



The Developmental Collision Hypothesis: An Empirical Test With Three Generations of Sexual Minority Youth

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Abstract

Sexual minority youth experience disproportionate rates of mental health symptomatology relative to their heterosexual peers. Less is known about why these disparities have persisted despite growing public awareness of sexual diversity. The *developmental collision hypothesis* states that increased cultural visibility of sexual diversity has accelerated the developmental timing of sexual minority identity formation processes such that they collide with early adolescence, a uniquely sensitive period for experiencing identity-based stigma and associated mental health vulnerability. To test this hypothesis, levels and relations between ages of sexual minority identity development milestones, frequency of LGBT-related victimization, and depressive symptoms were examined across three age-matched but cohort-distinct samples of sexual minority adolescents. Data come from three secondary datasets of sexual minority youth who were adolescents in the 1990s, 2000s, and 2010s, respectively: the Challenges and Coping Study, the Victimization and Mental Health among High Risk Youths Study, and the Risk and Protective Factors for Suicide among Sexual Minority Youth Study ($n = 1312$; $M_{\text{age}} = 17.34$, $SD = 1.30$; 52% female). Adolescents from more recent cohorts reported earlier mean ages of several milestones but similar frequencies of LGBT-related victimization relative to those from less recent cohorts. Path analysis models showed that earlier milestones were associated indirectly with more depressive symptoms through LGBT-related victimization. Notably, earlier ages of self-identification and disclosure of a sexual minority identity were also directly related to less depressive symptoms. Few generational differences in relations between constructs emerged. Findings garner initial support for the developmental collision hypothesis and suggest that LGBT-related victimization, rather than earlier milestones themselves, increases mental health vulnerability.

Keywords Sexual minority youth · Developmental collision hypothesis · Victimization · Discrimination · Life course

Introduction

Over the past several decades in the United States, social attitudes regarding sexual diversity shifted rapidly and public awareness boomed. Such shifts caused some to postulate that sexual minority stress and sexuality-related mental health disparities should be diminishing (Savin-Williams, 2005). Instead, trend studies show that sexual minority youth experience elevated rates of depressive

symptoms compared to their heterosexual peers, and that these rates have persisted or even widened over time for some sexual minority youth (Kerr et al., 2024). To date, there have been few theoretical or empirical explorations regarding why sexual minority youth continue to experience stigma and mental health disparities despite growing visibility of sexual diversity. The *developmental collision hypothesis* proposes that increased public awareness of sexual diversity has created opportunities for sexual minority youth to identify, acknowledge, and disclose minoritized sexual identities at younger ages than in prior generations; the unfolding of these processes earlier during adolescence is developmentally normative but may also expose youth to uniquely health-threatening stigma and associated mental health vulnerability (Russell & Fish, 2019). The current study aims to empirically test the developmental collision hypothesis by leveraging three samples of sexual minority adolescents from three distinct

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generations to examine levels and associations between the timing of sexual minority identity development processes, LGBT-related victimization, and depressive symptoms.

Social Change and Sexual Identity-Related Disparities in Depressive Symptoms

Few cultural attitudes have changed as rapidly as those related to sexual diversity in the last several decades. Prior to recent surges of anti-LGBT (i.e., lesbian, gay, bisexual, transgender, and other sexual and gender minoritized identities) discrimination and rhetoric (American Civil Liberties Union, 2024), much of this discourse reflected growing public recognition and societal acceptance of sexual diversity. Prominent examples include cultural moments such as the first lesbian kiss on US television in 1991 (BBC, 2024) and Melissa Etheridge's public disclosure at the presidential inauguration in 1993 (Siwak, 2024). Political and legal milestones included the March on Washington for Lesbian, Gay, and Bisexual Equal Rights and Liberation in 1993 (Wu, 2013), the US Supreme Court decision to overturn sodomy laws in 2003 (*Lawrence v. Texas*, 2003), the repeal of "Don't Ask, Don't Tell" in 2010 (Raghavan, 2021), and the Supreme Court decision to federally sanction marriage between same-sex partners in 2015 (*Obergefell v. Hodges*, 2015). In sum, cultural, legal, and political recognition of sexual diversity grew rapidly during this time.

Given well-established linkages between discrimination and health (Hatzenbuehler, 2009), some researchers presumed that increases in public awareness of sexual diversity would lead to diminishing sexual identity-related mental health disparities, including depressive symptoms (Savin-Williams, 2005). Contrary to these expectations, sexual minoritized youth exhibit striking disparities in depressive symptoms relative to their heterosexual peers, and sexual identity-related disparities in depressive and suicidal symptoms have remained stable or have even grown for some sexual minoritized subgroups in the past decades (Bettis & Liu, 2019). A recent study examining trends in depressive symptoms by sexual orientation between 2008 and 2018 reported significantly higher rates of depressive symptoms among sexual minority young adults relative to their heterosexual peers across years, and larger sexual minority-related disparities in depressive symptoms in 2018 relative to 2008 (Kerr et al., 2024). Similar widening disparities between sexual minority and heterosexual youth were reported between 1998 and 2013 among Canadian adolescents (Watson et al., 2018). Given that depressive symptoms are comorbid with health-threatening mood disorders including anxiety, suicidal ideation, and suicidal behavior (Marshall et al., 2011), reducing sexual identity-related disparities in depressive symptoms is crucial for increasing health equity among youth.

Addressing Mental Health Disparities: Integrating Minority Stress Theory, Life Course Perspectives, and Sexual Identity Development Literature

Minority Stress Theory is a prevailing theoretical framework for understanding sexual minority-related mental health disparities (Brooks, 1981; Meyer, 2003). It states that sexual minority people experience added stress because of societal stigma related to their minoritized sexual identities. Minority stressors include experiences of sexual minority motivated prejudice and discrimination, the anticipation of such events, and the internalization of homophobia and heteronormativity, all of which create psychological distress resulting in disproportionate mental health vulnerability (Hatzenbuehler & Pachankis, 2016). For sexual minority youth, a key mechanism of mental health vulnerability and a critical manifestation of minority stress is LGBT-related victimization, defined here as verbal, physical, or sexual victimization because of one's actual or perceived LGBT identity (Poteat et al., 2011). LGBT-related victimization is associated with concurrent and future depressive symptoms (Burton et al., 2013) and can be more detrimental to mental health than general (i.e., non-biased-based) victimization (Earnshaw et al., 2018).

Similarly to depressive symptoms, some have presumed that rapid shifts in public awareness of sexual diversity in the past several decades would result in diminishing LGBT-related victimization across time. Yet, research is mixed regarding temporal trends in rates of LGBT-related victimization. A study examining experiences of homophobic bullying among a statewide sample of secondary school students from California reported an increase in homophobic bullying between 2001 and 2008, followed by a decrease between 2009 and 2015 (Hatzenbuehler et al., 2019). Mixed results were also reported in a national survey examining LGBTQ+ students' school climate and victimization, which reported that between 2001 and 2015, there was a general decline in homophobic verbal harassment at school, however, between 2015 and 2021, these rates did not vary (Kosciw et al., 2022). The limited and inconsistent evidence for whether and how LGBT-related victimization has changed in the past several decades, coupled with the persistence of sexual identity-related mental health disparities, indicates that additional theory and research are needed to understand factors that influence these trends.

The life course perspective and the empirical literature regarding sexual minority identity development provide unique frameworks through which to examine minority stress and depressive symptoms alongside growing public recognition of sexual diversity. The life course perspective centers the developmental and sociohistorical contexts in which processes such as stigma and depressive symptoms unfold (Elder, 1998). Through this perspective, life events

such as bias-based victimization may have differential health impacts depending on when during the life course they occur (Hammack & Cohler, 2011). For example, experiencing LGBT-related victimization during early adolescence, when self-consciousness and peer regulation are heightened (Steinberg & Monahan, 2007), may increase the health repercussions of such experiences. Further, from a life course perspective, the timing and sequencing of sociohistorical events can influence sexual identity development, minority stress, and depressive symptoms. For example, greater public awareness of sexual diversity may result in the availability of information and education about sexual diversity at younger ages. Taken together, the life course perspective suggests that the developmental and sociohistorical timing of minority stress and identity formation processes may contribute importantly to sexual minority peoples' mental health. Yet, few studies account for life course influences when investigating sexual identity-related mental health disparities.

In this vein, the experience and timing of sexual minority identity development processes may shape minority stress and mental health. Specifically, acknowledging and disclosing a sexual minority identity can be psychologically beneficial to those whose authentic identity is supported and celebrated (Kosciw et al., 2015). For other sexual minority youth, the process of recognizing and developing a sexual minority identity in stigmatizing contexts is associated with minority stress and depressive symptoms, particularly if these processes occur alongside negative reactions, victimization, or discrimination (Chang et al., 2021). Still others may feel the need to conceal their identities or may expect rejection, both of which have been shown to contribute to depressive symptoms (Pachankis et al., 2020).

Consistent with the life course perspective, the timing of sexual minority identity developmental processes is critical for understanding their health relevance. *Sexual identity development milestones* (hereafter referred to as “milestones” or “milestone ages”) are the ages at which sexual minority people first experience awareness of same-sex attraction, self-realization of a sexual minority identity, same-sex sexual behavior, and disclosure of sexual minority identities. Recent studies report that depressive symptoms and suicidality co-occur with milestones including first same-sex attraction, self-realization, and disclosure (Malloy et al., 2021; Meyer et al., 2021). Conversely, other research demonstrates that after adjusting for LGBT-related victimization, those who disclosed a sexual minority identity reported better mental health in early adulthood relative to those who had not disclosed their identity (Russell et al., 2014). Understanding whether and how sexual minority youth experience minority stress in conjunction with milestones may help clarify the etiology of these relations to health and wellbeing.

Milestone timing is occurring earlier in the life course among more recent cohorts of sexual minority people, and this trend is particularly evident for ages of first self-identification and disclosure of a sexual minority identity (Hall et al., 2021). For example, in a national probability sample of three generations of sexual minority people in the United States, the most recent generation self-identified with sexual minority identities around age 14, the middle cohort self-identified at age 16, and the oldest cohort self-identified at age 18 (Meyer et al., 2021). Earlier milestone ages have been linked with more victimization (Friedman et al., 2008), suicidality (Dirkes et al., 2016), and depressive symptoms (Katz-Wise et al., 2017). Importantly, studies examining relationships between milestone ages with mental health rarely account for the influence of minority stressors as mechanisms in this association. Therefore, it is unclear whether and how the link between sexual identity development timing and mental health may operate through minority stressors (e.g., LGBT-related victimization). Further, despite shifts across sociohistorical time and associations with minority stress, few studies have examined how milestone timing is associated with LGBT-related victimization and depressive symptoms across multiple generations of sexual minority youth.

The Developmental Collision Hypothesis

The *developmental collision hypothesis* (Russell & Fish, 2019) integrates minority stress theory, life course perspectives, and sexual minority identity development literature to better understand persistent sexual identity-related health inequities in the face of growing public awareness of sexual diversity. This hypothesis contends that social changes in the visibility and rights of sexual minority people have accelerated the developmental timing of sexual identity formation processes such that these activities occur earlier in adolescence, during developmentally normative periods for emerging sexuality but sensitive periods for experiencing minority stress. Specifically, sexual minority youth who come out in adolescence must navigate school climates, peers, parents, and biological processes that are distinctly challenging when compared to adult biopsychosocial contexts (Russell & Fish, 2016). As a result, sexual identity developmental processes for contemporary cohorts of sexual minority youth collide with systemic, institutional, and interpersonal contexts of minority stress, resulting in mental health vulnerability (Russell & Fish, 2019). In sum, earlier milestone timing may be linked with more risk for compromised mental wellbeing as a result of increased (or increased effects of) minority stress. To test this hypothesis, cohort-distinct data that measures the maturational timing of sexual minority identity development processes, frequency of LGBT-related victimization, and depressive symptoms are needed. Yet, such data have historically been unavailable or unexamined.

Current Study

Despite growing public awareness of sexual diversity, sexual minority adolescents remain disproportionately vulnerable to depressive symptoms and minority stress. The developmental collision hypothesis proposes a possible framework for understanding these trends but has yet to be empirically tested. The aim of the current study was to test the developmental collision hypothesis by taking advantage of three age-matched but sociohistorically distinct cohorts of sexual minority adolescents to examine: (1) whether milestone timing, LGBT-related victimization, and depressive symptoms varied across cohorts; (2) the extent to which variability in depressive symptoms was related to variability in milestone timing and LGBT-related victimization; (3) whether milestone timing and depressive symptoms were associated indirectly through LGBT-related victimization; and (4) whether relations varied by cohort. In line with extant studies, the following hypotheses were developed: first, more recent cohorts would report earlier milestones than less recent cohorts, LGBT-related victimization would not vary by cohort, and depressive symptoms would be higher in more recent cohorts. Second, earlier milestones and more LGBT-related victimization would be associated with more depressive symptoms. Third, earlier milestones would be associated with more depressive symptoms indirectly through LGBT-related victimization. Finally, associations between earlier milestones, LGBT-related victimization, and depressive symptoms would vary by cohort and would be stronger for more recent cohorts of sexual minority youth given shifting cultural scripts regarding the social acceptability of sexual diversity.

Methods

Data Sources and Sample

This study combines three secondary datasets of sexual minority adolescents surveyed during sociohistorically distinct periods (Bishop et al., 2024). The data provide a unique opportunity for analysis based on similar study measures (Appendix Table 5) and recruitment methods. The *Challenges and Coping Study* (i.e., “1990s cohort”; D’Augelli et al., 2001) is a cross-sectional sample of 569 sexual minority youth ages 14–31 who were surveyed about navigating challenges related to their sexual orientation. About 93% of participants were under 25 years old. Youth were recruited from community-based organizations (CBOs), universities in the United States and Canada, and online. An adult liaison to the study was present at each site and supervised youth who chose to complete the survey after consenting (see D’Augelli et al., 2001 for additional details). Data were collected between 1995 and 1996.

The *Victimization and Mental Health among High Risk Youths Study* (i.e., “2000s cohort”; D’Augelli & Grossman, 2006), is a three-wave longitudinal survey of sexual orientation-based identity, stress, and health among 528 lesbian, gay, and bisexual (LGB) youth ages 15–19 years old at Wave 1. In the current study, data from Wave 1 were employed. Youth were recruited from three CBOs and via snowball sampling in New York City and its surrounding suburbs. Each study site had a liaison for the research project. Youth first completed consent materials and a self-administered questionnaire, and then a face-to-face interview with a trained interviewer (see D’Augelli & Grossman, 2006 for additional details). The first wave of data was collected between 1999 and 2001.

The *Risk and Protective Factors for Suicide among Sexual Minority Youth Study* (i.e., “2010s cohort”; Baams et al., 2015) is a four-wave longitudinal study of risk and protective factors for mental health among 1061 LGBTQ+ youth ages 15–21 years old. In the current study, data from Wave 1 were used. Youth were recruited from three CBOs and college groups located in major cities in the Northwest, Southwest, and West Coast of the United States, and via snowball sampling. Following an initial screening process, eligible youth contacted site coordinators to confirm an appointment to complete a survey packet. Participants provided consent and completed the survey packet at their respective study sites (see Baams et al., 2015 for additional details). The first wave of data were collected between 2011 and 2012.

The analytic sample in the current study is limited to participants ages 15–19 given that the age range of participants in the 2000s study was 15–19 years old. It is important to age-match the three samples to avoid conflating age influences with cohort influences (Bishop et al., 2024). The sample was also limited to cisgender participants as transgender adolescents are theorized to experience distinct identity development milestones (Puckett et al., 2021). Table 1 describes the demographic characteristics of the combined analytic sample, which were 1312 sexual minority adolescents ages 15–19 with valid responses to at least one milestone item ($M_{\text{age}} = 17.34$, $SD = 1.30$). Slightly under half of the sample participants were from the 2010s cohort, 39% were from the 2000s cohort, and 15% were from the 1990s cohort. The sample was diverse with respect to race/ethnicity, and was divided nearly evenly between male and female respondents and between lesbian/gay and bisexual+ participants.

Measures

Milestone ages

Four items assessed the ages at which participants reported sexual minority identity development milestones. Age of first awareness of same-sex attraction was assessed with

Table 1 Demographic characteristics of the study sample

Measure	CCS (1990s)	VMH (2000s)	RPF (2010s)	Total
<i>n</i> (%)	192 (14.63%)	514 (39.18%)	606 (46.19%)	1312 (100%)
Age	18.21 (0.89)	17.03 (1.28)	17.33 (1.30)	17.34 (1.30)
Race/ethnicity				
White	147 (76.56%)	320 (62.26%)	146 (24.09%)	613 (46.72%)
Black/AA	16 (8.33%)	128 (24.90%)	121 (19.97%)	265 (20.20%)
Another race	29 (15.10%)	66 (12.84%)	339 (55.94%)	434 (33.08%)
Sex				
Female	87 (45.31%)	246 (47.86%)	353 (58.25%)	686 (52.29%)
Male	105 (54.69%)	268 (52.14%)	253 (41.75%)	626 (47.71%)
Sexual identity				
Lesbian/gay	131 (68.23%)	238 (46.48%)	285 (47.03%)	654 (49.92%)
Bisexual+	61 (31.77%)	274 (53.52%)	321 (52.97%)	656 (50.08%)

Two participants were missing on sexual identity in the VMH cohort. Mean and standard deviations are reported for age. *n* and column percent are reported for all other variables

AA African American

responses to an open-ended question about the age at which youth first became aware that they were attracted to or felt different from people of the same sex, even though they may not have labeled these feelings. The item from the 1990s dataset survey reads, “How old were you when you first became aware that you were attracted to people of the same sex, even though you might not have labeled these feelings?” Age of first same-sex sexual behavior was assessed with an open-ended question about the age at which participants had their first sexual experience with a male or female, respectively. A sample item from the 2010s survey reads, “Did you engage in sexual activity with a [male/female] in the last year? If yes, how old were you the first time you engaged in sexual activity with a [male/female]?” Responses were retained for the item that matched the respondent’s sex, such that female participants’ responses were coded as the age at which they first engaged in sexual behavior with a female person, and male participants’ responses were coded as the age at which they first engaged in sexual behavior with a male person. Age of first sexual minority self-identification was assessed with an open-ended question about how old participants were when they first self-identified with a sexual minority orientation. A sample item from the 2000s survey reads, “How old were you when you first considered yourself LGBT?” Finally, age of first sexual minority disclosure was assessed with an open-ended question about how old participants were when they first told someone they identified with a sexual minority identity. A sample item from 2010s reads, “How old were you when you first told someone that you were lesbian/gay/bisexual/queer?” All responses were coded in years. Participants who did not respond, reported that they did not know, or reported that they had not experienced a given milestone were coded as missing on the associated milestone.

LGBT-related victimization

Within each dataset, frequency of LGBT-related victimization (D’Augelli et al., 2002) was assessed with five items that measured how often several forms of victimization occurred in participants’ lifetime because they were LGBT or someone thought they were. These forms included: (1) being called names or being teased; (2) being threatened with physical violence; (3) being punched, kicked, or beaten; (4) being hurt or threatened with a weapon such as a gun or knife; (5) being sexually abused or raped. Participants responded on a four-point scale (0 = *Never* to 3 = *Three or more times*). The mean score of items was used, and higher scores represented more frequent victimization.

Depressive symptoms

In the 1990s study, depressive symptoms were measured using the depressive symptoms subscale of the Trauma Symptom Checklist (TSC-40; Briere & Runtz, 1989). The TSC-40 depressive symptoms subscale contains nine items measured on a four-point scale (0 = *Never* to 3 = *Often*). A sample item from the TSC-40 reads, “How often have you experienced sadness in the past two months?” A mean composite score was used, and higher scores indicated higher levels of depressive symptoms. In the 2000s and 2010s studies, depressive symptoms were measured using the Beck Depression Inventory (Beck et al., 1996). In the 2000s study, the 21-item BDI-Y was used, and in the 2010s dataset the 20-item BDI-II was employed. On both scales, items were measured on a four-point scale (0 = *Never* to 3 = *Always*). A sample item from the BDI-Y reads, “I think that my life is bad”. A mean composite score was

calculated, and higher scores indicated higher levels of depressive symptoms.

Cohort

A three-category cohort variable was coded as CCS (i.e., 1990s cohort), VMH (i.e., 2000s cohort), or RPF (i.e., 2010s cohort), and the 2010s cohort was the reference group.

Covariates

Participants' sex was coded as male or female, and female was the reference group. Sexual identity was coded as lesbian/gay or bisexual+ (i.e., youth who identified as bisexual or another sexual minority identity such as uncertain, questioning, or a sexual minority identity not listed), and lesbian/gay was the reference group. Participants' race was coded as White, Black, or another race (e.g., Asian American, Native American, Native Hawaiian, East Indian, American Indian/Alaska Native, another race, Latinx, multiracial, or race unreported) and White was the reference group. Finally, maturational age was measured with items documenting youths' age or birth year.

Analytic Approach

Data were managed and analyzed using Stata 18 (StataCorp, 2023) and MPlus version 8 (Muthen & Muthen, 1998–2017). First, descriptive statistics, analyses of variance, and bivariate associations were calculated to summarize the sample and evaluate cohort differences between main study variables. Next, to assess relations between milestone ages, LGBT-related victimization, and depressive symptoms, a series of path analysis models were estimated to examine: (1) the direct effects between milestone ages, LGBT-related victimization, and depressive symptoms; (2) the indirect effect of LGBT-related victimization on the associations between milestone ages and depressive symptoms; and (3) variability by cohort. Path analysis models were estimated in an SEM framework with an ML estimator. Full information likelihood estimation (FIML) was used to account for missing data and indirect effects were bootstrapped at 1000 iterations. Model fit was assessed with the Chi-Square test, root mean square error of approximation (RMSEA), comparative fit index (CFI), and standardized root mean residual (SRMR). The model fit was acceptable across models, with an RMSEA < 0.05, a CFI > 0.95, and a SRMR < 0.05 (Kline, 2016; see Fig. 1).

For each milestone, the path analysis included two steps. First, a model that simultaneously estimated direct and indirect effects while controlling for age, cohort, sex, sexuality identity, and race/ethnicity on exogenous

variables was examined (the effect of cohort on LGBT-related victimization was not controlled for given descriptive statistics showing no differences across cohorts). Then, cohort variability in the direct and indirect effects were examined using multiple group analyses (MGA). Chi-square difference tests between unconstrained and constrained models were compared to identify whether models had significantly different model fit, and therefore whether relations between constructs meaningfully varied by cohort.

Results

Cohort Differences and Bivariate Associations Across Main Study Variables

Table 2 presents means, standard deviations, and one-way analyses of variance (ANOVA) testing cohort differences across main study variables. Milestone ages varied by cohort, except for first same-sex sexual behavior. Specifically, more recent cohorts reported earlier ages of first self-identification and disclosure of a sexual minority identity relative to less recent cohorts. The 2000s cohort reported earlier ages of first awareness of same-sex attraction than the 1990s and 2010s cohorts, and the 2010s cohort did not differ from the 1990s cohort. Unlike the cohort differences observed across milestone ages, there were no cohort differences in frequency of LGBT-related victimization across cohorts. With respect to depressive symptoms, the 2010s cohort reported higher levels of depressive symptoms than the 2000s cohort, and did not differ from the 1990s cohort in levels of depressive symptoms.

Table 3 shows bivariate associations across the main study variables. Correlations revealed the expected associations between milestone ages with LGBT-related victimization in that younger mean milestone ages were associated with higher LGBT-related victimization. Further, higher LGBT-related victimization was associated with more depressive symptoms. Conversely, first self-identification and disclosure were positively associated with depressive symptoms, such that older milestone ages were associated with more depressive symptoms. Age of first awareness of same-sex attraction and first same-sex sexual behaviors were not significantly correlated with depressive symptoms.

Associations Between Milestone Ages, LGBT-Related Victimization, and Depressive Symptoms

Figure 1 and Table 4 present standardized coefficients and significance levels for a set of path analysis models estimating the direct and indirect associations of milestone ages, LGBT-related victimization, and depressive

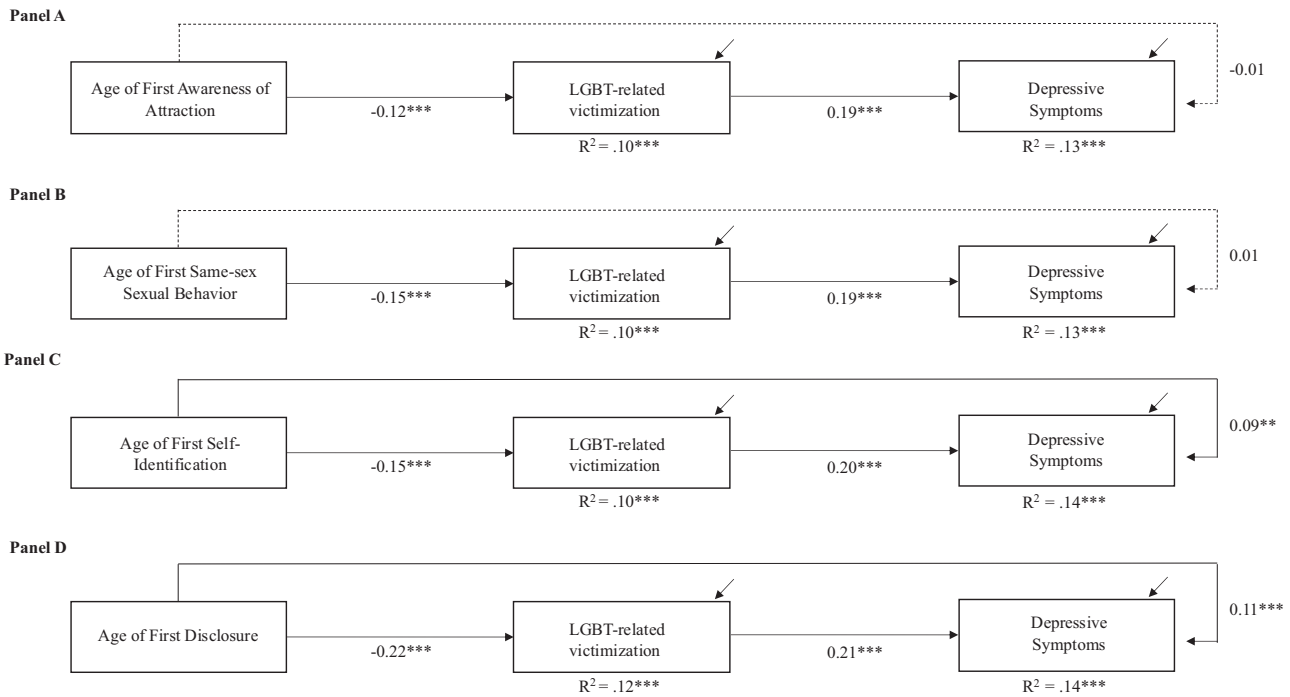


Fig. 1 Path analysis models of milestone age, LGBT-related victimization, and depressive symptoms. Panels **A–D** correspond to models estimating ages of first awareness of attraction, first same-sex sexual behavior, first self-identification, and first disclosure, respectively. Standardized path parameters are presented. Dashed lines indicate no

significance and solid lines indicate significance. Model fit: $\chi^2(2) = 1.89–9.29$, $p = 0.01–0.39$; CFI = 0.98–1.00; RMSEA = 0.00–0.05 [0.00–0.09]. SRMR = <0.01–0.01. Models adjusted for cohort, age, sex, sexual identity, and race/ethnicity. ** $p < 0.01$, *** $p < 0.001$

Table 2 Means, standard deviations, and one-way analyses of variance of main study variables by cohort

Measure	1990s		2000s		2010s		F
	M	SD	M	SD	M	SD	
Milestone age							
Awareness of same-sex attraction	10.61	3.38	10.06 ^a	3.40	10.63 ^a	3.81	3.85*
Same-sex sex	14.73	3.08	14.28	2.84	14.53	2.66	1.69
Self-identification	15.11 ^{ab}	2.13	14.00 ^a	2.33	14.11 ^b	2.59	14.90***
Disclosure	16.17 ^{ab}	1.67	14.57 ^{ac}	1.98	14.22 ^{bc}	2.43	56.82***
LGBT-related victimization	0.64	0.56	0.63	0.53	0.65	0.74	0.13
Depressive symptoms	0.91 ^a	0.56	0.56 ^{ab}	0.46	0.84 ^b	0.65	45.07***

Same superscripts indicate significant differences

* $p < 0.05$, *** $p < 0.001$

symptoms after accounting for covariates, with each milestone estimated in separate models. Figure 1A shows that age of first awareness of same-sex attraction was not directly related to depressive symptoms. However, earlier ages of first awareness of same-sex attraction were significantly related to higher levels of LGBT-related victimization ($\beta = -0.12$, $p < 0.01$) and higher LGBT-related victimization was significantly related to more depressive symptoms ($\beta = 0.19$, $p < 0.01$). In addition to direct effects, a significant indirect effect of age of first awareness of same-sex attraction on depressive symptoms through

LGBT-related victimization was observed ($\beta = -0.02$, $p < 0.01$; Table 4), indicating that earlier ages of awareness of same-sex attraction were related to more depressive symptoms through LGBT-related victimization.

Similarly to the model estimating age of first awareness of same-sex attraction, Fig. 1B shows that age of first same-sex sexual behavior was not directly related to depressive symptoms. Conversely, earlier ages of same-sex sexual behavior were significantly directly related to higher levels of LGBT-related victimization ($\beta = -0.15$, $p < 0.01$) and higher LGBT-related victimization was significantly

directly related to more depressive symptoms ($\beta = 0.19$, $p < 0.01$). Along with direct effects, a significant indirect effect of LGBT-related victimization on the relation between age of first same-sex sexual behavior with depressive symptoms was observed ($\beta = -0.03$, $p < 0.01$; Table 4), such that earlier ages of same-sex sexual behavior were related to more depressive symptoms through LGBT-related victimization.

Figure 1C illustrates that age of first self-identification was directly related to depressive symptoms ($\beta = 0.09$, $p < 0.01$), such that later ages of self-identification were associated with more depressive symptoms. Further, earlier ages of self-identification were significantly directly related to higher levels of LGBT-related victimization ($\beta = -0.15$, $p < 0.01$), and LGBT-related victimization was significantly directly associated with more depressive symptoms ($\beta = 0.20$, $p < 0.01$). In addition to these direct effects, a significant indirect effect of LGBT-related victimization on the relation between age of first self-identification with depressive symptoms was observed ($\beta = -0.03$, $p < 0.01$; Table 4), suggesting that earlier ages of self-identification

were related to higher depression through LGBT-related victimization.

Finally, Fig. 1D shows that age of first disclosure was directly related to depressive symptoms ($\beta = 0.11$, $p < 0.01$), such that later ages of disclosure were associated with more depressive symptoms. Further, earlier ages of disclosure were directly related to higher LGBT-related victimization ($\beta = -0.22$, $p < 0.01$). Finally, more LGBT-related victimization was directly related to more depressive symptoms ($\beta = 0.21$, $p < 0.01$). In addition to direct effects, a significant indirect effect of LGBT-related victimization on the relation between age of first disclosure with depressive symptoms was observed ($\beta = -0.05$, $p < 0.01$; Table 4), suggesting that earlier ages of disclosure were related to more depressive symptoms through LGBT-related victimization.

Multiple group analyses

In order to test whether associations between milestone ages, LGBT-related victimization, and depressive symptoms differed across cohorts, multiple group path analyses (MGA) were estimated. Specifically, for each milestone model, chi-square model fit indices were compared across a freely estimated multigroup model and a model whose paths from milestone to LGBT-related victimization, LGBT-related victimization to depression, and milestone to depression were constrained to be equal across cohort groups. No significant differences in model fit were observed for models estimating age of first awareness of same-sex attraction, self-identification, and disclosure, suggesting that relations did not vary by cohort. Regarding the models investigating age of first same-sex sexual behavior, the constrained model yielded significantly worse model fit than the freely estimated model ($\chi^2 = 15.49$, $\chi^2_{diff} p = 0.02$) indicating that cohort moderated associations in the model (see Fig. 2). Specifically, the direct effect of age of first same-sex sexual behavior on LGBT-related victimization was significantly stronger in the 2010s cohort ($\beta = -0.21$, $p < 0.01$) relative to the 1990s cohort ($\beta = -0.08$, $p = 0.27$), the latter of which did not reach

Table 3 Bivariate correlations, means, and standard deviations of main study variables

Measure	1	2	3	4	5	6
1. Awareness of same-sex attraction	–					
2. Same-sex sex	0.33	–				
3. Self-identification	0.47	0.41	–			
4. Disclosure	0.37	0.33	0.68	–		
5. LGBT victimization	-0.16	-0.16	-0.15	-0.17	–	
6. Depressive symptoms	>0.00	0.01	0.08	0.07	0.14	–
Mean	10.41	14.46	14.20	14.63	0.64	0.74
SD	3.60	2.82	2.45	2.25	0.64	0.59
Reported min	0	1	0	0	0	0
Reported max	19	19	19	19	3	2.9
N	1295	940	1282	1276	1294	1308

Bold coefficients indicate significance at $p < 0.05$. Pairwise correlations displayed

Table 4 Tests of indirect effects of path analysis models

Path	Mplus estimate of indirect effects			
	Indirect	95% CI indirect	Direct	Total
Awareness → LGBT victimization → Depressive symptoms	-0.024***	-0.038 - -0.012	-0.010	-0.034
Same-sex sex → LGBT victimization → Depressive symptoms	-0.028**	-0.052 - -0.013	0.010	-0.018
Self-identification → LGBT victimization → Depressive symptoms	-0.029***	-0.046 - -0.015	0.085**	0.055
Disclosure → LGBT victimization → Depressive symptoms	-0.045***	-0.065 - -0.028	0.108***	0.062*

Bold paths indicate significant indirect effects. Standardized results presented

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

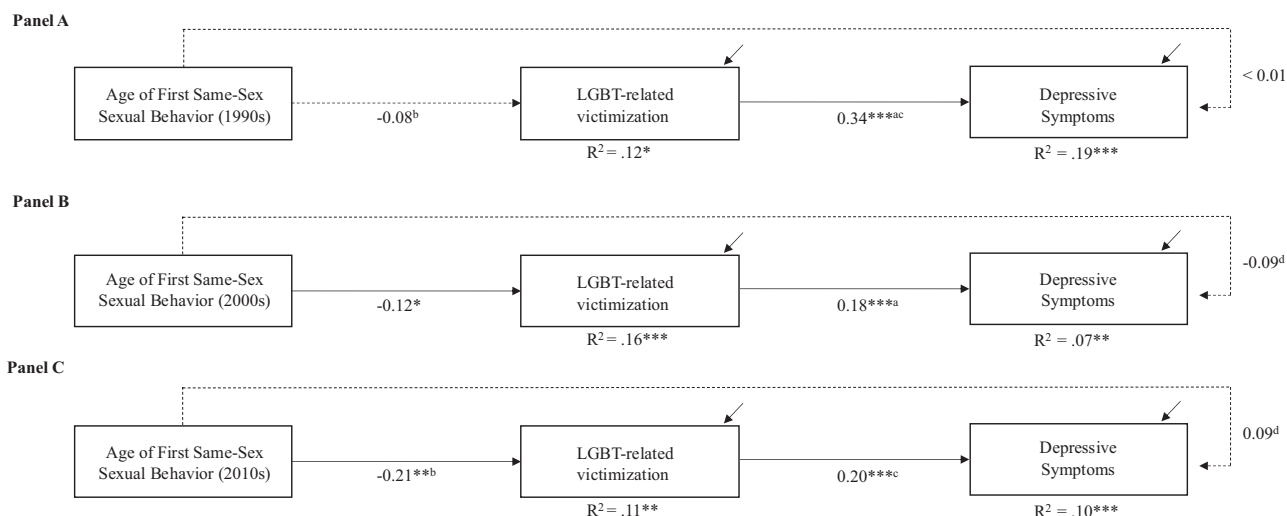


Fig. 2 Multiple group path analysis of age of same-sex sexual behavior, LGBT-related victimization, and depressive symptoms by cohort. Panels **A**, **B**, and **C** represent the 1990s, 2000s, and 2010s cohorts, respectively. Standardized path parameters are presented. Dashed lines indicate no significance and solid lines indicate significant paths.

Shared superscripts indicate significant differences in analogous paths across cohorts. Model fit indices not available. Models adjusted for age, sex, sexual identity, and race/ethnicity. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

statistical significance. Additionally, the direct effect of LGBT-related victimization on depression was stronger in the 1990s cohort ($\beta = 0.34$, $p < 0.01$) relative to the 2000s ($\beta = 0.18$, $p < 0.01$) and 2010s ($\beta = 0.20$, $p < 0.01$) cohorts. Further, the direct effect of same-sex sexual behavior on depressive symptoms significantly differed between the 2000s and the 2010s cohorts, although neither reached statistical significance. Finally, the strength of indirect effects did not differ across cohorts.

Discussion

Although public awareness regarding sexual diversity has increased in the past several decades, sexual minority-related mental health disparities among youth have persisted. The *developmental collision hypothesis* proposes that increased visibility of sexual diversity has accelerated the developmental timing of sexual minority identity formation processes such that they occur earlier in adolescence, during developmentally normative periods for emerging sexuality but uniquely sensitive periods for experiencing stigma and associated mental health vulnerability. The goal of the current study was to empirically test the developmental collision hypothesis by taking advantage of three age-matched but cohort-distinct datasets of sexual minority adolescents to examine levels of and relations between milestone timing, LGBT-related victimization, and depressive symptoms, as well as whether relations were distinct across cohorts. Findings suggest that earlier milestones were associated with more frequent LGBT-

related victimization across cohorts. In turn, higher LGBT-related victimization was linked with more depressive symptoms. Yet, earlier ages of first self-identification and disclosure were also directly related to lower risk for depressive symptoms. Thus, the current study lends support for the developmental collision hypothesis in that earlier milestones are associated with mental health vulnerability when they expose youth to stigma. At the same time, earlier milestones can also bolster mental health. Results suggest the need to address LGBT-related victimization in early adolescence and to better understand resilience factors associated with adolescent sexual identity development timing.

As expected, more recent cohorts of sexual minority adolescents reported earlier ages of milestones including self-identification and disclosure of sexual minority identities relative to less recent cohorts. Conversely, levels of LGBT-related victimization did not differ across cohorts. Finally, depressive symptoms in the 2010s cohort were similar to the 1990s cohort and higher than the 2000s cohort. Thus, descriptive data from the current study reflect patterns in the broader literature showing that across generations, sexual minority people form minoritized sexual identities at increasingly younger ages (Bishop et al., 2020) while experiencing similar frequencies of LGBT-related victimization (Kosciw et al., 2022). Despite increasing public awareness of sexual diversity across sociohistorical time, LGBT-related victimization is not decreasing and continues to be a potent source of mental health vulnerability for sexual minority adolescents (Gower et al., 2018).

No evidence of a direct relation between earlier milestones with more depressive symptoms was garnered in the current study. In fact, earlier ages of first self-identification and disclosure were directly associated with *less* rather than more depressive symptoms, whereas ages of first awareness of attraction and first same-sex sexual behavior were not directly related to depressive symptoms. Although this finding is inconsistent with some prior studies that have found relations between earlier milestones and more depressive symptoms among some sexual minority people (Katz-Wise et al. 2017), other studies have reported no direct association between milestone timing with mental health outcomes (D'Augelli, 2003) or that earlier milestones are related to more social connection and sexual orientation comfort (Floyd & Stein, 2002). Additionally, a small literature has found that the mental health vulnerability associated with disclosing an identity may be strongest directly after self-identification and disclosure, but may dissipate over time (Meyer et al., 2021). Finally, in safe and supportive contexts, disclosing a minoritized sexual identity has been found to be associated with positive social and emotional adjustment including higher self-esteem, access to social support, and feelings of authenticity (Russell et al., 2014). Given that the samples in the current study were either recruited from or had a connection to LGBT youth centers, it is reasonable to assume that participants had at least some access to affirming spaces. Additional protective factors including parental support, school climate, and inclusive anti-discrimination policies may also contribute to variability in the association between milestones and depressive symptoms. Future research should examine which and to what degree protective factors alter relations between milestone timing and mental health. Furthermore, understanding the conditions under which earlier formation of minoritized sexual identities are protective for health can provide important insight into theoretical extensions of the developmental collision hypothesis. Practitioners and clinicians can use the current study's findings to understand the importance of policies and programs that support sexual minority adolescents as they develop and disclose identities, such as LGBT-inclusive sexuality education, Gender-Sexuality Alliances, enumerated anti-bullying policies, and affirming healthcare settings (Russell et al., 2021).

Path analysis models showed that earlier milestones were associated with higher LGBT-related victimization, which in turn was related to more depressive symptoms. For first awareness of attraction and first same-sex sexual behavior, milestone ages were only indirectly related to depressive symptoms through LGBT victimization. These findings are consistent with prior research which has found that earlier milestones are associated with higher LGBT-related

victimization (D'Augelli et al., 1998), and that LGBT-related victimization is associated with more depressive symptoms (Earnshaw et al., 2018). The current study extends the literature by examining the relations between milestone timing, LGBT-related victimization, and depressive symptoms in tandem; taking this approach lends support to the notion that LGBT-related victimization, rather than earlier milestone timing in and of itself, drives vulnerability to depressive symptoms. Reducing LGBT-related victimization is a crucial strategy for eliminating LGBT-related mental health inequities including those related to depressive symptoms (Gower et al., 2018).

A host of developmental factors help to explain why earlier milestones are associated with higher LGBT-related victimization. From a cognitive developmental perspective, younger adolescents report elevated self-consciousness and peer regulation of sexuality and gender relative to older adolescents and adults (Poteat & Russell, 2013; Steinberg & Monahan, 2007). Specifically, sexual prejudice is highest in early adolescence, before teens have developed more complex cognition with respect to fairness and prejudice (Horn, 2006). These cognitions influence peer dynamics in that younger adolescents are less likely to remain friends with peers who come out than youth in later grades (Poteat et al., 2009). Additionally, earlier ages of forming a minoritized sexual identity means extended dependence on family members for social support. Coming out is often a source of family conflict and rejection (Puckett et al., 2015), both of which are highly correlated with LGBT-related victimization. Finally, in contemporary contexts, anti-LGBT youth legislation is prominent in media and politics and threatens the wellbeing of LGBT youth (Ronan, 2021). Younger adolescents may be more likely to internalize these broader cultural messages relative to older adolescents (Poteat & Anderson, 2012). Taken together, for many sexual minority adolescents, earlier milestone ages mean distinct and elevated vulnerability to LGBT-related victimization. Evidence-based strategies for reducing LGBT-related victimization should be tailored for the early adolescent context to maximize their effectiveness.

For models estimating the age of first self-identification and first disclosure, relations between earlier milestones and depressive symptoms operated through LGBT-related victimization; however, these indirect effects were weaker than the direct association between later milestones and more depressive symptoms. In other words, although earlier milestones were related to greater risk for LGBT-related victimization, ultimately, earlier milestones were most strongly associated with less depressive symptoms. This finding is aligned with previous research which showed that being out at school was related to higher levels of victimization, but that after accounting for victimization, was

also related to improved psychological adjustment in early adulthood (Russell et al., 2014). Self-identification and disclosure of a minoritized sexual identity are salient processes of identity development that provide self-clarity and the possibility to connect with others authentically. Although these processes can elicit minority stress, they may also confer social-emotional benefits such as social support and community connectedness that ultimately bolster mental health (Dorri & Russell, 2024). In sum, earlier sexual identity development processes are not in and of themselves associated with poor mental health; unsafe and stigmatizing social contexts link earlier coming out with mental health vulnerability. As such, it is crucial to ensure safe and supportive environments in which youth can understand their authentic identities to reduce sexual identity-related mental health disparities.

No cohort differences were observed in models estimating associations between milestone timing, LGBT-related victimization, and depressive symptoms as they related to ages of first awareness of same-sex attraction, self-identification, and disclosure. This finding supports extensive literature documenting the deleterious effects of LGBT-related victimization on mental health, both during adolescence and over the life course (Moyano & Sánchez-Fuentes, 2020). Conversely, relations between age of same-sex sexual behavior, LGBT-related victimization, and depression varied by cohort. Unlike the 2000s and 2010s cohorts, in the 1990s cohort, age of first same-sex sexual behavior was not associated with LGBT-related victimization. It is possible that during the 1990s, adolescents were engaging in same-sex sexual behavior in a more concealed context than were adolescents in the 2000s and 2010s, particularly given that those in later generations were more likely to self-identify prior to engaging in same-sex sex; in contrast, those in earlier generations were more likely to report the opposite order on average (Bishop et al., 2020). It is also possible that first same-sex sexual behavior is biopsychosocially distinctive from the other milestones measured in the current study because it is subject to opportunity and relational contexts in a way that awareness of attraction, self-identification, and disclosure are not, as demonstrated by the higher amount of missingness for this milestone relative to other milestones across studies (Bishop et al., 2020). Additional measurement work is needed to examine whether and how ages of first same-sex sexual behaviors should be understood as a sexual minority identity developmental milestone.

The developmental collision hypothesis as originally conceived did not articulate distinct hypotheses by individual milestones. Yet, findings from this and other studies suggest that milestone ages may not be declining at the same rate across sociohistorical time, and that relations between milestone ages, LGBT-related victimization, and mental

health do not all operate analogously across milestones. For example, prior studies have shown that across generations, sexual minority youth report first self-realization and first disclosure at younger ages, whereas fewer changes in first awareness of same-sex attraction and first same-sex sexual behavior have been reported across cohorts (Hall et al., 2021). Additional studies have shown that mental health is related to some milestones more strongly than others (Dirkes et al., 2016). Furthermore, although earlier ages of disclosure appear to result in interpersonal minority stress such as victimization, it is possible that earlier ages of intrapersonal milestones such as self-awareness of same-sex attraction may be more strongly associated with intrapersonal minority stress such as internalized homonegativity or anticipated stigma. As such, future studies should examine relations between individual milestones with a range of minority stressors and health outcomes to develop more nuanced hypotheses related to developmental collision.

Several limitations to the current study should be noted. First, although milestone ages and experiences of LGBT-related victimization are quasi-longitudinal given their retrospective nature, data used for path analyses were ultimately cross-sectional, and therefore the directionality of associations is unknown. Second, a different measure was used to assess depressive symptoms in the 1990s dataset relative to the 2000s and 2010s dataset. Although these measures are well-validated and prior research suggests that these scales are reliable and intercorrelated with one another (Sadowski & Friedrich, 2000), results should be interpreted with this limitation in mind. Similarly, participants in the 1990s and 2010s cohorts were recruited from several geographic areas throughout the United States while the 2000s sample was recruited from New York City and surrounding suburbs. Third, the maximum age in this study's analytic sample was 19 given the need to age-match samples to ensure comparability across cohorts. However, milestones unfold across the life course for many people (Bishop et al., 2023). As such, future studies should include broader age ranges and employ longitudinal data. Fourth, there may be important variability in relations between milestone ages, minority stress, and mental health among subgroups defined by social identities such as gender, race/ethnicity, and urbanicity. Future studies should investigate subgroup variability in these relations to maximize prevention and intervention efforts. Finally, the literature thus far (including the current study) has largely focused on relations between milestone ages with minority stress and health vulnerability. However, it is also critical to understand how access to health-promoting and protective factors may shift as young people develop sexual minority identities at earlier ages. Future research should integrate measures of social support, community connectedness, and other resiliency factors to more fully examine how sexual minority identity development is related to minority stress and mental health across sociohistorical time.

Conclusion

Sexual minority adolescents experience disproportionate rates of depressive symptoms relative to their heterosexual peers, yet less is known about why these disparities have persisted despite growing visibility of sexual diversity. The goal of the current study was to empirically test the possibility that expanded public awareness of sexual diversity has allowed contemporary sexual minority adolescents to develop minoritized sexual identities at younger ages, and that these distinct developmental contexts may be related to minority stress and mental health. This study lends support to the developmental collision hypothesis: more recent cohorts reported several milestones at younger ages, and younger milestones were associated with more exposure to LGBT-related victimization, which, in turn, was associated with more depressive symptoms. At the same time, earlier ages of both self-identification with and disclosure of a sexual minority identity were linked with fewer depressive symptoms above and beyond relations between earlier ages of these milestones, LGBT-related victimization, and depressive symptoms. Thus, those who come out at younger ages may experience more LGBT-related victimization, but earlier ages of sexual identity formation may also confer social support and self-authenticity that may ultimately be protective. At a time when national and international anti-LGBT youth legislation is ratified through danger discourses that tout discussions of sexual diversity as threatening, it is critical to know that supporting adolescents to recognize their authentic selves is an evidence-based strategy for improving wellbeing.

Authors' Contributions M.B. conceptualized and designed the study, performed the statistical analysis, and drafted the manuscript; J.F. participated in the interpretation of the analyses and reviewed the manuscript; S.R. provided access to the data, participated in the design and interpretation of the analyses, and reviewed the manuscript. All authors read and approved the final manuscript.

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Compliance With Ethical Standards

Conflict of interest The authors declare no competing interests.

Ethical approval This University of Texas IRB determined that this secondary data analysis was non-human subjects research.

Appendix

Table 5

Table 5 Milestone items by dataset

	Awareness of same-sex attraction	Same-sex sexual behavior	Sexual minority self-identification	Sexual minority identity disclosure
CCS (1990s cohort)	How old were you when you first became aware that you were attracted to people of the same sex, even though you might not have labeled these feelings?	How old were you when you had your first sexual experience with a [male/female]?	How old were you when you first considered yourself lesbian, gay, or bisexual?	How old were you when you first told someone that you were lesbian, gay, or bisexual?
VMH (2000s cohort)	How old were you when you first became aware that you were drawn to someone of the same sex, even though you might not have labeled these feelings as sexual?	Have you ever [given/received] [oral/vaginal/anal] sex with a [female/male]?" "How old were you when you first did this?	How old were you when you first considered yourself LGBT?	How old were you when you first told someone that you were [gay/lesbian/bisexual/transgender]?
RPF (2010s cohort)	How old were you when you first became aware that you felt different than other people your same sex, even though you might not have labeled these feelings?	Did you engage in sexual activity with a [male/female] in the last year? If yes, how old were you the first time you engaged in sexual activity with a [male/female]?	How old were you when you first labeled yourself as lesbian/gay/bisexual/queer?	How old were you when you first told someone that you were lesbian/gay/bisexual/queer?

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