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Sexual Orientation Identity Change, Developmental Trajectories of Depressive Symptoms, and Childhood Abuse from Adolescence to Young Adulthood

Abstract

Purpose: This study tested differences between youths who reported being heterosexual at ages 15.5 and 21, and those who changed from reporting being heterosexual at age 15.5 to non-heterosexual at age 21, in the developmental trajectories of depressive symptoms from age 22 to 24 years, and whether these longitudinal patterns were explained by childhood and adolescent abuse.

Methods: The Avon Longitudinal Study of Parents and Children (ALSPAC) was used (849 male youths and 1455 female youths). Youths' self-reported sexual orientation was measured at ages 15.5 and 21, and depressive symptoms were measured at ages 22, 23 and 24.

Childhood and adolescent abuse between birth and 17 years were reported by youths and their mothers.

Results: Male and female youths who changed from reporting being heterosexual to non-heterosexual reported significantly more depressive symptoms than their consistently heterosexual counterparts at all three ages (except the association for male youths at age 24), with total effects (unstandardized regression coefficients) ranging from 2.00 to 5.27. These associations were weakened but remained statistically significant when childhood and adolescent abuse was controlled for, with direct effects ranging from 1.50 to 4.68. These associations were mediated through childhood and adolescent abuse, with indirect effects ranging from 0.48 to 0.58. Differences between youths who consistently reported being heterosexual and those who changed from reporting being heterosexual to non-heterosexual in depressive symptoms decreased from age 22 to 24 years, possibly due to the success of identity integration.

Discussion: Childhood and adolescent abuse may partially explain these developmental disparities.

Keywords: sexual orientation, depressive symptoms, abuse, early adulthood, ALSPAC

There is growing interest in the association between change in sexual orientation and psychopathology. However, the underlying mechanisms remain understudied. Here we test, for the first time, differences between youths who consistently reported being heterosexual and those who changed from reporting being heterosexual to non-heterosexual (lesbian, gay, and bisexual) in their developmental trajectories of depressive symptoms in early adulthood, and whether those longitudinal patterns were explained by childhood and adolescent abuse.

Reported sexual orientation appears relatively stable from adolescence to early adulthood [1], with women being more likely to report change in sexual orientation than men (for review, see [2]), and bisexual individuals being more likely to report change in sexual orientation than heterosexual individuals [2]. Studies also suggest that individuals who reported change in sexual orientation were at increased risk of poorer mental health than those whose sexual orientation remained unchanged [3,4]. This association was moderated by the direction of changes (towards a more same-sex- or opposite-sex-orientation). Individuals who reported change in sexual identity towards a more opposite-sex-orientation did not differ from those who consistently reported being heterosexual in depressive symptoms [5,6] and substance use [7]. However, compared with individuals who consistently reported being heterosexual, those who changed from reporting being heterosexual to non-heterosexual were at increased risk of depressive symptoms [8,9], substance use [7,10], and suicidal ideation [11,12], though the effect sizes were small or moderate. It is hypothesized that a transition from heterosexual to non-heterosexual may bring about novel minority stressors (e.g., internalized homophobia and identity management) due to the discrimination targeting the now non-heterosexual individuals, which increase their risk of poorer mental health [2,13]. However, studies show that the increased risk of poorer mental health associated with transition from heterosexual to non-heterosexual compared with consistently heterosexual only reduced in magnitude, but remained statistically significant, after adjusting for certain

stressors (such as discrimination [5,14]). Thus, alternative explanations to minority stress should be considered empirically.

Adolescents who display greater childhood gender nonconformity (gender expression incongruent with societal gender norms or expectations) have been shown to be more likely to change from reporting being heterosexual to non-heterosexual between adolescence and early adulthood [1]. Thus, youths who change from reporting being heterosexual to non-heterosexual may be preconceived as non-heterosexual before sexual orientation transition since gender nonconforming individuals tend to be categorized as non-heterosexual by others [16]. Minority stress theory suggests that non-heterosexual youths are at increased risk of poorer mental health than heterosexual youths due to more discrimination or victimization targeting non-heterosexuality [17]. Accordingly, greater childhood gender nonconformity displayed by youths who changed from reporting being heterosexual to non-heterosexual may increase their risk of experiencing abuse in both childhood and adolescence [15,18], resulting in poorer mental health in early adulthood. This is because childhood gender nonconformity may act as a behavioral forecast of later non-heterosexuality which attracts stigma and discrimination from others throughout childhood [15]. Gender role conflict theory also proposes that, under the socio-cultural pressure to conform to gender norms, greater childhood gender nonconformity displayed by youths who changed from reporting being heterosexual to non-heterosexual may lead to internalized self-criticism, self-imposed restrictions on one's own behaviors (including concealment and appearance management), and being abused by others in childhood and adolescence, resulting in poorer mental health in early adulthood [19]. Thus, childhood and adolescent abuse provides one developmentally *early* mechanism for the association between reported sexual orientation change *later* in adolescence, and/or in young adulthood, and poor health outcomes. This may be important as

it suggests the health effects are not due to the change in reported sexual orientation per se, but with antecedent processes.

With maturation during adulthood, self-acceptance, and psychological resources for coping with stress appear to increase [20]. Non-heterosexual individuals also began to disclose their sexual orientation to friends and families in early twenties [21], which may be associated with a loss of social support in some domains (e.g., family or peers) but greater social support or new social networks in others (e.g., among other sexual minorities) [22]. Thus, resources to cope with stress associated with transition from heterosexual to non-heterosexual may start to accumulate from early adulthood, which may help buffer the negative effect of abuse on the association between change in reported sexual orientation and mental health outcomes. In addition, such youth may set themselves on the path towards greater sexual and social identity integration which may be associated with less psychological distress over time [23].

Here, we test differences between youths who reported being heterosexual at ages 15.5 and 21 and youths who changed from reporting being heterosexual at age 15.5 to non-heterosexual at age 21 in their developmental trajectories of depressive symptoms from age 22 to 24 years, and whether those longitudinal patterns were partially explained by childhood and adolescent abuse. Developmental models of sexual identity suggest there may be important developmental periods and milestones for sexual identity, particularly during adolescence to early adulthood. Such milestones may include first awareness of same-sex attraction, sexual exploration with same-sex and opposite-sex partners, self-identification as non-heterosexual, and disclosure of one's non-heterosexual sexual orientation to others [24,25]. First awareness of same-sex attraction and self-identification as non-heterosexual among non-heterosexual youths have been found to be at about 15 years and about 20 years, respectively [24,25]. Thus, we focused on change in sexual orientation between ages 15.5 and

21 since it closely overlaps with those sexual identity milestones. Youths may be more likely to report change in sexual orientation during this time after which relative stability may be observed [1]. The Avon Longitudinal Study of Parents and Children (ALSPAC), a British prospective birth cohort, was used. We hypothesized that youths who changed from reporting being heterosexual to non-heterosexual would be at increased risk of depressive symptoms than youths who consistently reported being heterosexual at all three ages and the group differences would decrease from age 22 to 24 years. We also hypothesized that these associations would be partially accounted for by childhood and adolescent abuse.

Methods

Participants

Participants were part of the ALSPAC. Pregnant women resident in the Bristol area of the Southwest of UK with expected delivery dates between 1st April 1991 and 31st December 1992 were invited to participate the ALSPAC. Following this initial recruitment, subsequent attempts were made to bolster the sample, resulting in 15,658 fetuses and 14,901 children who were alive at one year of age [26-28]. Self-completed questionnaires by children have been collected via postal or email questionnaires since the age of 5 years and 5 months. Study data were collected and managed using Research Electronic Data Capture (REDCap) tools hosted at the University of Bristol [29]. REDCap is a secure, web-based software platform designed to support data capture for research studies. The study website contains details of all the data that are available through a fully searchable data dictionary and variable search tool (<http://www.bristol.ac.uk/alspac/researchers/our-data/>). Youths who reported being heterosexual at ages 15.5 and 21 or changed from reporting being heterosexual at age 15.5 to non-heterosexual at age 21, and at least one valid assessment of depressive symptoms at ages 22, 23, and 24 were included, $N = 2,304$ (849 male youths and 1455 female youths). Gender identity was not available in ALSPAC. Ethical approval for the study was obtained from the

ALSPAC Ethics and Law Committee and the Local Research Ethics Committees. Informed consent for the use of data collected via questionnaires and clinics was obtained from participants following the recommendations of the ALSPAC Ethics and Law Committee at the time.

Measures

Sexual Orientation

Youths' self-reported sexual orientation at ages 15.5 and 21 was measured via one item: "Please choose the description that best fits how you think about yourself" on a 5-point Kinsey-like scale: 1 = 100% heterosexual, 2 = mostly heterosexual but also attracted to the same sex, 3 = bisexual (equally attracted to both sexes), 4 = mostly homosexual but also attracted to the opposite sex, 5 = 100% homosexual, 6 = not sexually attracted to either sex, and 7 = not sure. Over 83% youths who reported being mostly heterosexual remained in the heterosexual (100% or mostly heterosexual) category, and mostly heterosexual youths were more similar to 100% heterosexual than non-heterosexual youths in depressive symptoms. Thus, youths who reported being 100% or mostly heterosexual at 15.5 and 21 were coded as consistently heterosexual and those who reported being 100% or mostly heterosexual at 15.5 and being bisexual, 100% or mostly homosexual at 21 were coded as a transition from being heterosexual to non-heterosexual. Youths who reported being "not sexually attracted to either sex" and "not sure" at age 15.5 were excluded from analyses given the small cell sizes of transition patterns (e.g., only eight youths who reported being "not sexually attracted to either sex" at ages 15.5 with sexual orientation available at age 21). Youths who reported being non-heterosexual at 15.5 and 21 and had a transition from being non-heterosexual at age 15.5 to heterosexual at age 21 were also excluded from analyses due to a low rate of abuse (Supplemental Table 1). As a result, 801 consistently heterosexual male youths, 48 male youths with a transition from being heterosexual to non-heterosexual, 1410 consistently

heterosexual female youths, and 45 female youths with a transition from being heterosexual to non-heterosexual were included. With our sample size, we have 95% power to detect a medium effect (Cohen's $d = 0.5$) at the 5% significance level for both male and female youths.

Childhood and Adolescent Abuse

Youths' experiences of emotional, physical, and sexual abuse between birth and 17 years were reported by youths and their mothers and derived by Croft et al. (2019) [30]. Example items were whether adults had said hurtful or insulting things to the youth (emotional abuse), whether the youth has been hit, kicked, punched, or attacked with the intention of hurting them (physical abuse), and whether the youth has been forced by an adult or older child into sexual activity (sexual abuse). Each type of abuse was classified as present if a response of "yes" was given to any of the included questions for the corresponding abuse and classified as absent if a response of "yes" was never given to any of the included questions and a response of "no" was given to at least one question for the corresponding abuse [30].

Childhood and adolescent abuse were classified as present if emotional, physical, or sexual abuse was present, and classified as absent if emotional, physical, and sexual abuse were absent.

Depressive Symptoms

Youths' self-reported depressive symptoms at ages 22 (the mean age at completion), 23, and 24 years were measured via the Short Mood and Feelings Questionnaire (SMFQ) [31]. The SMFQ has 13 items assessing the presence of depressive symptoms in the past two weeks (e.g., I cried a lot). Each item was rated on a 3-point scale ranging from 0 = *not true* to 2 = *true*. SMFQ has acceptable reliability and validity [31]. The total score of 13 items was used, with a higher score indicating more depressive symptoms.

Potential Confounders

Potential confounders that were associated with both sexual orientation and depression [32,33] and available in the ALSPAC were chosen. These included maternal age at birth, youths' mother-reported paternal age at birth, birthweight (kilograms), youths' mother-reported duration of breastfeeding (months) at age 1.25 years, youths' mother-reported number of older brothers youths lived with at age 0.5 years, and parental absence (a derived variable based youths' mother-reported age of youths when biological father/mother stopped living with youth before age seven), and childhood gender nonconformity measured via Preschool Activities Inventory at ages 2.5, 3.5 and 4.75 and reported by youths' mothers. Details have been described elsewhere [33]. Ethnicity was not included since ethnicity was not associated with change in sexual orientation (also see [13]).

Data Analysis

Missing Data

All analyses were conducted in Mplus 8.8. The variables had 1.88%-29.48% missing information (Supplemental Table 2 and 3). For latent growth analyses, missing information for depressive symptoms was handled using full information maximum likelihood estimation with robust standard errors (MLR), and missing information for abuse and potential confounders was handled using mentioning variances of those variables with missing in the MODEL command. For mediation analyses, missing information for depressive symptoms and abuse was handled using Bayesian Markov chain Monte Carlo estimation method, and missing information for potential confounders was handled using mentioning variances of confounding factors with missing in the MODEL command. Given the high proportion of missing information for potential confounders, sensitivity analysis comparing analyses using maximum likelihood estimation and complete-cases to handle missing information for confounding factors was not performed.

Latent Growth Analysis

To examine developmental trajectories of depressive symptoms from ages 22 to 24, linear latent growth models were used, with depressive symptoms measured at ages 22, 23, and 24 used as indicators (quadratic latent growth models were not performed given only three time points). We fixed the loadings of the slopes (the change rate in depressive symptoms from ages 22 to 24 years) to be the age differences in years between assessments, and loadings of the latent intercept (the average of depressive symptoms score at a chosen time point) to be one. Latent intercepts were set at the three ages (ages 22, 23, and 24) alternatively to estimate the average of depressive symptoms score for each age, respectively. The correlation between latent intercept and slope, and variances of the latent intercept and slope were freely estimated. Any potential multivariate normality violation was handled using MLR.

A two-step hierarchical latent growth model was used to examine differences between youths who consistently reported being heterosexual and those who changed from reporting being heterosexual to non-heterosexual in depressive symptoms for each age (latent intercept) and the change in depressive symptoms from ages 22 to 24 (latent slope), and whether this association was confounded by childhood and adolescent abuse. First, change in reported sexual orientation as a predictor was included in the latent growth model, controlling for potential confounders (Model 1). In the second step, childhood and adolescent abuse was entered (Model 2). The extent to which the association between change in reported sexual orientation and depressive symptoms was explained by abuse was measured as the attenuation of estimates in Model 2 compared with Model 1. Analyses were stratified by sex since the association between change in reported sexual orientation and the latent intercept was moderated by sex.

Mediation Analysis

To test whether childhood and adolescent abuse act as a mediator of the association between change in reported sexual orientation and the average of depressive symptoms score for each

age (latent intercept from Model 2 of the latent growth model mentioned above), structural equation modelling was used to examine the hypothesized model shown in Figure 1. No mediation was performed for the average of depressive symptoms score at age 24 among male youths since the total effect was not statistically significant (Table 1). Latent intercepts were set at the three ages (ages 22, 23, and 24) alternatively to estimate the average of depressive symptoms score for each age, respectively. A Bayesian Markov chain Monte Carlo estimation method based on Mplus' default non-informative priors was used, which did not assume normality [34]. This method treats the binary mediator as a continuous latent variable and fits the data using linear regression for abuse and depressive symptoms. Three chains were requested for the Gibbs sampler, and 10000 iterations was specified. No obvious cause for concern regarding the convergence was found based on trace plots, posterior distribution using histograms, autocorrelation plots, and proportional scale reduction factor. The median (point estimate), total effect, indirect effect, direct effect, and 95% Bayesian Credible Intervals were reported. Analyses were stratified by sex since the association between change in reported sexual orientation and depressive symptoms was moderated by sex.

Results

Change in Reported Sexual Orientation and Depressive Symptoms in Latent Growth Analysis

All latent growth models had acceptable model fit statistics (Table 1). Male and female youths who changed from reporting being heterosexual to non-heterosexual reported significantly more depressive symptoms than their consistently heterosexual counterparts at all three ages (except the association for male youths at age 24; Model 1, Table 1) and the group differences decreased from age 22 to 24 years, ranging from 1.98 to 5.26, all $ps < .05$. Those associations (except the association for male youths at age 24) were weakened but

remained statistically significant when childhood and adolescent abuse was controlled for, ranging from 1.71 to 4.90, all $ps < .05$ (Model 2, Table 1). For male youths, childhood and adolescent abuse explained 9.09%, 13.64%, and 27.84% of the association between change in reported sexual orientation and depressive symptoms at three ages, respectively. For female youths, the corresponding figures were 6.84%, 8.14%, and 10.05%, respectively.

The Mediating Effect of Childhood and Adolescent Abuse

The unstandardized path coefficients were shown in Figure 2. Male and female youths who changed from reporting being heterosexual to non-heterosexual reported significantly more depressive symptoms than their consistently heterosexual counterparts at all three ages (except the association for male youths at age 24), with total effects ranging from 2.00 to 5.27, all $ps < .01$. Those associations were weakened but remained statistically significant when childhood and adolescent abuse was controlled for, with direct effects ranging from 1.50 to 4.68, all $ps < .05$. More depressive symptoms reported by male and female youths who changed from reporting being heterosexual to non-heterosexual compared to their consistently heterosexual counterparts were significantly mediated through childhood and adolescent abuse, with indirect effects ranging from 0.48 to 0.58, all $ps < .05$. The degree of mediation by childhood and adolescent abuse was 16.05% and 24.50% for male youths at ages 22 and 23, respectively. For female youths, the degree of mediation by childhood and adolescent abuse were 11.01%, 12.26%, and 14.14% for ages 22, 23, and 24, respectively.

Discussion

Male and female youths who changed from reporting being heterosexual to non-heterosexual reported significantly more depressive symptoms than their consistently heterosexual counterparts in early adulthood, which was consistent with some prior research [8,9]. Childhood and adolescent abuse explained less than 25% of the association between change in reported sexual orientation and depressive symptoms. Youths who change sexual

orientation reports may be at increased risk of experiencing abuse in both childhood and adolescence [15,18] in part due to their greater gender nonconformity which attracts stigma and discrimination from others and so results in more depressive symptoms in early adulthood [17]. Future work should explore ways to minimize victimization and other minority stressors faced by those who eventually report a non-heterosexual identity.

The associations between change in reported sexual orientation and depressive symptoms were weakened but remained statistically significant after controlling for childhood and adolescent abuse. This suggests that explanations other than childhood and adolescent victimization may also explain those associations. According to identity control theory [35], transitioning from heterosexual to non-heterosexual is often precipitated by cognitive dissonance between maintaining a heterosexual identity and experiencing same-sex attraction or sexual behaviors, which may be associated with increased risk of greater psychological distress and more depressive symptoms. Alternatively, transitioning from heterosexual to non-heterosexual may bring about novel minority stressors (e.g., internalized homophobia and loss of familial social support [2]) due to the discrimination or stigma targeting non-heterosexual individuals, which may then increase the risk of more depressive symptoms.

We also found that differences between individuals who consistently reported being heterosexual, and those who had changed from reporting being heterosexual to non-heterosexual, in depressive symptoms decreased from age 22 to 24 years, which is consistent with some prior research [36]. From a developmental and identity formation perspective, youths who changed from reporting being heterosexual to non-heterosexual may gradually develop positive coping strategies, accept their non-heterosexual identity, disclose their sexual orientation to family and friends and widen their social networks outside the family environment (e.g., to include other sexual minority people), and achieve sexual and social

identity integration with maturation during adulthood [37]. These changes may be associated with decreased differences between youths who changed from reporting being heterosexual to non-heterosexual and those who consistently reported being heterosexual in depressive symptoms from early adulthood.

This study formally tested the mediating effect of childhood and adolescent abuse on the association between change in reported sexual orientation and developmental trajectories of depressive symptoms in early adulthood for the first time. Study strengths included using a large birth cohort in UK with high statistical power, analyses stratified by sex, measuring multiple types of abuse prospectively, and measuring depressive symptoms at multiple time points. However, there were several limitations. Youths who consistently reported being non-heterosexual and had a transition from being non-heterosexual to heterosexual were not compared to youths who reported a transition from heterosexual to non-heterosexual in the risk of depressive symptoms due to small cell sizes of youths who had experienced abuse. We did not examine whether our associations vary across different types of abuse due to small cell sizes of youths who had experienced abuse. We were uncertain whether youths who had a valid report of sexual orientation at age 15.5 had changed their sexual orientation multiple times before reaching age 21. We also did not quantify the magnitude of changes in reported sexual orientation (magnitude was quantified as changes in “steps” along the sexual identity scale). Finally, we did not examine the influences of change in specific minority stressors associated with change in reported sexual orientation (e.g., loss of social support) on depressive symptoms.

In sum, we found that male and female youths who changed from reporting being heterosexual to non-heterosexual reported significantly more depressive symptoms than their consistently heterosexual counterparts in early adulthood, and the group differences

decreased from age 22 to 24 years. Childhood and adolescent abuse may explain some of these developmental disparities but not all.

Implications and Contributions

Interventions designed to reduce sexual orientation-related disparities in mental health outcomes in youth or emerging adulthood may need to consider early life factors (such as childhood and adolescent maltreatment experienced by sexual minorities) and be sensitive to possible changes in reported sexual orientation at these times.

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Figure captions

Figure 1

Hypothesized Model Tested in the Mediation Analysis

Note. Latent intercepts were set at the three ages (ages 22, 23, and 24) alternatively to estimate the average of depressive symptoms score for each age, respectively (only intercept fixed at 22 was shown here as an example). For change in reported sexual orientation identity, youths who reported being heterosexual at 15.5 and 21 years are the reference group. For the paths from change in reported sexual orientation to abuse and the average of depressive symptoms score for each age, birthweight, duration of breastfeeding, parental age at birth, number of older brothers, average of gender nonconformity score at age 2.5, and the linear change in gender nonconformity from 2.5 to 4.75 years old were controlled for. Given that paternal and maternal age are highly correlated ($r = .66$), a summary score based on the first principal component extracted from the principal component analysis was used (the first component had an eigenvalue of 1.66 and explained 83.09% of the variation in parental age at birth).

Figure 2

Unstandardized Path Estimates from the Mediation Analysis Stratified by Sex

Note. The unstandardized path coefficients and their 95% credibility intervals were reported. No mediation was performed for the average of depressive symptoms score at age 24 among male youths since male youths who changed from reporting being heterosexual to non-heterosexual did not differ significantly from male youths who reported being heterosexual at 15.5 and 21 years in the average of depressive symptoms score at age 24. For change in reported sexual orientation, youths who reported being heterosexual at 15.5 and 21 years are the reference group. β_1 and β_2 represents the differences between youth who changed from reporting being heterosexual to non-heterosexual, and those who reported being heterosexual at 15.5 and 21 years, in the average depressive symptoms score at ages 22 (the top panel), 23 (the middle panel), and 24 (the bottom panel), and abuse for male and female youths, respectively. For the paths from change in reported sexual orientation to abuse and the average of depressive symptoms score for each age, birthweight, duration of breastfeeding, parental age at birth, number of older brothers, average of gender nonconformity score at age 2.5, and the linear change in gender nonconformity from 2.5 to 4.75 years old were controlled for. Given that paternal and maternal age are highly correlated ($r = .66$), a summary score based on the first principal component extracted from the principal component analysis was used (the first component had an eigenvalue of 1.66 and explained 83.09% of the variation in parental age at birth).

* $p < .05$. ** $p < .01$. *** $p < .001$

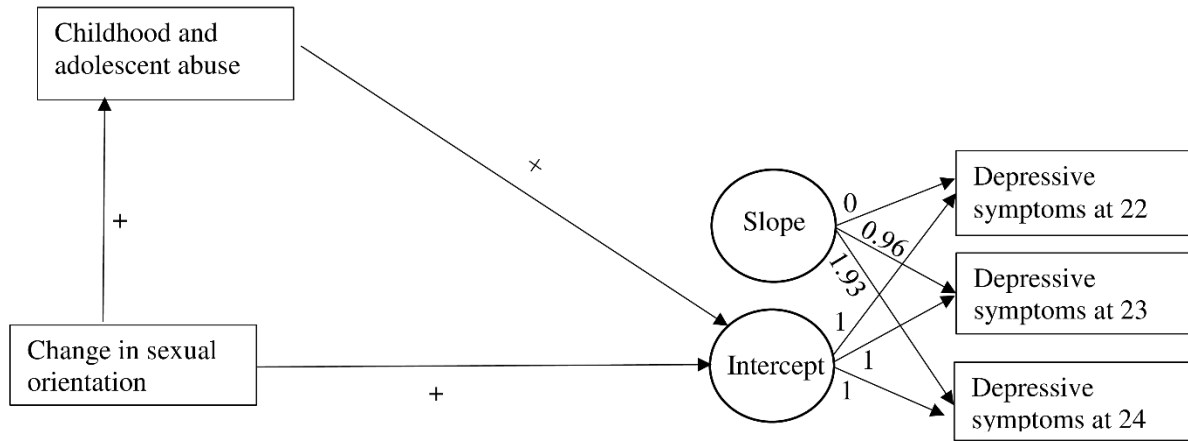


Figure 1

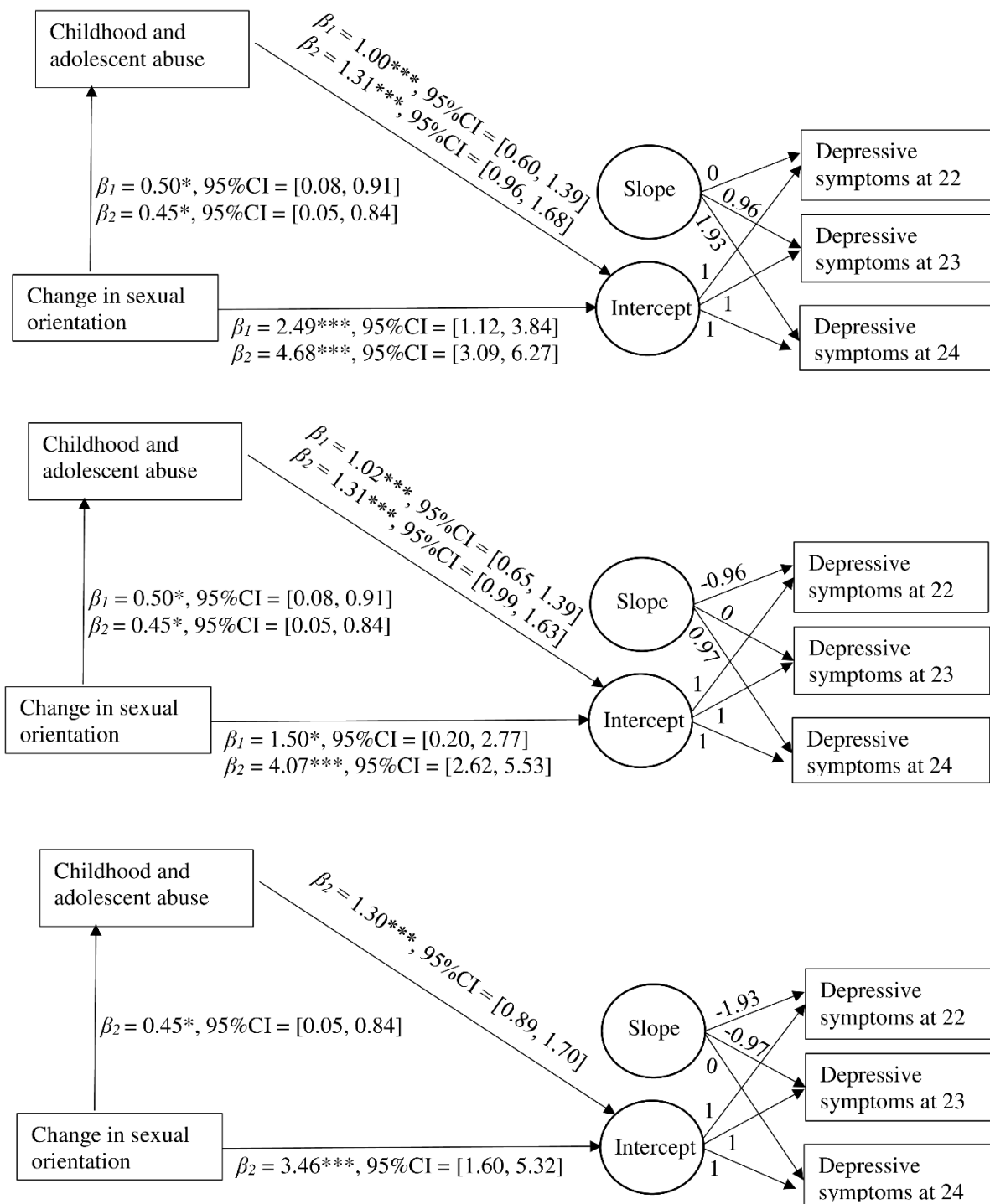


Figure 2

Supplemental Table 1*Descriptive Statistics for Abuse and Depressive Symptoms Stratified by Change in Reported Sexual Orientation and Sex.*

Sex	Variables	Change in reported sexual orientation		Missing, %
		Consistently heterosexual	Heterosexual to non-heterosexual	
Male youths	Abuse between birth and 17, <i>n</i> (%)			8.13
	No	478 (64.86)	22 (51.16)	
	Yes	259 (35.14)	21 (48.84)	
	Depressive symptoms at age 22			1.88
	<i>N</i>	786	47	
	<i>M</i> (<i>SD</i>)	4.44 (4.48)	7.26 (6.39)	
	Depressive symptoms at age 23			23.56
	<i>N</i>	608	41	
	<i>M</i> (<i>SD</i>)	4.87 (4.52)	6.24 (5.51)	
	Depressive symptoms at age 24			26.27
	<i>N</i>	588	38	
	<i>M</i> (<i>SD</i>)	5.70 (5.23)	6.79 (6.33)	
Female youths	Abuse between birth and 17, <i>n</i> (%)			9.76
	No	751 (59.04)	16 (39.02)	
	Yes	521 (40.96)	25 (60.98)	
	Depressive symptoms at age 22			2.68
	<i>N</i>	1372	44	
	<i>M</i> (<i>SD</i>)	5.74 (5.50)	10.55 (7.87)	
	Depressive symptoms at age 23			15.33
	<i>N</i>	1192	40	
	<i>M</i> (<i>SD</i>)	6.19 (5.39)	11.18 (7.01)	
	Depressive symptoms at age 24			17.04
	<i>N</i>	1172	35	
	<i>M</i> (<i>SD</i>)	6.92 (5.95)	10.83 (7.91)	

Note. “Consistently heterosexual” refers to youths who reported being heterosexual at 15.5 and 21 years. “Heterosexual to non-heterosexual” refers to youths who changed from reporting being heterosexual at 15.5 to reporting being non-heterosexual (lesbian, gay, and bisexual) at 21.

Supplemental Table 2*Descriptive Statistics for Potential Confounders Stratified by Change in Reported Sexual Orientation and Sex.*

Sex	Potential Confounders	Change in reported sexual orientation		Missing, %
		Consistently heterosexual	Heterosexual to non-heterosexual	
Male youth	Gender nonconformity at age 2.5			16.49
	<i>N</i>	1176	39	
	<i>M (SD)</i>	40.95 (8.16)	42.64 (6.31)	
	Gender nonconformity at age 3.5			11.34
	<i>N</i>	1249	41	
	<i>M (SD)</i>	36.88 (9.09)	38.54 (8.33)	
	Gender nonconformity at age 4.75			15.88
	<i>N</i>	1183	41	
	<i>M (SD)</i>	35.03 (9.21)	39.58 (11.13)	
	Maternal age at birth (years)			5.36
	<i>N</i>	1334	43	
	<i>M (SD)</i>	28.85 (4.37)	28.79 (4.52)	
	Paternal age at birth (years)			29.48
	<i>N</i>	990	36	
	<i>M (SD)</i>	31.64 (5.53)	30.53 (4.38)	
	Number of old brothers			5.64
	<i>N</i>	1331	42	
	<i>M (SD)</i>	0.37 (0.62)	0.33 (0.61)	
	Birthweight (kilograms)			6.67
	<i>N</i>	1315	43	
<i>M (SD)</i>	3.37 (0.50)	3.28 (0.73)		
Duration of breastfeeding (months)			10.31	
<i>N</i>	1264	41		
<i>M (SD)</i>	5.46 (4.69)	5.63 (4.94)		

	Parental absence before age 7, <i>n</i> (%)			15.26
	Both presence	1082 (90.77)	36 (87.80)	
	Either parent absence	110 (9.23)	5 (12.20)	
Female youth	Gender nonconformity at age 2.5			13.31
	<i>N</i>	696	40	
	<i>M (SD)</i>	59.25 (7.68)	57.46 (8.11)	
	Gender nonconformity at age 3.5			7.07
	<i>N</i>	745	44	
	<i>M (SD)</i>	60.92 (8.15)	54.30 (8.65)	
	Gender nonconformity at age 4.75			11.07
	<i>N</i>	711	44	
	<i>M (SD)</i>	63.44 (8.14)	55.05 (8.00)	
	Maternal age at birth (years)			3.89
	<i>N</i>	768	48	
	<i>M (SD)</i>	29.27 (4.32)	29.69 (4.37)	
	Paternal age at birth (years)			24.97
	<i>N</i>	599	38	
	<i>M (SD)</i>	32.05 (5.27)	32.21 (5.38)	
	Number of old brothers			3.77
	<i>N</i>	770	47	
	<i>M (SD)</i>	0.38 (0.63)	0.53 (0.78)	
	Birthweight (kilograms)			5.30
	<i>N</i>	756	48	
	<i>M (SD)</i>	3.50 (0.56)	3.44 (0.61)	
	Duration of breastfeeding (months)			8.13
	<i>N</i>	734	46	
	<i>M (SD)</i>	5.51 (4.56)	5.24 (5.14)	
	Parental absence before age 7, <i>n</i> (%)			10.95

Both presence	664 (93.39)	>40 (>88.89) ^a
Either parent absence	47 (6.61)	< 5 (<11.11) ^a

Note. “Consistently heterosexual” refers to youths who reported being heterosexual at 15.5 and 21 years. “Heterosexual to non-heterosexual” refers to youths who changed from reporting being heterosexual at 15.5 to reporting being non-heterosexual (lesbian, gay, and bisexual) at 21.

^aTo comply with Avon Longitudinal Study of Parents and Children publication requirements, exact numbers and percentages were not presented to ensure that identities of cell counts less than five cannot be recovered.