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Exposure to Adverse Life Events among Children Transitioning into Adolescence: Intersections of Socioeconomic Position and Race

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Abstract

Background: Racism is shown to diminish the protective effects of family socioeconomic position (SEP) resources for racial minorities compared to the majority groups, a pattern called minorities' diminished returns. Our existing knowledge is minimal about diminished returns of family SEP indicators on reducing exposure to adverse life events among children transitioning into adolescence. **Aim:** To compare diverse racial groups for the effects of family income and family structure on exposure to adverse life events of pre-adolescents transitioning to adolescence.

Methods: In this longitudinal study, we analyzed data from 22,538 observations belonging to racially diverse groups of American 9–10-year-old children (n = 11,878) who were followed while transitioning to adolescence. The independent variables were family income and family structure. The primary outcome was the number of stressful life events with impact on adolescents, measured by the Life History semi-structured interview. Mixed-effects regression models were used for data analysis to adjust for data nested to individuals, families, and centers.

Results: Family income and married family structure had an overall inverse association with children's exposure to adverse life events during transition to adolescence. However, race showed significant interactions with family income and family structure on exposure to adverse life events. The protective effects of family income and married family structure were weaker for African American than White adolescents. The protective effect of family income was also weaker for mixed/other race than White adolescents.

Conclusion: While family SEP is protective against children's exposure to adverse life events, this effect is weaker for African American and mixed/other race compared to White youth.

Introduction

Adverse life experiences are a major social determinant of children's health and development[1]. Children who experience adverse life events during the transition to adolescence have worse developmental outcomes in adulthood. The harmful effects of adverse life experiences are non-specific and systemic, impacting a wide range of physiological pathways[2,3] and contributing to general anxiety[4], post-traumatic stress[5], depressive disorder[4], suicidality[3], substance use[6], drug use[7], and premature mortality[3,8]. Exposure to adverse life experiences during the transition to adolescence negatively impacts brain and neurocognitive development[9], and increases the risk of cardiovascular and metabolic diseases[10]. Potential mechanisms responsible for the negative health effects of adverse life experiences include systemic inflammation[11], telomere shortening[12,13], and altered DNA methylation[14,15].

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Racial minority status[16] and low socioeconomic position (SEP)[17] are two overlapping constructs that correlate with higher exposure to adverse life experiences during childhood and adolescence[18]. Racial minority and low SEP families report higher levels of exposure to adverse life experiences, impacting child and adolescent health and development[19]. Differences in exposure to adverse life experiences may be one of the main underlying mechanisms that explain racial- and SEP-related disparities in health and development[18]. Evidence suggests the impact of SEP on health at the population and individual level may be exerted through increased exposure to adverse life experiences[20].

Recent studies using cross-sectional data show a stronger SEP-associated reduction in exposure to adverse life experiences among White children, youth, and adults compared to racial minorities[21-24]. Using the Adolescent Brain Cognitive Development (ABCD) study data, researchers showed SEP effects on exposure to adverse life experiences were weaker for African American children than White children[25]. The cross-sectional study compared the role of parental education and family income but did not include the role of family structure or examine other racial groups[25]. Another cross-sectional study used data from the Fragile Families and Child Wellbeing Study (FFCWS) and found an inverse link between SEP and spanking that was weaker in African American than White children[26]. High SEP African American parents report higher levels of occupational stress than their lower SEP counterparts, while high SEP White parents report lowered occupational stress compared to lower SEP White parents[27]. In a cross-sectional survey study, high SEP African Americans remained at higher risk of poverty than high SEP Whites[28,29]. Thus, high SEP is associated with a stronger reduction in parental stress, adverse life experiences, and risk of poverty among White families compared to African American families. This research is mainly cross-sectional, and future research using longitudinal data is needed to better understand the interaction between SEP and adverse life experiences.

African American and Latino youth and adults show diminished protective effects of certain family SEP indicators such as family income and family structure on tangible health and developmental outcomes[30,31]. According to Marginalization-related Diminished Returns (MDRs) theory, various SEP indicators[29,32-34] tend to generate smaller health gains for racialized and minoritized groups[31,34-38]. However, most of the MDRs literature is on African American families[30,31,36,39,40], and further research is needed to compare the effects of family SEP on exposure to adverse life experiences between Whites and other various racial groups.

Aims

Our aim was to compare the effects of family income and family structure on children's exposure to adverse life experiences during their transition to adolescence and determine whether the size of effect varied according to minority status. We expected weaker protective effects of family income and family structure among racial minorities compared to White children. Weaker protective effects of SEP may explain why high SEP racial minority youths remain at higher risk of depression, anxiety, and substance use compared to White youths (i.e., MDRs)[30,31]. We build on the previous research by incorporating a longitudinal design, expanding the comparison to include other non-White groups, and testing for diminished returns of two SEP indicators, namely family income and family structure, on children's exposure to adverse life experiences during their transition to adolescence.

Methods

We conducted a secondary analysis of the Adolescent Brain Cognitive Development (ABCD) study data. ABCD is a national longitudinal investigation of a racially and economically diverse sample of pre-adolescent children transitioning to adolescence[41]. Recruitment was mainly from schools[42], and more information about ABCD's purpose, methodology, and measurement is available elsewhere[41]. ABCD data is diverse across race, SEP, and geography. The analytical sample contained 22,538 observations belonging to 11,878 pre-adolescents. ABCD study ethics were originally approved by the University of California, San Diego (UCSD) Institutional Review Board (IRB). All adolescents who participated in the ABCD study provided assent, and all parents who participated in the ABCD project signed informed consent[43]. Our study was exempt from a full IRB review, as decided by the Charles R. Drew University of Medicine and Science IRB.

Our study variables included demographic factors: parental education, race, ethnicity, age and gender, and two SEP indicators: family income and family structure. Exposure to adverse life experiences was measured every two years and all other variables were measured at enrollment. Parents reported their child's date of birth, and age was calculated in months (time interval between birth and study enrollment). Age was treated as a continuous measure, gender was a dichotomous variable, and ethnicity was 1 for Latino/Hispanic and 0 for non-Latino/non-Hispanic. Parents answered the questions "What is the highest grade or level of school you have completed or the highest degree you have received?" and "What is the highest grade or level of school your partner has completed or the highest degree he/she has received?" Responses were as listed in Table 1. Parental education variables reflected the highest education of mother or father. Family income was a categorical measure with three levels. The exact question was, "What is your total combined family income for the past 12 months? This should include income (before taxes and deductions) from all sources, wages, rent from properties, social security, disability and veteran's benefits, unemployment benefits, worker's

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compensation". Responses were also as listed in Table 1. Parents reported their marital status, and family structure was dichotomously coded 1 for married (two-parents co-living) and 0 for any other status. Parent reported race of the child was the moderator. This variable was a categorical measure with the following categories: African American/ Black, Asian, Mixed/Other, and White (reference category).

Adverse life experiences during transition to adolescence was measured using the Life events history, a validated instrument to measure traumatic events and adversities. Life events history is a semi-structured interview with items such as 1) Someone in family died? 2) Family member was seriously injured? 3) Saw crime or accident? 4) Lost a close friend? The response for each item was 0 (no) or 1 (yes). If an event was experienced, the following questions were asked: did the event happen during the last year? Was the event negative or positive? To what degree did the event effect the individual's life (0 = Not at All; 1 = A Little; 2 = Some; 3 = A lot)? By counting the responses indicating a negative effect of an adverse life experience, we generated a continuous variable with higher scores indicating higher exposure to impactful adverse life experiences during the transition to adolescence[44]. Log of this continuous number was then calculated and used as the outcome measure. Appendix 1 shows the formula for calculation of the sum score.

The Data Exploration and Analysis Portal (DEAP) statistical platform, based on the R statistical package, was used for analysis. For univariate analysis, we reported mean and standard deviation [SD] and frequency/percentage overall and by race. For multivariable analysis, mixed-effects regression models (a specific type of multi-level regression) were used. These models adjusted for ABCD nested data, as multiple observations exist per individuals, who are nested to families, who are themselves nested to centers. All regression models were performed in the pooled sample, including all racial groups regardless of their group membership. *Model 1* did not include any interaction terms. Beta from this model is indicative of the association between independent and dependent variables in the pooled sample. *Models 2* and *3* included interaction terms between race and family income and family structure, respectively. Betas from these models are indicative of the association in Whites (main effect) and difference between other races and Whites (interaction term). The outcome was the effect of adverse life experiences during the transition to adolescence. Predictors were family income and structure. The moderator was race. Confounders were age, gender, ethnicity, and parental education. Before we tested the models, we ruled out collinearity between our measures. Family income, family structure, and parental education were operationalized as categorical variables and there was no collinearity between our study variables (all correlations weaker than .4). Standardized beta coefficients (b), 95% CI, and p-value were reported.

Results

Table 1 provides a summary of descriptive statistics for

Table 1: Descriptive data overall and by race.

Vars	Level	Overall	White	African American	Asian	Other/Mixed	P
N		22,538	15,546	2,872	424	3,696	
		Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	
Age (Month) *		141.18 (12.01)	141.48 (12.09)	140.08 (11.41)	141.45 (12.27)	140.72 (12.06)	< 0.001
Log (Adverse Experiences)*		1.07 (1.34)	1.08 (1.31)	0.97 (1.44)	0.56 (1.37)	1.16 (1.35)	< 0.001
		n(%)	n(%)	n(%)	n(%)	n(%)	
Family Structure (Married)*	No	6511 (28.9)	3121 (20.1)	1961 (68.3)	66 (15.6)	1363 (36.9)	< 0.001
	Yes	16027 (71.1)	12425 (79.9)	911 (31.7)	358 (84.4)	2333 (63.1)	
Gender*	Female	10731 (47.6)	7273 (46.8)	1425 (49.6)	205 (48.3)	1828 (49.5)	0.003
	Male	11807 (52.4)	8273 (53.2)	1447 (50.4)	219 (51.7)	1868 (50.5)	
Parental Education*	< HS Diploma	649 (2.9)	256 (1.6)	194 (6.8)	7 (1.7)	192 (5.2)	< 0.001
	HS Diploma/GED	1552 (6.9)	632 (4.1)	564 (19.6)	3 (0.7)	353 (9.6)	
	Some College	5677 (25.2)	3247 (20.9)	1159 (40.4)	34 (8.0)	1237 (33.5)	
	Bachelor	6284 (27.9)	4804 (30.9)	483 (16.8)	111 (26.2)	886 (24.0)	
	Post Graduate Degree	8376 (37.2)	6607 (42.5)	472 (16.4)	269 (63.4)	1028 (27.8)	
Family Income *	< 50K	5885 (26.1)	2639 (17.0)	1804 (62.8)	60 (14.2)	1382 (37.4)	< 0.001
	> =50K& < 100K	6691 (29.7)	4872 (31.3)	680 (23.7)	96 (22.6)	1043 (28.2)	
	> =100K	9962 (44.2)	8035 (51.7)	388 (13.5)	268 (63.2)	1271 (34.4)	
Ethnicity	Non- Hispanic	18564 (82.4)	13151 (84.6)	2731 (95.1)	385 (90.8)	2297 (62.1)	< 0.001
	Hispanic	3974 (17.6)	2395 (15.4)	141 (4.9)	39 (9.2)	1399 (37.9)	

*p < 0.05 for comparison of racial groups

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both the overall sample and split by race. Our secondary analysis was performed on 22,538 nested observations that belonged to 11,023 9-10 years old children followed over time. On average, each participant had two observations and the total number of observations by race were White (n = 15,546; 69.0%), African American (n = 2,872; 12.7%), Asian (n = 424; 1.9%), and other/mixed race (n = 3,696; 16.4%). Racial groups differed in age, gender, family education, income, structure, and exposure to impactful adverse experiences during the transition to adolescence.

Multivariate Analysis

Table 2 shows the model fits. Model 3 with family structure by race interactions showed the best fit, followed by Model 1 with main effects only. Model 2 with family income by race interactions showed the worst fit.

Table 3 summarizes the results of two regression models in the overall (pooled) sample. Model 1 (Main Effect Model) showed inverse associations between family income and exposure to adverse life experiences during transition to adolescence. Model 2 showed that the association between family income and exposure to adverse life experiences varies by race. The protective effect of high family income on children's exposure to adverse life experiences was weaker for African American

and mixed/other race than White children (Appendix Figure 1 and Appendix Figure 2).

Table 4 summarizes the results of a regression model in the overall (pooled) sample. *Model 1* (Main Effect Model) showed an inverse association between married family structure and exposure to adverse life experiences during transition to adolescence. *Model 3* showed that the association between family structure and exposure to adverse life experiences among children during their transition to adolescence varies by race. The protective effect of a married family structure on children's exposure to adverse life experiences was weaker for African American than White children (Appendix Figure 1 and Appendix Figure 2).

Table 2: Fit across models.

	Model 1	Model 2	Model 3
N	22,538	22,538	22,538
R-squared	0.02276	0.02331	0.02324
ΔR-squared	0.0083	0.00767	0.01191
ΔR-squared %	0.83%	0.77%	1.19%

Model 1: Main Effects of SEP Indicators + Covariates
Model 2: Main Effects of SEP Indicators + Covariates + Race x Family Income
Model 3: Main Effects of SEP Indicators + Covariates + Race x Family Structure

Table 3: Summary of regression in the absence and presence of interactions between race and family income.

	Estimate	Std. Error	p	Estimate	Std. Error	p
		Model 1			Model 2	
Family Structure (Married)	-0.44	0.03	< 0.001	-0.45	0.03	< 0.001
Age (Month)	0.00	0.00	0.012	0.00	0.00	0.013
Gender (Male)	-0.08	0.02	< 0.001	-0.08	0.02	0.000
Ethnicity (Hispanic)	-0.20	0.04	< 0.001	-0.21	0.04	< 0.001
Race						
White				Reference		
African American	-0.33	0.04	< 0.001	-0.41	0.06	< 0.001
Asian	-0.52	0.08	< 0.001	-0.44	0.22	0.048
Other/Mixed	0.02	0.03	0.586	-0.08	0.06	0.173
Parental Education						
Less than HS Diploma	Reference			Reference		
HS Diploma/GED	0.24	0.08	0.003	0.24	0.08	0.003
Some College	0.56	0.07	< 0.001	0.55	0.07	< 0.001
Bachelor	0.56	0.08	< 0.001	0.54	0.08	< 0.001
Post Graduate Degree	0.58	0.08	< 0.001	0.57	0.08	< 0.001
Family Income						
< 50K	Reference			Reference		
> =50K& < 100K	-0.08	0.04	0.046	-0.11	0.05	0.018
> =100K	-0.32	0.04	< 0.001	-0.38	0.05	< 0.001
Family Income > =100K x African American				0.30	0.11	0.006
Family Income > =50K& < 100K x African American				0.04	0.09	0.687
Family Income > =100K x Asian				-0.02	0.24	0.944
Family Income > =50K& < 100K x Asian				-0.28	0.28	0.325
Family Income > =100K x Other/Mixed				0.18	0.08	0.025
Family Income > =50K& < 100K x Other/Mixed				0.10	0.08	0.248

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Table 4: Summary of regression in the absence and presence of interactions between race and family structure.

	Estimate	Std. Error	p	Estimate	Std. Error	p
		Model 1			Model 2	
Family Structure (Married)	-0.44	0.03	< 0.001	-0.51	0.04	< 0.001
Age (Month)	0.00	0.00	0.012	0.00	0.00	0.014
Gender (Male)	-0.08	0.02	< 0.001	-0.08	0.02	0.000
Ethnicity (Hispanic)	-0.20	0.04	< 0.001	-0.21	0.04	< 0.001
Race						
White	Reference			Reference		
African American	-0.33	0.04	< 0.001	-0.44	0.05	< 0.001
Asian	-0.52	0.08	< 0.001	-0.45	0.22	0.035
Other/Mixed	0.02	0.03	0.586	-0.07	0.06	0.263
Parental Education						
Less than HS Diploma	Reference			Reference		
HS Diploma/GED	0.24	0.08	0.003	0.24	0.08	0.003
Some College	0.56	0.07	< 0.001	0.55	0.07	< 0.001
Bachelor	0.56	0.08	< 0.001	0.54	0.08	< 0.001
Post Graduate Degree	0.58	0.08	< 0.001	0.57	0.08	< 0.001
Family Income						
< 50K	Reference			Reference		
> =50K& < 100K	-0.08	0.04	0.046	-0.32	0.04	< 0.001
> =100K	-0.32	0.04	< 0.001	-0.08	0.04	0.029
Family Structure (Married) x African American				0.25	0.08	0.002
Family Structure (Married) x Asian				-0.07	0.23	0.765
Family Structure (Married) x Other/Mixed				0.12	0.07	0.093

Discussion

Although family income and married family structure protected children against exposure to adverse life experiences during transition to adolescence, these effects were weaker for African American than White adolescents. Similarly, the effect of married family structure on children against exposure to adverse life experiences was weaker for other/mixed race than White children.

Our finding is a replication of our previous cross-sectional comparison between African American and White children, expanded to include longitudinal data and compare across all races. Our findings indicated diminished returns of family income and structure on future exposure to adverse life experiences during transition to adolescence for African American adolescents relative to Whites. In other words, high SEP better translates to less exposure to adverse life experiences during adolescence for White than African American or other/mixed race families. Thus, White children from married high-income families report fewer adverse life experiences during the transition to adolescence than African American children from married high income families.

These results replicate and extend other MDRs findings. Similar MDRs are documented for various SEP resources, age groups, and outcomes[30,31]. The literature has frequently documented MDRs for SEP indicators such as family income and family structure[32,35,45,46]. This paper suggests that higher-than-expected and disproportionate exposure to adverse life experiences during childhood and transition to adolescence may be one of the main explanatory mechanisms for higher rates of anxiety, depression, suicide, and health problems in racial minority children[32,35,45,46] and adults[23,24,47-49] across SEP levels. Thus, adverse life events contribute to the development of poor behavioral, physical, and mental health outcomes[6,50,51].

While MDRs are well described, the societal and contextual processes that explain MDRs are still unknown. One potential explanation for our finding is segregation. African American families may remain in poor neighborhoods across SEP lines, with their children attending under resourced schools[52,53]. As a result of residing in this high-risk environment, environmental exposures are increased in high SEP African American families compared to high SEP Whites. In such a high-risk and low-resource social context, adolescents may be exposed to aggression from whom? peers? parents? neighborhood violence? and other stressors[54,55].

Researchers have attributed MDRs to structural and institutional racism[30,56]. Childhood poverty may reduce the protective effect of high SEP attained as an adult[57]. Prejudice and discrimination also interfere with the expected benefits of increased family income and married family structure for minority families[24,48,49]. Multilevel economic and societal mechanisms may explain the persistence of MDRs across generations[30,56].

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There is an ongoing need for a more comprehensive body of research focused on understanding the multifaceted roles of peers, neighborhoods, schools, and family context in the continued risk present in high SEP African American adolescents. Studies are needed to ascertain the extent to which schools, neighborhoods, family environments, and peer interactions contribute to the enduring adverse life conditions experienced by high SEP African American adolescents. Additionally, there is a pressing need to investigate whether additional environmental exposures can amplify the effects of risk factors faced by adolescents in at-risk demographic groups. To address these critical research gaps, studies must delve into the interactions and relative contributions of these key factors in the lives of high SEP African American adolescents. By exploring the intricate connections between these environmental and social determinants, we can gain insights into the nuanced factors that influence the life trajectories and well-being of high SEP African American adolescents. Furthermore, such research can inform evidence-based strategies to provide targeted support and resources that address the unique challenges faced by this population, ultimately promoting greater equity and improved outcomes in their lives[58]. At the population level, researching the combined effects of economic and social determinants of health help to identify social or public policies that can equalize the returns of SEP indicators, and which strategies can best reduce the undesired effects of racial segregation in the lives of high SEP African American adolescents[59].

Implications

Based on our findings, the following policies and directions can be suggested to reduce the impact of adverse life events on the lives of high SEP African American adolescents: First is to focus on reducing racism. Racism is a key factor that diminishes the returns of family SEP for racial minorities. Therefore, it is important to work towards reducing racism and discrimination against racial minority groups, particularly African Americans. Policy efforts should focus on promoting equity and inclusion in all aspects of life, particularly employment. Second is to strengthen the social support available for racial minority adolescents across SEP lines. Social support is an important factor in reducing stress and promoting mental health. Policies and programs should focus on increasing access to social support networks for high SEP racial minority adolescents. This can be achieved through programs that promote community involvement, peer mentoring, and family engagement. Third is to provide resources for coping with stress. Policies and programs may provide resources and support for coping with stress in African American communities, neighborhoods, and schools. This can include mental health services, stress management programs, and educational resources that improve adolescents' coping strategies. Fourth is to improve access to counseling at schools. Policies should focus on improving access to free psychological services in urban areas with high concentration of African American families. Finally, we should educate parents and providers regarding high prevalence of stress in the lives of high SEP African American adolescents.

Limitations

This study had a few methodological limitations. We only focused on race as a marginalizing identity. Sexual orientation, nativity, citizenship, and gender identity are other sources of marginalizing identities that may reduce the returns of family SEP indicators[45,60-62]. Similarly, this study only investigated family-level SEP indicators, though we did not have access to family wealth measures. It is still unknown if neighborhood-level SEP also shows any sign of diminished returns. The study also did not investigate any intersectionality between race and gender in this population. In addition, we did not perform multiple comparison corrections. Finally, our analysis measures did not specify factors such as segregation or neighborhood conditions, reports of race-based discrimination of child or family, etc. as possible bases for these diminished returns. Future research may also test if neighborhood SEP or racial or SEP segregation explains diminished returns of family SEP on adverse life experiences. By including contextual data from neighborhoods, schools, friends, and families, we would better understand what factors cause diminished returns of family SEP for racial minorities.

Conclusion

Compared to Whites, racial minority adolescents from high income and married families report higher exposure to adverse life experiences during their transition to adolescence. Higher exposure to adverse life experiences may explain why high SEP racial minority adolescents remain at risk for negative health outcomes that is disproportionate to their SEP. As adverse life events are known risk factors for health and development, efforts should be made to prevent stress in the lives of middle-class minority families.

Disclosures

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Development (ABCD) Study (https://abcdstudy.org), held in the NIMH Data Archive (NDA). This is a multisite, longitudinal study designed to recruit more than 10,000 children age 9-10 and follow them over 10 years into early adulthood.

**Conflicts of Interest:** None.

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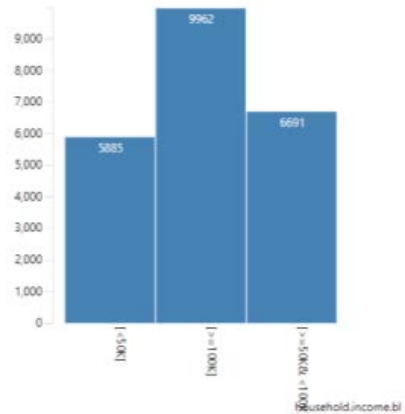
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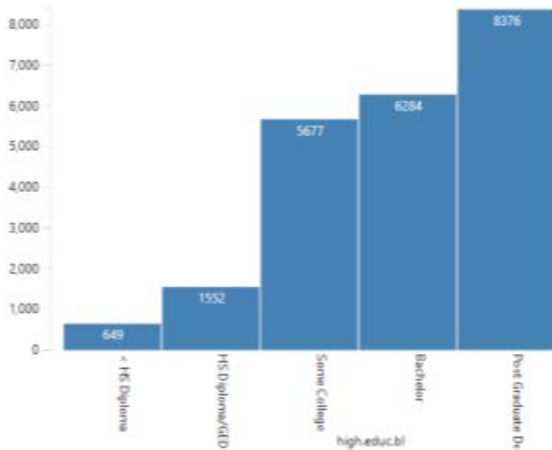Journal of Mental Health & Clinical Psychology

Appendix 1

Calculation of the outcome:
life_events_phenx_ss_affect_sum_p
ple_p_ss_affect_sum
How Much Affected Sum: Validation: No Minimum
sum([ple_died_fu2_p], [ple_injured_fu2_p], [ple_crime_fu2_p], [ple_friend_fu2_p], [ple_friend_injur_fu2_p], [ple_financial_fu2_p], [ple_sud_fu2_p], [ple_ill_fu2_p], [ple_injur_fu2_p], [ple_argue_fu2_p], [ple_job_fu2_p], [ple_away_fu2_p], [ple_arrest_fu2_p], [ple_friend_died_fu2_p], [ple_mh_fu2_p], [ple_sib_fu2_p], [ple_victim_fu2_p], [ple_separ_fu2_p], [ple_law_fu2_p], [ple_school_fu2_p], [ple_move_fu2_p], [ple_jail_fu2_p], [ple_step_fu2_p], [ple_new_job_fu2_p], [ple_new_sib_fu2_p])
https://nda.nih.gov/data_structure.html?short_name=abcd_mhy02

Model 1
log.life_events_phenx_ss_affect_sum_p ~ married.bl + age + sex + high.educ.bl + race.4level + household.income.bl + hisp
Random: ~(1|abcd_site)+(1|rel_family_id)+(1|src_subject_id)

Model 2
log.life_events_phenx_ss_affect_sum_p ~ married.bl + age + sex + high.educ.bl + race.4level + household.income.bl + hisp + household.income.bl x race.4level
Random: ~(1|abcd_site)+(1|rel_family_id)+(1|src_subject_id)

Model 3
log.life_events_phenx_ss_affect_sum_p ~ married.bl + age + sex + high.educ.bl + race.4level + household.income.bl + hisp + married.bl x race.4level
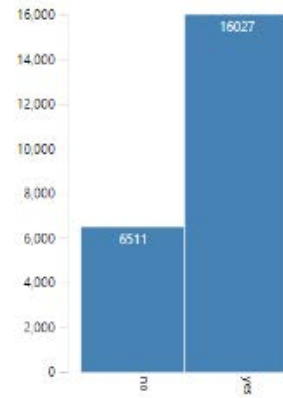Random: ~(1|abcd_site)+(1|rel_family_id)+(1|src_subject_id)
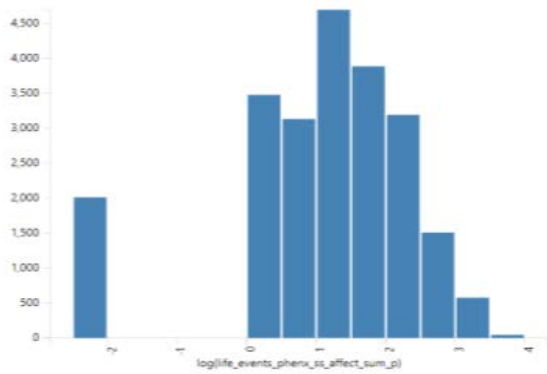
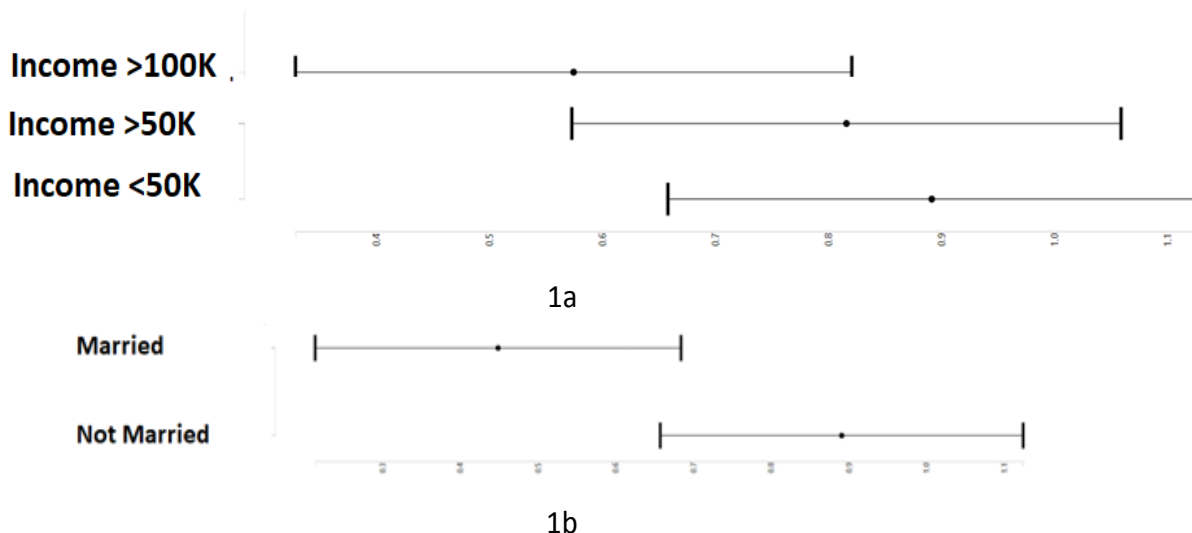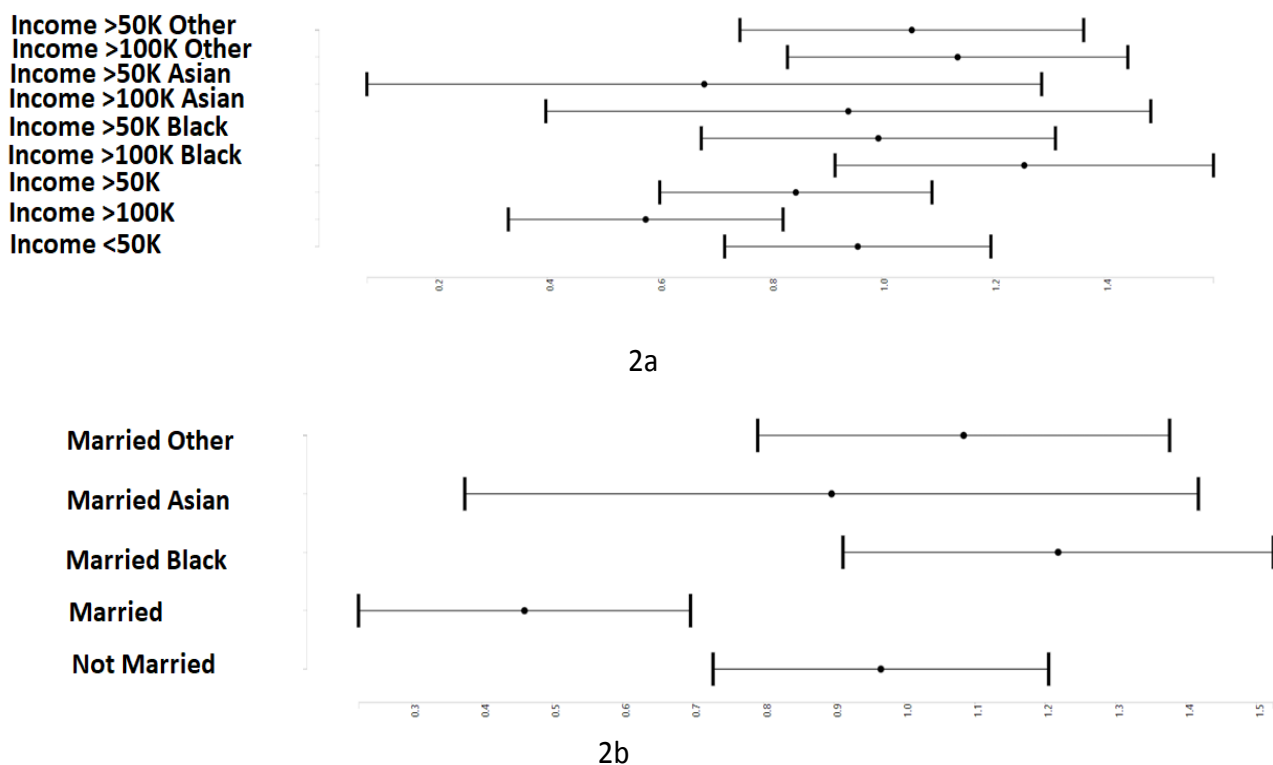Outcome (log of adverse life experiences)

Family Income

Educational Attainment

Family Structure

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1a

1b

Appendix Figure 1: Least square mean score of log (adverse life experience) by intersections of family income (1a), and family structure (1b) overall during transition to adolescence

2a

2b

Appendix Figure 2: Least square mean score of log (adverse life experience) by intersections of family income (2a), and family structure (2b) by race during transition to adolescence