, 2020). Cross-sectional surveys are well-suited to examine the prevalence or risk of a specific variable (Omair, 2015).

Sample

As part of the Project CABS cross-country survey, 5,945 university students from the United States, Canada, England, South Africa, Spain, Argentina, and Uruguay completed measures of ACEs and current mental health. Participants were approached in different manners across countries. In the United States, Canada, England, and South Africa, Psychology students were recruited and were given credit for research participation. In Argentina and Uruguay, participants were recruited via social networks, email listings and flyers. These participants were entered into a raffle of prizes. Lastly, in Spain, all students of the university were recruited via email and remunerated with five euros. The only inclusion/exclusion criterion concerned age. Participants had to be over the age of 18 years, in order to be able to give legal consent for participation.

Data Collection

The survey used standardised structured questionnaires. Standardised questionnaires enable the researcher to obtain data in the exact same way from many participants. From the full survey battery, our secondary data analysis only used the questionnaires measuring demographics, ACE exposure and mental health symptoms.

Socio-demographic Questionnaire

A socio-demographic questionnaire was used in the Project CABS survey to gather data on a range of variables (see Appendix B). This study used the items relating to the respondents' gender, childhood SES and sexual orientation only.

Adverse Childhood Experiences International Questionnaire (ACE-IQ)

The ACE-IQ (see Appendix C) was developed by the World Health Organisation in 2018. It is a cross-cultural measure designed to assess ACEs in all countries, and further evaluate the interrelation between the ACEs and risk behaviours and health status in later life (WHO, 2018). The ACE-IQ is designed for administration to people aged 18 years and older. This questionnaire is administered in order to obtain information about whether respondents were exposed in childhood to abuse, neglect or violence and to other adverse family circumstances such as parental mental illness, substance use, divorce or incarceration (WHO, 2018). The ACE-IQ measures 13 different ACES of which 12 were included in the Project CABS study (the item on exposure to terrorism etc. was left out as this type of exposure is uncommon in the countries that were sampled). The ACE-IQ has been found to be valid and reliable across several countries, including lower income countries. For instance, in China, the ACE-IQ showed acceptable content validity and test-retest reliability and semantic equivalence was also displayed by the ACE-IQ domain subscales (Ho et al., 2019). In a study in Nigeria, the ACE-IQ was found to be a reliable and valid index of adverse childhood experiences (Kazeem, 2015). In a study in Malawi, research findings showed that the ACE-IQ is suitable to use with adolescents in lower income settings (Kidman et al., 2019). This depicts that the ACE-IQ is appropriate for use in the African context. While the ACE-IQ can use either binary coding (coding an ACE as present even if it only occurred once during childhood) or frequency coding (coding an ACE as present if it occurred repeatedly during childhood) we used the frequency coding only as this is more reflective of persistent childhood adversity (WHO, 2018).

Inventory of Depression and Anxiety Symptoms (IDAS)

The IDAS (see Appendix D) was designed to assess specific symptom dimensions associated with major depression and anxiety disorders which are associated with major depression (Watson et al., 2007). IDAS contains 10 specific symptom scales: Suicidality, Lassitude, Insomnia, Appetite Loss, Appetite Gain, Ill Temper, Well-Being, Panic, Social Anxiety, and Traumatic Intrusions. The IDAS has been shown to be a valid and reliable measure of depression mood and

anxiety disorder (Stasik-O'Brien et al., 2019). Convergent validity and discriminant have also been established (Watson et al., 2007). In this study, all the sub-scales were combined into one score to obtain a total IDAS score out of 270.

Procedure

As this is a secondary analysis, data for this study have already been collected. The researchers analyzed the data as described below to determine whether sociodemographic factors (gender, childhood SES, and sexual orientation) moderate the relationship between ACEs and mental health difficulties among university students.

Data Analysis

Data analysis was run using R, a programming language that computes statistics and graphics. Firstly, the prevalence of sample characteristics was analysed, followed by the frequency of ACEs in the total sample. Thereafter, the prevalence of ACEs and the mean number of cumulative ACEs was calculated for each sociodemographic group. Chi-square tests and *t*-tests were then run to investigate sociodemographic differences in the prevalence of specific ACEs and cumulative ACEs, as well the differences in severity of mental health symptoms. Lastly, regression analyses were run to investigate the relationship between cumulative ACEs and severity of mental health symptoms and whether the three sociodemographic factors moderate this relationship.

Results

Sample Characteristics

Table 1 shows the characteristics of the study sample. The percentage of female participants (70.08%) was more than double the percentage of male participants (29.18%). The percentage of higher income participants (73.23%) was nearly triple the percentage of lower income participants (26.66%) and the percentage of 'exclusively heterosexual' participants (72.30%) was more than double the percentage of 'not exclusively heterosexual' participants (27.47%).

Table 1

Sample Characteristics

Sociodemographic Group	Prevalence	
	n	*%*
Gender		
Male	1735	29.18
Female	4166	70.08
Socioeconomic status		
Lower income	1585	26.66
Higher income	4354	73.23
Sexual orientation		
Exclusively heterosexual	4298	72.30
Not exclusively heterosexual	1633	27.47

Note. Lower income represents the following SES groups: "we often did not have enough basic necessities (like food, shelter or clothes)" and "my parents / caregivers earned an income but we were always on a very tight budget"; higher income represents the following SES groups: "middle class", "upper middle class" and "wealthy"; not exclusively heterosexual under sexual orientation includes the following groups: "mostly heterosexual", "equally heterosexual and homosexual", "mostly homosexual", "exclusively homosexual" and "other".

Prevalence of ACEs in Total Sample

The majority of the sample (70.18%) experienced at least one type of ACE while 46.53% experienced more than one type of ACE. The rates of exposure to different ACE types are recorded in Table 2. The most common type of ACE was parental separation with a prevalence rate of 30.82%, followed by household violence with a prevalence rate of 27.99%, and emotional neglect with a prevalence rate of 26.88%. The least common type of ACE reported was physical abuse with a prevalence rate of 7.30%.

Table 2

ACE Type	Experienced	
	n	*%*
Physical abuse	434	7.30
Emotional abuse	972	16.35
Sexual abuse	1093	18.39
Drug abuse	935	15.73
Incarcerated guardian	461	7.75
Ill guardian	1387	23.33
Household violence	1664	27.99
Separation	1832	30.82
Emotional neglect	1598	26.88
Physical neglect	446	7.50
Bullying	690	11.61
Community violence	445	7.46

Differences in ACE Exposure Across Sociodemographic Groups

The prevalence of ACE exposure for each sociodemographic group is recorded in Tables 3 and 4. Table 3 reports the prevalence of violence, abuse and neglect while Table 4 reports other family adversities.

Table 3

Prevalence of exposure to violence, abuse and neglect by sociodemographic group (%)

Sociodemographic Group	ACE Type						
	Bullying	Community violence	Emotional abuse	Emotional neglect	Physical abuse	Physical neglect	Sexual abuse
Gender							
Male	10.14	10.14	13.37	27.20	8.13	7.95	9.34
Female	11.86	6.36	17.33	26.40	6.72	7.13	21.89
Socio-economic status							
Lower income	16.09	12.49	22.21	36.72	11.86	10.16	25.24
Higher income	10.00	5.67	14.24	23.31	5.65	6.50	15.92
Sexual orientation							
Exclusively heterosexual	9.31	7.42	14.29	23.41	6.58	7.28	13.78
Not exclusively heterosexual	17.64	7.59	21.80	36.07	9.12	8.08	30.68

Table 4

Exposure to family adversity by sociodemographic group (%)

Sociodemographic Group	ACE Type				
	Drug	Household violence	Ill guardian	Incarceration	Separation
Gender					
Male	11.53	23.46	15.91	6.34	26.74
Female	17.23	29.50	26.07	8.19	32.43
Socio-economic status					
Lower income	24.61	38.55	30.73	14.32	42.84
Higher income	12.52	24.18	20.67	5.37	26.46
Sexual orientation					
Exclusively heterosexual	13.63	25.27	19.61	7.07	29.22
Not exclusively heterosexual	21.00	35.15	33.07	9.43	34.97

Chi-Square tests were run to explore statistically significant differences in exposure to each ACE type across sociodemographic groups. A total of 36 tests were run and p was set to $< .001$ after applying the Bonferroni correction. The results of the tests are presented in Table 5.

With regard to gender differences, significantly more females than males reported experiencing emotional abuse, sexual abuse, household violence, exposure to drugs, having an ill guardian and separation of guardians

while significantly more males reported experiencing community violence. With regard to SES, the lower income group experienced significantly more exposure to each of the 12 types of ACE when compared to the higher income group. With regard to sexual orientation, participants who were not exclusively heterosexual reported significantly more exposure to physical abuse, sexual abuse, emotional abuse, household violence, emotional neglect, bullying, drugs, having an ill guardian and separation of guardians. Having an incarcerated guardian also approached significance.

Table 5

Chi-square statistics for ACEs

ACE Type	Sociodemographic Factor								
	Gender			Socio-economic status			Sexual orientation		
	df	X^2	*p*	*df*	X^2	*p*	*df*	X^2	*p*
Physical abuse	1	3.65	0.06	1	66.23	<.001	1	11.29	0.0008
Emotional abuse	1	14.24	0.0002	1	53.84	<.001	1	48.53	<.001
Sexual abuse	1	130.50	<.001	1	67.01	<.001	1	224.57	<.001
Exposure to drugs	1	30.15	<.001	1	127.82	<.001	1	48.52	<.001
Incarcerated guardian	1	5.81	0.02	1	129.46	<.001	1	9.28	0.002
Ill guardian	1	70.90	<.001	1	65.39	<.001	1	120.24	<.001
Household violence	1	22.31	<.001	1	119.34	<.001	1	56.61	<.001
Separation of guardians	1	18.75	<.001	1	161.69	<.001	1	20.96	<.001

Emotional neglect	1	0.47	0.50	1	105.53	<.001	1	95.41	<.001
Physical neglect	1	1.23	0.27	1	22.41	<.001	1	1.11	0.29
Exposure to bullying	1	3.63	0.07	1	42.02	<.001	1	79.72	<.001
Community violence	1	25.26	<.001	1	78.18	<.001	1	0.04	0.84

Note. Significance value was set to $p < .001$

Sociodemographic Differences in Cumulative ACE Exposure

The sample experienced an average of 2.01 cumulative ACEs. Each sociodemographic group's mean number of cumulative ACE exposure is documented in Table 6.

Table 6

Mean numbers of ACEs by sociodemographic group

Sociodemographic Factor	Descriptive Statistics			
	M	*SD*	*95% CI*	
			LL	*UL*
Gender				
Male	1.70	1.95	1.61	1.79
Female	2.11	2.20	2.04	2.18
Socio-economic status				
Lower income	2.86	2.56	2.73	2.98
Higher income	1.71	1.91	1.65	1.76
Sexual orientation				
Exclusively heterosexual	1.77	2.01	1.71	1.83
Not exclusively heterosexual	2.65	2.40	2.53	2.76

Differences in cumulative ACEs across the different sociodemographic groups were analyzed using two-tailed *t*-tests. The Bonferroni correction was applied to these three tests and the significance level was set at $p < .01$. Each sociodemographic factor had a statistically significant relationship with cumulative ACE exposure. For gender, $t(3631.9) = -7.05$, $p < .01$, indicating that female participants were exposed to more ACEs than male participants. For SES, $t(2260.2) = 16.39$, $p < .01$, indicating that the lower income group was exposed to more ACEs than the higher income group. Lastly, for sexual orientation, $t(2553.2) = -13.14$, $p < .01$, indicating that the 'not exclusively heterosexual' group experienced more ACEs than the 'exclusively heterosexual' group.

Sociodemographic Differences in Mental Health Symptoms

The IDAS has a maximum score of 270, with higher scores indicating more severe mental health symptoms. The mean score for the sample was 172.45 and the mean IDAS score for each sociodemographic group is documented in Table 7.

Table 7

Mean scores on IDAS by sociodemographic group

Sociodemographic Factor	Descriptive Statistics			
	M	*SD*	*95% CI*	
			LL	*UL*
Gender				
Male	166.36	45.85	164	169
Female	174.52	47.09	173	176
Socio-economic status				
Lower income	180.31	49.47	178	183
Higher income	169.60	46.08	168	171
Sexual orientation				
Exclusively	167.09	45.11	166	168

heterosexual				
Not exclusively heterosexual	186.62	49.77	184	189

Note. Total IDAS score was out of 270.

The differences in severity of mental health symptoms across the sociodemographic groups were analyzed using two-tailed *t*-tests. The Bonferroni correction was applied to these three tests, setting $p < .01$. Each sociodemographic factor had a statistically significant relationship with mental health symptoms. For gender, $t(3325.2) = -6.18$, $p < .01$, indicating that female participants currently have more severe mental health symptoms than male participants. For SES, $t(2646.4) = 7.51$, $p < .01$, indicating that the lower income group have more severe mental health symptoms than the higher income group. Lastly, for sexual orientation, $t(2709.4) = -13.84$, $p < .01$, indicating that the 'not exclusively heterosexual' group have more severe mental health symptoms than the 'exclusively heterosexual' group.

Relationship Between Cumulative ACEs and Mental Health

A regression model was run to assess the relationship between cumulative ACE score and severity of mental health symptoms. Additional models were run to investigate whether the three sociodemographic factors moderate this relationship. The Bonferroni correction was applied to the four models, setting $p < .0125$. The results of these analyses are documented in Table 8.

Mental Health Symptoms a Function of Cumulative ACEs

Cumulative ACE exposure was significantly correlated with mental health symptoms with a correlation coefficient of 0.34. Severity of mental health symptoms was modelled as a function of cumulative ACE exposure without any moderators. The model was statistically significant with $R^2 = 0,11$, $F(5943) = 766.60$, $p < .0125$. Thus, the model accounts for 11% of the variation in severity of mental health symptoms.

Table 8

Regression models pre

Model	Statistics							
	B/β	*SE*	*t*	*P*[1]	R^2	Adjusted R^2	*F*(df)	*P*[2]
Model 1: No moderator					0.1142	0.1141	766.60(5943)	<.001
(Intercept)	157.59	0.80	200.04	<.001				
Cumulative ACEs	7.39	0.27	27.69	<.001				
Model 2: Gender moderator					0.1128	0.1124	249.9(5897)	<.001
(Intercept)	154.24	1.41	109.65	<.001				
Cumulative ACEs	7.11	0.54	13.10	<.001				
Gender:	5.08	1.70	3.00	0.003				
Interaction: Cumulative ACE X gender	0.08	0.63	0.13	0.90				
Model 3: Sexual orientation moderator					0.13	0.13	295.9(5927)	<.001
(Intercept)	154.77	0.90	172.89	<.001				
Cumulative ACEs	6.96	0.33	20.83	<.001				
Sexual orientation	13.93	1.86	7.51	<.001				
Interaction: Cumulative ACEs X sexual orientation	-0.19	0.56	-0.34	0.73				
Model 4: Socio-economic status moderator					0.1165	0.1161	260.9(5935)	<.001
(Intercept)	163.05	1.68	97.34	<.001				

Cumulative ACEs	6.04	0.44	13.81	<.001
Socio-economic status	-7.22	1.90	-3.80	<.001
Interaction: Cumulative ACEs X socio-economic status	2.04	0.56	3.63	<.001

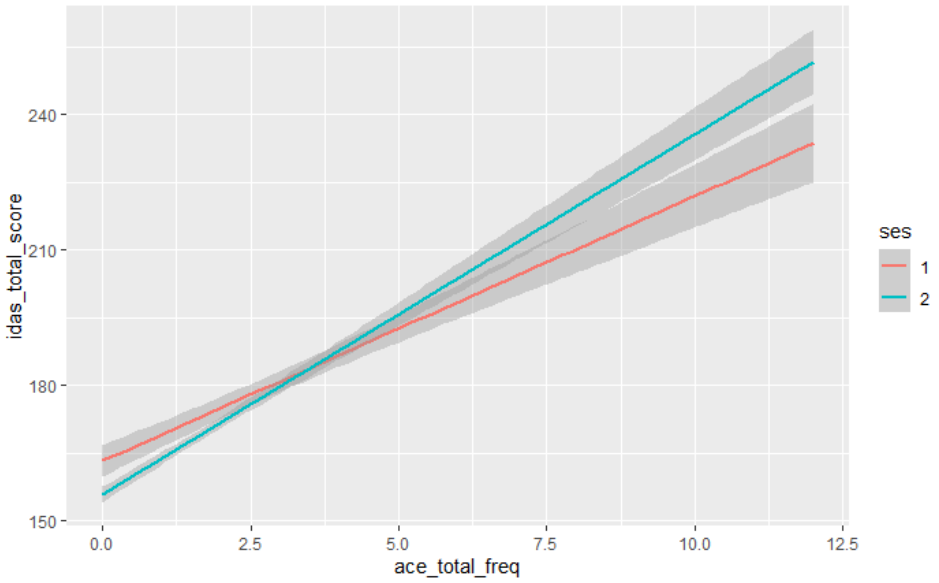
Mental Health Symptoms as a Function of Cumulative ACEs with Gender as a Moderator

A linear regression was run to investigate whether cumulative ACE exposure significantly predicts severity of mental health symptoms with gender as the moderator. The model was statistically significant with $R^2 = 0{,}11$, $F(5897) = 249.9$, $p < .0125$. However, while cumulative ACE exposure and gender were each significant predictors of severity of mental health symptoms, the interaction between the two factors was not significant ($p = 0.90$) indicating that gender does not moderate the relationship between cumulative ACEs and mental health.

Mental Health Symptoms as a Function of Cumulative ACEs with SES as a Moderator

A linear regression was run to investigate whether cumulative ACE exposure significantly predicts severity of mental health symptoms with SES as the moderator. The model was statistically significant with $R^2 = 0{,}12$, $F(5935) = 260.90$ and $p < .0125$. Furthermore, cumulative ACE exposure, SES, and the interaction between the two factors were each statistically significant predictors for severity of mental health symptoms. Figure 1 shows a greater increase in mental health symptoms in relation to cumulative ACEs for the higher income group than the lower income group. This indicates that higher income predicted more severe mental health symptoms than lower income.

Figure 1



Note. 1 = lower income; 2 = higher income.

Mental Health Symptoms as a Function of Cumulative ACEs with Sexual Orientation as a Moderator

A linear regression was run to investigate whether cumulative ACE exposure significantly predicts severity of mental health symptoms with sexual orientation as the moderator. The model was statistically significant with $R^2 = 0{,}13$, $F(5927) = 295.90$ and $p < .0125$. However, while cumulative ACE exposure and sexual orientation were each significant predictors of severity of mental health symptoms, the interaction between the two was not ($p = 0.73$), indicating that sexual orientation does not moderate the relationship between cumulative ACE exposure and mental health.

Discussion

While research has begun to examine the relationship between ACEs and mental health in university students, very few studies have investigated whether sociodemographic factors influence this relationship. This study has sought to bridge this gap in the literature and has utilized a large sample of university students from various countries spanning four continents. The study sample showed great diversity in participants' gender, SES and sexual orientation. High levels of repeated exposure to a range of ACEs, including various types of violence, abuse and neglect were found across these varied sociodemographic groups. Moreover, the study showed that exposure to cumulative ACES appears to be the norm among university students rather than the exception which is in line with previous findings from student samples in specific countries like South Korea (Kim, 2017), Tunisia (El Mhamdi et al., 2017) and the United States of America (Sciolla et al., 2019). This confirms that university samples are, in general, a highly trauma-exposed population and higher education institutions should be sensitive to this in planning student support services. This study further reports on the higher prevalence of ACEs among minority groups in universities when compared to majority groups. Further still, the study investigates if and how sociodemographic factors predicts mental health in relation to ACEs.

Sociodemographic Factors and ACEs

In this international sample of university students, female gender, lower SES and non-heteronormative sexuality are all associated with a greater risk of exposure to specific ACEs and to cumulative ACEs. When compared to male university students, female university students have been found to experience more types of ACEs as well as higher ACE scores by several other studies (Kim, 2017; Dorvil et al., 2020; Sciolla et al., 2019). Similarly, this study found significantly more female students experiencing cumulative ACEs than male students. Female students were further reported to have experienced several specific ACE types more frequently while more males experienced only one type of ACE more frequently than female students. There are several factors that may influence this finding. For one, society has developed to allow and even encourage females to disclose adversity while ideas of masculinity refrains males from doing the same (Bynum et al., 2010). Secondly, this study reported more females experiencing emotional and sexual abuse which may be a result of the high global rate of gender-based violence.

Lower income students reported a greater prevalence of most ACE types (75%) compared to higher income students. The greater risk of exposure to specific and cumulative ACEs among lower SES university students was also found in Australia (Doidge et al., 2017), Scotland (Marryat & Frank, 2019) and Brazil (Soares et al., 2016). The disparity in

prevalence of several ACE types highlights the role of SES in increasing risk for a broad range of childhood adversities. Economic stress may cause these disparities as poverty has been found to increase violent behaviour, marital unrest, poor nourishment, and illegal activity (Bulled & Singer, 2020; Kim, 2020) all of which influence ACE exposure. The stress of financial constraints may cause parents to employ maladaptive coping mechanisms such as drug use. This can spiral into various problems and expose children to several ACEs as drug use can expose both parent and child to gang violence, criminal activity (such as stealing to be able to buy drugs) and neglect as financial resources go toward drug use as opposed to food and household requirements. Furthermore, poverty has been found to increase punitive parenting and family violence, exposing children to further ACEs (Bywaters et al., 2015). Poverty has also been associated with intimate partner violence which increases children's risk of exposure to ACEs as well as mental health symptoms (Bulled & Singer, 2020).

As for non-heterosexual university students, this study supports evidence that non-heterosexual university students have greater risk of exposure to ACEs than heterosexual university students (Dorvil et al., 2020; Sieben et al., 2019). This study found a greater prevalence of each ACE type among non-heterosexual students compared to heterosexual students. As this disparity is constant across all forms of ACEs, sexual orientation must play a pivotal role in increasing risk for childhood adversity. It is possible that sexuality informs ACE exposure in the following way. Non-heterosexual youth are often the victims of discrimination in schools as well as general society (Ceatha et al., 2019). This can be explained by social cognition theory which states that members of society operate in social groups that causes people to classify others as either in-group members, or out-group members (Hollander & Howard, 2000). Social cognition tells us that non-heterosexual individuals are seen as out-group members by a large proportion of society and by going against society's expectations of what is deemed to be normal sexual behaviour and attraction, attention is drawn to the topic of sexuality (Hollander & Howard, 2000). With attention on sexuality, heterosexual people may be ill-informed about non-heterosexual people as social cognition further tells us that out-group people are unlikely to have complex understanding of non-heterosexual people and are thus likely to recall negative details about them (Hollander & Howard, 2000). This forms stereotypes and perpetuates discrimination and ostracization of non-heterosexual people (Hollander & Howard, 2000). This can increase non-heterosexual people's risk of exposure to ACE types including abuse, neglect, bullying and violence. It is also possible that gender, SES and sexual orientation intersect for many students, increasing their

risk of ACE exposure. For example, non-heterosexual female students with lower income may have a much higher risk of specific and cumulative ACEs. This study does not have the scope to investigate this, however, future research should adopt a more intersectional approach to understanding ACE exposure.

Sociodemographic Factors, ACEs and Mental Health

Although gender and sexual orientation are associated with a higher risk of experiencing ACEs, in this sample, they do not interact with ACE exposure to predict mental health in young adulthood. Therefore, cumulative ACEs appears to predict worse mental health in a similar way for males and females and for those with a heteronormative and non-heteronormative sexual orientation. Although this study reported higher prevalence of ACEs among female students, others have reported similar experiences across genders as well as some ACE types being more prevalent for females while other types are more prevalent for males (El Mhamdi et al., 2017; Miranda-Mendizabal et al., 2019). Therefore, it is possible that there is great variation in gender differences in ACEs which influences the moderating ability of this sociodemographic factor.

This study's findings also indicated greater prevalence of each ACE type among non-heterosexual students, it would be reasonable to assume that sexuality influences the relationship between ACEs and mental health. However, this is not the case in this study. It may be that the high prevalence of ACEs among non-heterosexual students may allow them to develop healthy coping strategies such as social support and professional help which the LGBT community places great importance on (Schnarrs et al., 2019). It is also possible that the interaction between gender and sexual orientation may have resulted in a more nuanced relationship between ACEs and mental health than this study was able to identify. Thus, an intersectional approach may produce greater understanding of the moderating factor of gender and sexual orientation. Further research is required to investigate this possibility.

However, SES does appear to play a moderating role between cumulative ACEs and mental health. This study found that university students with higher income were at greater risk of developing more severe mental health symptoms than lower income students with the same exposure to ACEs. The reason for this can only be speculated, however, it is possible that participants from different SES groups may deal with cumulative ACE exposure in different ways. For example, ACEs are more prevalent in low-income communities as seen in our bivariate results as well as in previous findings (Doidge et al., 2017; Marryat & Frank, 2019; Soares et al., 2016). The commonality of multiple adversities in lower income communities may make it easier for

community members to seek social support from others who have experienced similar childhood adversities without feeling stigmatized. However, in higher income communities, fewer people have experienced childhood adversities, and those who have may not feel able to disclose this to others in their community for fear of being judged or stigmatized, causing them to internalize their feelings over time. However, future research will be needed to better understand the role of SES in moderating the relationship between ACE exposure and mental health.

Limitations

This study grouped participants who identified as 'mostly heterosexual', 'equally heterosexual and homosexual', 'mostly' homosexual', 'exclusively homosexual' and 'other' together despite previous research reporting different experiences of diversity and mental health across these varied groups (Borgogna et al., 2018; Schnarrs et al., 2019). Future research may benefit from studying the interaction of sexual orientation, ACEs and mental health with more varied representations of the different groups of sexual identity. Furthermore, measuring SES on a binomial scale may not be comprehensive enough to accurately assess childhood income status. Future research should include more varied representations of income status. Another limitation is the reliance on retrospective recall about childhood experiences which may not be accurate. Furthermore, the use of volunteer samples may create a bias as either more psychologically vulnerable or more psychologically healthy students could have elected to participate in the study, rather than a more representative sample of students.

Recommendations for Future Research

Determining whether sociodemographic factors moderate the relationship between ACEs and mental health can benefit from repeated research into this topic as there is such limited research to date. Future research should represent different social groups individually in their data analysis. Furthermore, studies should look at how the intersection of different sociodemographic factors may play a role in increasing long term mental health risks associated with childhood adversities. Further still, the literature on this topic could benefit from studying other sociodemographic factors beyond gender, SES and sexual orientation.

Conclusion

This study investigated whether sociodemographic factors are associated with exposure to specific ACEs, and with cumulative ACE exposure in an international sample of university students. Findings indicated that gender, SES and sexual orientation were all associated with

ACEs, with the female, lower income and not-exclusively heterosexual groups each having higher prevalence of both specific ACEs as well as cumulative ACEs when compared to their opposing groups. Furthermore, the study investigated whether gender, SES and sexual orientation moderated the relationship between cumulative ACE exposure and mental health symptoms. Findings indicated that gender and sexual orientation did not moderate this relationship despite a higher prevalence of ACEs among female and not-exclusively heterosexual students. Potential explanations included an interaction between sociodemographic groups resulting in more nuanced explanation that requires further research. However, SES was found to moderate the relationship between cumulative ACEs and mental health symptoms with higher income predicting more severe mental health symptoms.

References

Alhowaymel, F., Kalmakis, K., & Jacelon, C. (2020). Developing the concept of adverse childhood experiences: A global perspective. *Journal of Pediatric Nursing*, *56*, 18-23. https://doi-org.ezproxy.uct.ac.za/10.1016/j.pedn.2020.10.004

Auerbach, R. P., Mortier, P., Bruffaerts, R., Alonso, J., Benjet, C., Cuijpers, P., Demyttenaere, K., Ebert, D. D., Green, J. G., Hasking, P., Murray, E., Nock, M. K., Pinder-Amaker, S., Sampson, N. A., Stein, D. J., Vilagut, G., Zaslavsky, A. M., Kessler, R. C., & WHO WMH-ICS Collaborators. (2018). WHO world mental health surveys international college student project: Prevalence and distribution of mentaldisorders. *Journal of Abnormal Psychology*, *127*(7), 623–638. http://dx.doi.org.ezproxy.uct.ac.za/10.1037/abn0000362

Ballester, L., Alayo, I., Vilagut, G., Almenara, J., Cebría, A. I., Echeburúa, E., Gabilondo, A., Gili, M., Lagares, C., Piqueras, J. A., Roca, M., Soto-Sanz, V., Blasco, M. J., Castellvi, P., Mortier, P., Bruffaerts, R., Auerbach, R. P., Nock, M. K., Kessler, R. C., & Jordi, A. (2020). Mental disorders in Spanish university students: Prevalence, age of-onset, severe role impairment and mental health treatment. *Journal of Affective Disorders*, *273*, 604-613. https://doi.org/10.1016/j.jad.2020.04.050

Bantjes, J., Lochner, C., Saal, W., Roos, J., Taljaard, L., Page, D., Auerbach, R. P., Mortier, P., Bruffaerts, R., Kessler, R. C., & Stein, D. J. (2019). Prevalence and sociodemographic correlates of common mental disorders among first-year university students in post-apartheid South Africa: Implications for a public mental health approach to student wellness. *BMC Public Health, 19*(922), 1–12. https://doi.org/10.1186/s12889-019-7218-y

Borgogna, N. C., McDermott, R. C., Aita, S. L., & Kridel, M. M. (2019). Anxiety and depression across gender and sexual minorities: Implications for transgender, gender nonconforming, pansexual, demisexual, asexual, queer, and questioning individuals. *Psychology of Sexual Orientation and Gender Diversity*, *6*(1), 54-63. https://doi.org/10.1037/sgd0000306

Bulled, N., & Singer, M. (2020). In the shadow of HIV & TB: A commentary on the covid epidemic in South Africa. *Global Public Health, 15*(8), 1231-1243. https://doi-org.ezproxy.uct.ac.za/10.1080/17441692.2020.1775275

Bynum, L., Ridings, D. L., Wynkoop, K. S., Anda, R. F., Edwards, V. J., & Strine, T. W. (2010). Adverse childhood experiences reported by adults – five states, 2009. *MMWR. Morbidity and Mortality Weekly Report, 59*(49), 1609-1613. https://link.gale.com/apps/doc/A248659670/AONE?u=unict&sid=bookmark-AONE&xid=a3cdad39

Bywaters, P., Bunting, L., Davidson, G., Hanratty, J., Mason, W., McCartan, C., & Steils, N. (2015). The relationship between poverty, child abuse and neglect: An evidence review. York: Joseph Rowntree Foundation. https://www.jrf.org.uk/report/relationship-between-poverty-child-abuse-and-neglect-evidence-review23Effective

Ceatha, N., Mayock, P., Campbell, J., Noone, C., & Browne, K. (2019). The power of recognition: A qualitative study of social connectedness and wellbeing through LGBT sporting, creative and social groups in Ireland. *International Journal of Environmental Research and Public Health, 16*(19), 1-18. https://doi.org/10.3390/ijerph16193636

Clements-Nolle, K., Lensch, T., Baxa, A., Gay, C., Larson, S., & Yang, W. (2018). Sexual identity, adverse childhood experiences, and suicidal behaviors. *Journal of Adolescent Health, 62*(2), 198-204. https://doi-org.ezproxy.uct.ac.za/10.1016/j.jadohealth.2017.09.022

di Girolamo, G., Dagani, J., Purcell, R., Cocchi, A., & McGorry, P. D. (2012). Age of onset of mental health services: Needs, opportunities and obstacles. *Epidemiology and Psychiatric Sciences, 21*(1), 47-57. https://doi.org/10.1017/S2045796011000746

Doidge, J. C., Higgins, D. J., Delfabbro, P., & Segal, L. (2017). Risk factors for child maltreatment in an Australian population-based birth cohort. *Child Abuse & Neglect, 64*, 47-60. https://doi-org.ezproxy.uct.ac.za/10.1016/j.chiabu.2016.12.002

Dorvil, S., Vu, M., Haardorfer, R., Windle, M., & Vu, C. (2020). Experiences of adverse childhood events and racial discrimination in relation to depressive symptoms in college students. *College Student Journal, 54*(3), 295-308. https://search-ebscohost-com.ezproxy.uct.ac.za/login.aspx?direct=true&db=mlf&AN=EIS146818474&site=ehost-live

El Mhamdi, S., Lemieux, A., Bouanene, I., Salah, A. B., Nakajima, M., Salem, K. B., & al'Absi, M. (2016). Gender differences in adverse childhood experiences, collective violence, and the risk for addictive behaviors among university students in Tunisia. *Preventive Medicine, 99*, 99-104. https://doi.org/10.1016/j.ypmed.2017.02.011

Forster, M., Grigsby, T. J., Rogers, C. J., & Benjamin, S. M. (2018). The relationship between family-based adverse childhood experiences and substance use behaviors among a diverse sample of college students. *Addictive Behaviors, 76*, 298-304. https://doi-org.ezproxy.uct.ac.za/10.1016/j.addbeh.2017.08.037

Grigsby, T. J., Rogers, C. J., Albers, L. D., Benjamin, S. M., Lust, K., Eisenberg, M. E., & Forster, M. (2020). Adverse childhood experiences and health indicators in a young adult, college student sample: Differences by gender. *International Journal of Behavioral Medicine*, *27*, 660–667. https://doi-org.ezproxy.uct.ac.za/10.1007/s12529-020-09913-5

Hardt, J., & Rutter, M. (2004). Validity of adult retrospective reports of adverse childhood experiences: Review of the evidence. *Journal of Child Psychology and Psychiatry*, *45*(2), 260-73. https://doi.org/10.1111/j.1469-7610.2004.00218.x

Ho, G. W. K., Chan, A. C. Y., Chien, W. T., Bressington, D. T., & Karatzias, T. (2019). Examining patterns of adversity in Chinese young adults using the adverse childhood experiences – international questionnaire (ACE-IQ). *Child Abuse and Neglect, 88,*179-188. https://doi.org/10.1016/j.chiabu.2018.11.009

Hollander, J. A., & Howard, J. A. (2000). Social psychological theories on social inequalities. *Social Psychology Quarterly, 63*(4), 338-351. https://www.jstor.org/stable/2695844

Hughes, K,, Bellis, M. A., Hardcastle, K. A., Sethi, D., Butchart, A., Mikton, C., Jones, L., & Dunne, M. P. (2017). The effect of multiple adverse childhood experiences on health: A systematic review and meta-analysis. *Lancet Public Health*, *2*(8):e356-e366. e356–e366. https://doi.org/10.1016/S2468-2667(17)30118-4

Kalmakis, K. A., & Chandler, G. E. (2014). Adverse childhood experiences: Towards a clear conceptual meaning. *Journal of Advanced Nursing, 70*(7), 1489-1501. https://doi-org.ezproxy.uct.ac.za/10.1111/jan.12329

Karatekin, C. (2018). Adverse childhood experiences (ACEs), stress and mental health in college students. *Stress and Health, 34*, 36–45. https://doi-org.ezproxy.uct.ac.za/10.1002/smi.2761

Kazeem, O. T. (2015). A validation of the adverse childhood experiences scale in Nigeria. *Research on Humanities and Social Sciences, 5*(11), 18-23. https://doi.org/10.7176/RHSS

Kessler, R. C., Aguilar-Gaxiola, S., Alonso, J., Chatterji, S., Lee, S., Ormel, J., Bedirhan Üstün, T., & Wang, P. S. (2009). The global burden of mental disorders: An update from the WHO world mental health (WMH) surveys. *Epidemiology Psichiatric Society, 18*(1): 23-33. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3039289/

Kessler, R. C., McLaughlin, K. A., Green, J. G., Gruber, M. J., Sampson, N. A., Zaslavsky, A. M., Aguilar-Gaxiola, S., Alhamzawi, A. O., Alonso, J., Angermeyer, M., Benjet, C., Bromet, E., Chatterji, S., de Girolama, G., Demyttenaere, K., Fayyad, J., Florescu, S., Gal, G., Gureje, O., … Williams, D. R. (2010). Childhood adversities and adult psychopathology in the WHO World Mental Health Surveys. *The British Journal of Psychiatry*, *197*, 378–385. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3039289/

Kidman, R., Smith, D., Piccolo, L. R., & Kohler, H. P. (2019). Psychometric evaluation of the adverse childhood experience international questionnaire (ACE-IQ) in Malawian adolescents. *Child Abuse and Neglect, 92*, 139-145. https://doi.org/10.1016/j.chiabu.2019.03.015

Kim, Y. H. (2017). Associations of adverse childhood experiences with depression and alcohol abuse among Korean college students. *Child Abuse & Neglect, 67*, 338-348. https://doi-org.ezproxy.uct.ac.za/10.1016/j.chiabu.2017.03.009

Kim, A. W. (2020). Promoting mental health in community and research settings during covid-19: Perspectives and experiences from Soweto, South Africa. *American Journal of Human Biology*, *32*(5), e23509-e23515. https://doi-org.ezproxy.uct.ac.za/10.1002/ajhb.23509

Lee, C., & Feng, J. (2021). Impacts of childhood adversity forms and drinker self-schema on undergraduate drinking behaviors and depression. *Addictive Behaviors, 114*, 1–7. https://doi-org.ezproxy.uct.ac.za/10.1016/j.addbeh.2020.106756

Lefevor, G. T., Boyd-Rogers, C. C., Sprague, B. M., & Janis, R. A. (2019). Health disparities between genderqueer, transgender, and cisgender individuals: An extension of minority

stress theory. *Journal of Counseling Psychology, 66*(4), 385–395. https://doi.org/10.1037/cou0000339

Li, X., Zheng, H., Tucker, W., Xu, W., Wen, X., Lin, Y., Jia, Z., Yuan, Z., & Yang, W. (2019). Research on relationships between sexual identity, adverse childhood experiences and non-suicidal self-injury among rural high school students in less developed areas in China. *International Journal of Environmental Research and Public Health, 16*. https://doi.org/10.3390/ijerph16173158

Marryat, L., & Frank, J. (2019). Factors associated with adverse childhood experiences in Scottish children: A prospective cohort study. *BMJ Paediatrics Open, 3*:e000340. http://dx.doi.org.ezproxy.uct.ac.za/10.1136/bmjpo-2018-000340

Meléndez, J. C., Mayordomo, T., Sancho, P., & Tomás, J. M. (2012). Coping strategies: Gender differences and development throughout life span. *The Spanish Journal of Psychology*, *15*(3), 1089-1098. https://doi.org/10.5209/rev_SJOP.2012.v15.n3.39399

Meyer, I. H. (2003). Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: Conceptual issues and research evidence. *Psychology of Sexual Orientation and Gender Diversity*, *1*(S), 3-26. https://doi.org/10.1037/2329-0382.1.S.3

Miranda-Mendizabal, A., Castellvi, P., Alayo, I., Vilagut, G., Blasco, M. J., Torrent, A., Ballester, L., Almenara, J., Lagares, C., Roca, M., Sesé, A., Piqueras, J. A., Soto-Sanz, V., Rodríguez-Marín, J., Echeburúa, E., Gabilondo, A., Cabriá, A. I., Bruffaerts, R., Auerbach, R. P., … Alonso, J. (2019). Gender commonalities and differences in risk and protective factors of suicidal thoughts and behaviours: A cross-sectional study of Spanish university students. *Anxiety and Depression Association of America, 36*, 1102-1114. https://onlinelibrary-wiley-com.ezproxy.uct.ac.za/journal/15206394

Naicker S. N., Norris, S. A., Mabaso, M., Richter, L. M. (2017). An analysis of retrospective and repeat prospective reports of adverse childhood experiences from the South African Birth to Twenty Plus cohort. *PLoS One*, 12(7): e0181522. https://doi.org/10.1371/journal.pone.0181522

O'Donnell, M., Nassar, N., Leonard, H., Jacoby, P., Mathews, R., Patterson, Y., & Stanley, F. (2010). Characteristics of non-Aboriginal and Aboriginal children and families with

substantiated child maltreatment: A population-based study. *International Journal of Epidemiology, 39*(3), 921-928. https://doi-org.ezproxy.uct.ac.za/10.1093/ije/dyq005

Omair, A. (2015). Selecting the appropriate study design for your research: Descriptive study designs. *Journal of health specialities, 3*(3), 153-156. https://doi.org/10.4103/1658-600X.159892

Schnarrs, P. W., Stone, A. L., Salcido, R., Baldwin, A., & Nemeroff, C. B. (2019). Differences in adverse childhood experiences (ACEs) and quality of physical and mental health between transgender and cisgender sexual minorities. *Journal of Psychiatric Research, 119*, 1-6. https://doi.org/10.1016/j.jpsychires.2019.09.001

Sciolla, A. F., Wilkes, M. S., & Griffin, E. J. (2019). Adverse childhood experiences in medical students: Implications for wellness. *Academic Psychiatry, 43*(4), 369–374. https://doi-org.ezproxy.uct.ac.za/10.1007/s40596-019-01047-5

Sieben, A., Renner, L. M., Lust, K., Vang, W., & Nguyen, R. H. N. (2019). Adverse childhood experiences among Asian/Pacific Islander sexual minority college students. *Journal of Family Violence, 35*(3), 297-303. https://doi.org/10.1007/s10896-019-00095-7

Smyth, J. M., Hockemeyer, J. R., Heron, K. E., Wonderlich, S. A., & Pennebaker, J. W. (2008). Prevalence, type, disclosure, and severity of adverse life events in college students. *Journal of American College Health, 57*(1), 69-76. https://doi.org/10.3200/JACH.57.1.69-76

Soares, A. L. G., Howe, L. D., Matijasevich, A., Wehrmeister, F. C., Menezes, A. M. B., & Gonçalves, H. (2016). Adverse childhood experiences: Prevalence and related factors in adolescents of a Brazilian birth cohort. *Child Abuse & Neglect, 51*, 21-30. http://creativecommons.org/licenses/by/4.0/

Stasik-O'Brien, S. M., Brock, R. L., Chmielewski, M., Naragon-Gainey, K., Koffel, E., McDade-Montez, E., O'Hara, M. W., & Watson, D. (2019). Clinical utility of the Inventory of Depression and Anxiety Symptoms (IDAS). *Assessment*, 26(5), 944-960. https://doi.org/10.1177/1073191118790036

Thomas, L. (2020, May 8). *"What is a cross-sectional study?"*, https://www.scribbr.com/methodology/cross-sectional-study/

Tripathy J. P. (2013). Secondary Data Analysis: Ethical Issues and Challenges. *Iranian journal of*

public health, *42*(12), 1478–1479. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4441947/

Walsh, D., McCartney, G., Smith, M., & Armour, G. (2019). Relationship between childhood socioeconomic position and adverse childhood experiences (ACEs): A systematic review. *Journal of Epidemiology & Community Health*, *73*, 1087-1093. http://dx.doi.org.ezproxy.uct.ac.za/10.1136/jech-2019-212738

Watson, D., O'Hara, M. W., Simms, L. J., Kotov, R., Chmielewski, M., McDade-Montez, E. A., Gamez, W., & Stuart, S. (2007). Development and validation of the inventory of depression and anxiety symptoms (IDAS). *Psychological Assessment*, *19*(3), 253-268. https://doi.org/10.1037/1040-3590.19.3.253

Wilson, S., & MacLean, R. (2011). Ethics. In S. Wilson & R. MacLean, *Research methods and data analysis for psychology*, pp.593-619. Maidenhead: McGraw-Hill Education.

World Health Organization. (2020, January 28). *Adverse childhood experiences international questionnaire (ACE-IQ).* https://www.who.int/publications/m/item/adverse-childhood-experiences-international-questionnaire-(ace-iq)

Appendix A

Consent form

Project CABS

Informed Consent for Surveys

01/03/2019

Adrian J. Bravo, from the Center on Alcoholism, Substance Abuse, and Addictions at the University of New Mexico, is conducting a research study. The purpose of the research is to examine factors related to alcohol, marijuana, and prescription drug use. You do not have to use alcohol, marijuana, or prescription drugs to participate in this study. You are being asked to participate in this study because you are a college student 18 years of age or older.

Your participation will involve completing a survey online. The survey should take about 60 minutes to complete. The survey includes questions about your alcohol use, marijuana use, prescription drug use, internet/videogame use, personality traits, childhood events, mental health, and other beliefs. Your involvement in the study is voluntary, and you may choose not to participate. You can refuse to answer any of the questions at any time. There are no known risks in this study, but some individuals may experience discomfort or loss of privacy when answering questions. We respect that we are asking participants to disclose engagement in potentially illegal activities and thus we recommend that you complete the survey in a private place. There are no names or identifying information associated with your responses. Because the data are deidentified, your responses are completely anonymous and cannot be linked back to you.

The findings from this project will provide information on factors that influence people's decision to use alcohol/marijuana/prescription drugs, the way in which people use alcohol/marijuana/prescription drugs, and the experiences associated with use of alcohol/marijuana/prescription drugs. If published, results will be presented in summary form only.

If you have any questions about this research project, please feel free to call Adrian J. Bravo at 505 925 2344. If you have questions regarding your rights as a research subject, or about what you should do in case of any harm to you, you may call the UNM Office of the IRB (OIRB) at (505) 277-2644 or irb.unm.edu.

By clicking "Next", you will be agreeing to participate in the above described research study.

Appendix B

Sociodemographic questionnaire

Your age (in years): [ ]

Which option best describes your gender? {Choose one}

( ) Male ( ) Female ( ) Transgender ( ) Other _____

( ) Prefer not to respond

University level of study: {Choose one}

( ) First year undergraduate ( ) Second year undergraduate ( ) Third year undergraduate

( ) Fourth year undergraduate ( ) Fifth year undergraduate ( ) Postgraduate

( ) Other

Which option best describes your racial identification?

( ) Black African ( ) Coloured ( ) Asian ( ) Indian ( ) White ( ) Other

( ) Prefer not to respond

Which option best describes your sexual orientation:

{Choose one}

( ) Exclusively heterosexual

( ) Mostly heterosexual

( ) Equally heterosexual and homosexual

( ) Mostly homosexual

( ) Exclusively homosexual

( ) Other

( ) I prefer not to respond

How would you describe your socioeconomic status when you were growing up?

( ) We often did not have enough basic necessities (like food, shelter or clothes)

( ) My parents/caregivers earned an income but we were always on a very tight budget

( ) Middle class

( ) Upper middle class

( ) Wealthy

Appendix C

ACE-IQ

When you were growing up, during the first 18 years of your life . . .

4.1 Did you live with a household member who was a problem drinker or alcoholic, or misused street or prescription drugs?

Yes

No

4.2 Did you live with a household member who was depressed, mentally ill or suicidal?

Yes

No

4.3 Did you live with a household member who was ever sent to jail or prison?

Yes

No

4.4 Were your parents ever separated or divorced?

Yes

No

Not applicable

4.5 Did your mother, father or guardian die?

Yes

No

Don’t know/not sure

These next questions are about certain things you may actually have heard or seen IN YOUR HOME. These are things that may have been done to another household member but not necessarily to you

When you were growing up, during the first 18 years of your life . . .

4.6 Did you see or hear a parent or household member in your home being yelled at, screamed at, sworn at, insulted or humiliated?

4.7 Did you see or hear a parent or household member in your home being slapped, kicked, punched or beaten up?

4.8 Did you see or hear a parent or household member in your home being hit or cut with an object, such as a stick (or cane), bottle, club, knife, whip etc.?

Response scale for these Questions:

Many times

A few times

Once

Never

These next questions are about certain things YOU may have experienced.

When you were growing up, during the first 18 years of your life . . .

5.1 Did a parent, guardian or other household member yell, scream or swear at you, insult or humiliate you?

5.2 Did a parent, guardian or other household member threaten to, or actually, abandon you or throw you out of the house?

5.3 Did a parent, guardian or other household member spank, slap, kick, punch or beat you up?

5.4 Did a parent, guardian or other household member hit or cut you with an object, such as a stick (or cane), bottle, club, knife, whip etc?

5.5 Did someone touch or fondle you in a sexual way when you did not want them to?

5.6 Did someone make you touch their body in a sexual way when you did not want them to?

5.7 Did someone attempt oral, anal, or vaginal intercourse with you when you did not want them to?

5.8 Did someone actually have oral, anal, or vaginal intercourse with you when you did not want

them to?

Response scale for these Questions:

Many times

A few times

Once

Never

PEER VIOLENCE

These next questions are about BEING BULLIED when you were growing up. Bullying is when a young person or group of young people say or do bad and unpleasant things to another young person. It is also bullying when a young person is teased a lot in an unpleasant way or when a young person is left out of things on purpose. It is not bullying when two young people of about the same strength or power argue or fight or when teasing is done in a friendly and fun way.

When you were growing up, during the first 18 years of your life . . .

6.1 How often were you bullied?

Many times

A few times

Once

Never (Go to 6.3)

6.2. How were you bullied most often?

I was hit, kicked, pushed, shoved around, or locked indoors

I was made fun of because of my race, nationality or colour

I was made fun of because of my religion I was made fun of with sexual jokes, comments, or gestures

I was left out of activities on purpose or completely ignored

I was made fun of because of how my body or face looked

I was bullied in some other way

This next question is about PHYSICAL FIGHTS. A physical fight occurs when two young people of about the same strength or power choose to fight each other.

When you were growing up, during the first 18 years of your life . . .

6.3 How often were you in a physical fight?

Many times

A few times

Once

Never

WITNESSING COMMUNITY VIOLENCE

These next questions are about how often, when you were a child, YOU may have seen or heard certain things in your NEIGHBOURHOOD OR COMMUNITY (not in your home or on TV, movies, or the radio).

When you were growing up, during the first 18 years of your life . . .

7.1 Did you see or hear someone being beaten up in real life?

7.2 Did you see or hear someone being stabbed or shot in real life?

7.3 Did you see or hear someone being threatened with a knife or gun in real life?

Response scale for these Questions:

Many times

A few times

Once

Never

Appendix D

Inventory of Depression and Anxiety Symptoms (IDAS)

Below is a list of feelings, sensations, problems, and experiences that people sometimes have. Read each item to determine how well it describes your recent feelings and experiences. Then select the option that best describes **how much** you have felt or experienced things this way **during the past two weeks, including today**. Use this scale when answering:

1	2	3	4	5
Not at all	**A little bit**	**Moderately**	**Quite a bit**	**Extremely**

1. I was proud of myself
2. I felt exhausted
3. I felt depressed
4. I felt inadequate
5. I slept less than usual
6. I felt fidgety, restless
7. I had thoughts of suicide
8. I slept more than usual
9. I hurt myself purposely
10. I slept very poorly
11. I blamed myself for things
12. I had trouble falling asleep
13. I felt discouraged about things
14. I thought about my own death

15. I thought about hurting myself
16. I did not have much of an appetite
17. I felt like eating less than usual
18. I thought a lot about food
19. I did not feel much like eating
20. I ate when I wasn't hungry
21. I felt optimistic
22. I ate more than usual
23. I felt that I had accomplished a lot
24. I looked forward to things with enjoyment
25. I was furious
26. I felt hopeful about the future
27. I felt that I had a lot to look forward to
28. I felt like breaking things
29. I had disturbing thoughts of something bad that happened to me
30. Little things made me mad
31. I felt enraged
32. I had nightmares that reminded me of something bad that happened
33. I lost my temper and yelled at people
34. I felt like I had a lot of interesting things to do
35. I felt like I had a lot of energy
36. I had memories of something scary that happened
37. I felt self-conscious knowing that others were watching me
38. I felt a pain in my chest
39. I was worried about embarrassing myself socially

40. I felt dizzy or light headed

41. I cut or burned myself on purpose

42. I had little interest in my usual hobbies or activities

43. I thought that the world would be better off without me

44. I felt much worse in the morning than later in the day

45. I felt drowsy, sleepy

46. I woke up early and could not get back to sleep

47. I had trouble concentrating

48. I had trouble making up my mind

49. I talked more slowly than usual

50. I had trouble waking up in the morning

51. I found myself worrying all the time

52. I woke up frequently during the night

53. It took a lot of effort for me to get going

54. I woke up much earlier than usual

55. I was trembling or shaking

56. I became anxious in a crowded public setting

57. I felt faint

58. I found it difficult to make eye contact with people

59. My heart was racing or pounding

60. I got upset thinking about something bad that happened

61. I found it difficult to talk with people I did not know well

62. I had a very dry mouth

63. I was short of breath

64. I felt like I was choking

Appendix E

Ethical approval for original study

DATE: January 24, 2019

IRB #: 21018

IRBNet ID & TITLE: [1357905-2] Project CABS

PI OF RECORD: Adrian Bravo,

PhD SUBMISSION TYPE:

Response/Follow-

Up

BOARD DECISION: APPROVED

EFFECTIVE DATE: January 24,

2019EXPIRATION DATE: N/A

RISK LEVEL: MINIMAL RISK

PROJECT STATUS: ACTIVE - OPEN TO ENROLLMENT

DOCUMENTS:

- Letter - Response letter (UPDATED: 01/24/2019)
- Other - Automatic Sona Credit through Qualtrics (UPDATED:01/24/2019)

- Other - Resources Sheet (UPDATED: 01/24/2019)
- Protocol - Protocol (UPDATED: 01/24/2019)
- Questionnaire/Survey - Questionnaire (UPDATED: 01/24/2019)

Thank you for your Response/Follow-Up submission. The UNM IRB has APPROVED your submission.This approval is based on an acceptable risk/benefit ratio and a project design wherein the risks to participants have been minimized. **This project is not covered by UNM's Federalwide Assurance (FWA) and will not receive federal funding.**

The IRB has determined the following:

- Informed consent must be obtained and documentation has been waived for this project. To obtain consent, use only approved consent document(s).

This determination applies only to the activities described in the submission and does not apply should any changes be made to this research. If changes are being considered, it is the responsibility of
the Principal Investigator to submit an amendment to this project and receive IRB approval prior to implementing the changes. A change in the research may disqualify this research from the current reviewcategory. **If federal funding will be sought for this project, an amendment must be submitted so that the project can be reviewed under relevant federal regulations.**

All reportable events must be promptly reported to the UNM IRB, including:
UNANTICIPATED PROBLEMS involving risks to participants or others, SERIOUS or

UNEXPECTED adverse events, NONCOMPLIANCE issues, and participant COMPLAINTS.

If an expiration date is noted above, a continuing review or closure submission is due no later than 30 days before the expiration date. **It is the responsibility of the Principal Investigator to apply for continuing review or closure and receive approval for the duration of this project.** If the IRB

approval for this project expires, all research related activities must stop and further action will be required by the IRB.

Please use the appropriate reporting forms and procedures to request amendments, continuing review,closure, and reporting of events for this project. Refer to the OIRB website for forms and guidance on submissions.

Please note that all IRB records must be retained for a minimum of three years after the closure of this project.

The Office of the IRB can be contacted through: mail at MSC02 1665, 1 University of New Mexico, Albuquerque, NM 87131-0001; phone at 505.277.2644; email at irbmaincampus@unm.edu; or in-personat 1805 Sigma Chi Rd. NE, Albuquerque, NM 87106. You can also visit the OIRB website at irb.unm.edu.