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Risk factors and outcomes of chronic sexual harassment during the transition to college: Examination of a two-part growth mixture model

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Abstract

A two-part latent growth mixture model was implemented in order to examine heterogeneity in the growth of sexual harassment (SH) victimization in college and university students, and the extent to which SH class membership explains substance use and mental health outcomes for certain groups of students. Demographic risk factors, mental health, and substance use were examined as they related to chronically experienced SH victimization. Incoming freshmen students (N = 2855; 58% female; 54% White) completed a survey at five time points. In addition to self-reporting gender, race, and sexual orientation, students completed measures of sexual harassment, anxiety, depression, binge drinking, and marijuana use. Overall, self-reported SH declined upon college entry, although levels rebounded by the third year of college. Results also supported a two-class solution (Infrequent and Chronic) for SH victimization. Being female, White, and a sexual minority were linked to being classified into the Chronic (relative to the Infrequent) SH class. In turn, Chronic SH class membership predicted greater anxiety, depression, and substance use, supporting a mediational model.

Keywords

Binge drinking; Marijuana use; Depression; Anxiety; Sexual harassment; Longitudinal

While a great deal of media attention recently has been given to the issue of sexual assault on college campuses (Gray, 2014a, 2014b), sexual harassment (SH) is a more far-reaching problem. Approximately 40%–60% of women (Cortina et al., 1998; Fitzgerald et al., 1988; Kalof et al., 2001; Shepela and Levesque, 1998) and 28–51% of men (Kalof et al., 2001; Shepela and Levesque, 1998) report experiencing SH in college. Under Title IX of the Education Amendments of 1972(92 S. 659, 1972), SH in the school setting is defined as any sexual behavior that interferes with a student's right to an equal education, and can include

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any type of unwanted sexual behavior based on a student's gender, such as inappropriate touching, sexist jokes, and requests for sexual favors.

Research indicates that SH victimization is associated with negative mental health and substance use in adults (Richman et al., 1999; Rospenda et al., 2009) and adolescents (Bucchianeri et al., 2014; Espelage et al., 2012). Some cross-sectional research has also looked at experiences of SH in college students, finding an association between SH and psychological distress (Huerta et al., 2006; Reilly et al., 1986; Till, 1980; van Roosmalen and McDaniel, 1998) and between SH and alcohol use (Monks et al., 2010). College students may be an especially vulnerable population for several reasons: young men and women are interacting with relatively little supervision, college is a transitional time when identities and social networks are disrupted and fluctuating, and alcohol use tends to increase (Arnett, 2000; Clodfelter et al., 2010; Till, 1980). For example, emerging adults at this time are actively exploring identity issues related to romantic relationships, religion, professions, and ideologies. While this process can ultimately lead to satisfying outcomes, frustrations stemming from failures or rejections related to identity exploration are stressors that this population may frequently encounter (Arnett, 2000). Experiencing SH victimization during a period of already heightened duress, i.e., when coping resources are already taxed, may have particularly deleterious consequences for mental and behavioral health (Lazarus and Folkman, 1984). In particular, students may turn to maladaptive or avoidant forms of coping, which include problematic drinking and drug use (Rohde et al., 1990; Smith et al., 2003).

Thus, like sexual assault, SH can undermine the health of college students. Despite its prevalence, the fact that SH tends to be a chronic stressor when it occurs in the workplace (McGinley et al., 2011; Rospenda et al., 2000), and the greater health-harming effects of chronic versus more acute stressors in general (McEwen, 2004; Wheaton, 1997), there has been no longitudinal research on either the experience of SH over time or the impact of SH on mental health and substance use outcomes over time in college samples. Nor has there been research to determine which students may be at greater risk for experiencing chronic SH. Given that underage drinking continues to be a major public health concern, particularly the relative rise in heavy drinking among college women (Newes-Adeyi et al., 2005), the current study adds to the existing literature on college student SH and substance use by investigating the direct and indirect links between demographic factors (e.g., gender, sexual orientation, race/ethnicity), chronic SH, and substance use as well as mental health outcomes. Specifically, we use two-part latent growth mixture modeling to accomplish two aims. First, we examine trajectories of SH experiences among college students over time. Second, we examine the extent to which increased substance use and decreased mental health during the initial years of college, particularly among certain groups of students, may be explained by level of exposure to SH. Our goal is to inform prevention efforts on college campuses in the areas of both SH and substance misuse prevention.

1. Examinations of SH over time

1.1. Chronic experiences of SH

Several scholars have noted that SH tends to be experienced chronically over time in adolescence and adulthood; further, these chronic experiences of SH especially contribute to negative mental health and substance use outcomes (Coggan et al., 2003; Rospenda et al., 2000). For example, longitudinal investigations of youth in middle and early high school have shown that prior reports of SH are significantly related to future assessments of SH victimization (Petersen and Hyde, 2009a,b), self-harm (Marshall et al., 2013), emotional distress (i.e., anxiety, depression), and problem substance use (i.e., alcohol, marijuana, other illicit drug use) (Chiodo et al., 2009). In an examination of a college-aged sample, current SH was strongly predicted by previous SH on campus (Clodfelter et al., 2010). Workplace SH also strongly predicted workplace SH 1–2 years later (Glomb et al., 1999; McLaughlin et al., 2012; Nielsen and Einarsen, 2012). Studies using advanced longitudinal data analytic techniques have also established the existence of chronic SH in adult workers. Using latent growth mixture modeling, McGinley et al. (2011) uncovered two trajectories of SH: infrequent and chronic. Workers experiencing chronic SH consistently experienced elevated levels of SH over 10 years, and these chronic victimization experiences in turn predicted a battery of alcohol use outcomes. The present study extends prior research by investigating the link between chronic SH and problematic substance use and mental health outcomes over time among college students.

1.2. Developmental trends in SH

Scholars have reported that while the number of SH experiences increases between middle school and early high school (McMaster et al., 2002; Petersen and Hyde, 2009a,b), SH victimization appears to decline upon college entry (Petersen and Hyde, 2013b). But how do SH experiences change over time throughout college? To date, only one study has investigated this question. In a study of female undergraduate students, Cortina et al. (1998) found that the likelihood to report any sexual harassment typically increased with each additional year in school (e.g., from 39% in the first year to over 54% by years 4 and 5). However, this was a cross-sectional investigation, and these percentages reflect a “yes or no” response to experiencing SH at any point while attending their university; in other words, only cumulative experiences were assessed at one time point. Thus, no studies have examined latent growth of SH victimization throughout college, nor the possibility that different trajectories of SH victimization may emerge over time in this population.

1.3. Rationale for examining growth in SH

Thus, given the need for longitudinal studies using current advanced data analytic techniques to examine sexual harassment victimization (Neall and Tuckey, 2014; Petersen and Hyde, 2009a,b), and research demonstrating that more chronic experiences of SH are associated with poorer mental health and substance use outcomes (Chiodo et al., 2009; McGinley et al., 2011), the current study fills this gap in the research by using a person-centered approach in order to investigate heterogeneity in latent growth trajectories of SH victimization among college students.

1.4. Demographic risk factors of sexual harassment

1.4.1. Gender—In addition to outcomes linked to SH, it is important to consider what groups are at risk for increased SH victimization. Research on SH and gender has been mixed. While several studies have reported that women experience greater mean levels of SH than men (Berdahl and Moore, 2006; Das, 2009; Hand and Sanchez, 2000; Kalof et al., 2001; Lott et al., 1982; Reilly et al., 1986), others have reported more nuanced (McGinley et al., 2011), nonsignificant (Rospenda et al., 2000), or reversed (McMaster et al., 2002; Petersen and Hyde, 2009a,b; Wei and Chen, 2012) links between gender and SH. Still, studies have shown that some women are especially stressed or prone to self-blame by this form of victimization, which may have implications on their mental health (Goldstein et al., 2007; Lott et al., 1982; Petersen and Hyde, 2013a, 2013b; Till, 1980; Yoon et al., 2010), although few studies have attempted to understand these relations longitudinally in a young adult collegiate sample. Further, while men have overall higher rates of substance use than women (Goldstein et al., 2007; Greenbaum et al., 2005; O'Malley and Johnston, 2002), research indicates that college women have experienced a notable increase in problem drinking behaviors (e.g., binge drinking) compared to male students, whose rates have not exhibited a similar increase (Hoeppner et al., 2013; Newes-Adeyi et al., 2005). Since women may be especially stressed or prone to self-blame by SH and are currently exhibiting increased drinking at the college level, we explored the potential links among gender, SH, and mental health and substance use in an effort to explain this increase.

1.4.2. Race—Research on racial and ethnic minority individuals has similarly been mixed in regards to sexual harassment experiences. While some studies have found that incidences of SH are higher in these groups, and particularly among minority women (Berdahl and Moore, 2006; Cortina et al., 1998; Goldstein et al., 2007; McLaughlin et al., 2012), others have shown that racial and ethnic minority status is linked to fewer reported incidences of sexual harassment, perhaps due to increased tolerance of sexually harassing behaviors (Clodfelter et al., 2010; Cortina et al., 2001; Goldstein et al., 2007; Ho et al., 2012; Kearney and Gilbert, 2012; Krieger et al., 2006; Welsh et al., 2006; Yoon et al., 2010). Further, one investigation of SH in college students showed no differences in rates of SH experiences across ethnic/racial groups (Kalof et al., 2001).

Direct links between race and mental health and behavioral outcomes are likewise complex. Whereas White students tend to report the overall highest levels of substance use compared to other racial or ethnic groups (Goldstein et al., 2007; O'Malley and Johnston, 2002), racial and ethnic minority students who experience other types of harassment (particularly racial discrimination) have been found to have elevated levels of drinking (Martin et al., 2003). Studies have also indicated that ethnic minority youth have higher levels of depression and anxiety (Okazaki, 1997; Roberts et al., 1997), particularly when compared to White male counterparts (Kelly et al., 1999). Yet, other studies exploring mental health status among racial or ethnic groups have failed to find significant differences (Eisenberg et al., 2007; Goldstein et al., 2007). Given these inconsistent findings, the links among race/ethnicity, SH victimization, mental health and substance use were also examined in the current study.

1.4.3. Sexual orientation—Research regarding correlates and outcomes of SH in sexual minority populations appears to be more straightforward. Numerous studies have found that sexual minority (e.g., bisexual, gay, lesbian, questioning) individuals are at greater risk for experiencing SH compared to individuals belonging to the sexual majority (Cortina et al., 1998; Gruber and Fineran, 2008; Mitchell et al., 2014; Nawyn et al., 1999; Williams et al., 2003; Williams et al., 2005). SH can be especially upsetting or distressing when experienced by sexual minority youth (Mitchell et al., 2014). Moreover, SH experienced by sexual minority individuals may place them at an increased risk for negative outcomes; sexual minority youth have typically reported poorer mental and physical health outcomes and higher rates of substance use problems compared to their heterosexual peers (Gruber and Fineran, 2008; Nawyn et al., 1999; Williams et al., 2005). The current study sought to more formally test potential links among sexual orientation, SH victimization, and mental health and substance use outcomes.

1.5. Rationale for examining a mediational model

In light of the research described above, and to address gaps in existing research, we explored SH as a mediator of the relationship between demographic risk factors (gender, race, sexual orientation) and mental health and substance use in an effort to elucidate the direct and indirect relations among these variables. While cross-sectional research indicates that women, those of white race/ethnicity, and LGBQ students are more likely to experience sexual harassment in college (e.g., Hill and Silva, 2005), this study is the first longitudinal study to use a within-subjects approach to determine which groups of students are at greater risk for experiencing *chronic* SH, and whether negative mental health and substance use outcomes can be explained by exposure to chronic SH. We hypothesize that each of the demographic risk factors listed above (gender, race, sexual orientation) are directly and indirectly associated with future mental health (i.e., anxiety, depression) and substance use (i.e., binge drinking, marijuana use) outcomes via chronic SH victimization. We proposed this mediational model examining the direct and indirect links among demographic risk factors, SH victimization, and outcomes based on empirical evidence suggesting direct links among 1) demographic risk factors and SH, and 2) SH and mental and behavioral outcomes. We believe it is important to note possible indirect links given that SH may provide an explanatory mechanism for links between demographic predictors and outcomes (e.g., several groups have reported being particularly distressed by SH) (Goldstein et al., 2007; Mitchell et al., 2014). Moreover, direct effects may mask these important indirect processes. For example, whereas male students typically consume more alcohol than women (Greenbaum et al., 2005; O'Malley and Johnston, 2002), it is possible that women may consume more alcohol than men if they experience chronic SH victimization.

2. Material and methods

2.1. Sampling and data collection

Study participants were recruited from a sample of 9100 incoming freshmen at eight colleges and universities in the Midwestern United States. Six schools provided us with a random sample of students, and two schools chose to allow us to sample all freshman students. Electronic and mail survey invitations to complete a web survey were sent out at

four points in time: at the very beginning of students' first year of college in the fall of 2011 (baseline/T0), the spring of 2012 (T1), about 4 months after baseline, the beginning of fall 2012 (T2), about 4 months after T1, the beginning of fall 2013 (T3), about 12 months after T2, and the beginning of fall 2014 (T4), about 12 months after T3. When schools provided us with a postal mail address for students, a postcard was also mailed to inform them that the survey e-mail invitation had been sent. Students were required to be at least 18 years old at baseline in order to complete the survey. Students were sent a $25 Amazon gift certificate for completing the baseline survey, a $30 certificate at each time point for completing the T1, T2, and T3 surveys, and a $40 certificate for completing the T4 survey. The study was reviewed and approved by the IRB at the authors' institution, as well as the IRB at each school (although some schools deferred to the authors' institution and waived review). Informed consent was obtained from all individual participants included in the study.

At baseline, 2984 students responded to the invitation. Data was excluded from analysis for various reasons, including age less than 18 at baseline (n = 2), erratic responses to items (n = 1), non-freshman status (n = 1), no data at any time point for SH (n = 53), and age was greater than 20 (n = 72) (in order to represent a more typical incoming freshman population). Additionally, due to an oversight in the data collection, age was not collected from every respondent at baseline, and age information was missing for 683 participants. However, these participants were retained in the final analysis. A total of 2855 (58.3% female) participants were retained in the growth model for SH. Of those who reported information on race/ethnicity (n = 48, 1.7%, participants left this question blank), 53.3% reported White, 8.1% reported African American, 16.7% reported Asian/Pacific Islander, 12.9% reported Hispanic/Latino, and 7.3% reported multiracial/other.

Overall retention rates for subsequent time points were as follows: 71% (T1), 70% (T2), 65% (T3), and 67% (T4). Additionally, a series of attrition analyses (t-tests, Chi-square) indicated that those who dropped out of the study at any point were significantly more likely to be African American, not exclusively heterosexual, depressed, engage in more binge drinking, and experience greater sexual harassment than those who provided data at all time points. However, full information maximum likelihood (FIML) was implemented (Enders, 2006), allowing for the majority of the sample to be retained in the final regression analysis if participants were not missing all predictor variables. This modern missing data technique produces estimates for missing data based on available information, and is less biased than traditional approaches to handling missing data (e.g., listwise deletion).

2.2. Materials

2.2.1. Demographic and control variables—Participants indicated their gender, race, and sexual orientation at baseline. To assess sexual orientation, participants were asked “What is your sexual orientation?” with a 5-point response scale (1 = Exclusively Heterosexual (84.4%), 2 = Mostly Heterosexual (8.1%), 3 = Bisexual (2.6%), 4 = Mostly Lesbian/Gay (1.2%), 5 = Exclusively Lesbian/Gay (1.5%)). Due to variable skewness, this was recoded into a 4-point response scale by combining the latter two categories. Some participants (n = 64, 2.2%) did not respond to this question. Lifetime Stress was included in our analysis to control for major life events that could have a substantial impact on

harassment, substance use and mental health. Lifetime Stress was assessed by administering The List of Threatening Experiences (LTE-Q) (Brugha et al., 1985; Brugha and Cragg, 1990). The LTE-Q is based on life events collected in a general population sample, rated for long-term contextual threat. Participants indicated whether or not (*yes/no*) they experienced any of the life events (e.g., a major illness, parents' divorce, abusive experiences) throughout their lives.

2.2.2. Sexual harassment—Sexual Harassment (SH) at school was measured at Baseline, T1, T2 and T3 with a 12-item modified version of the Sexual Experiences Questionnaire (SEQ) (Fitzgerald et al., 1988), worded to make items applicable to both male and female students. The SEQ has been extensively used for the study of the psychological construct of SH, including use in college student samples (Fitzgerald, 1996; Fitzgerald et al., 1995, 1988, 1997). Nine items were selected for inclusion from the full version of the SEQ based on item-total correlations in a university study of sexual and generalized harassment (Richman et al., 1999). Questions about SH were modified to reflect the previous 4 or 12 months, depending on the time point (thus, there was no overlap in assessment periods). The previous 12 months was used at baseline. Additionally, questions about SH were limited to the school setting. Specifically, students were asked "*During the last 4/12 months at school, how often have you been in a situation where any of your fellow students or teachers did any of the following?*" The SEQ items behaviorally depict three types of SH: gender harassment (the items we used assessed being put down because of your gender; treated differently because of your gender; crude and offensive sexual remarks), unwanted sexual attention (the items we used assessed unwanted attempts to be drawn into discussions of a sexual nature; unwanted sexual attention; and inappropriate touching and an additional item which is not on current versions of the SEQ but which loads strongly on the gender harassment subscale - being leered at in an uncomfortable way), and sexual coercion (the items we used assessed negative consequences for not engaging in sexual behavior; bad treatment for refusing dates or sex; promise of special treatment for agreeing to dates or sexual behavior). We also added two items to assess the potential problem of cyber-harassment (i.e., "*Sent you offensive e-mails or text messages that were sexual in nature*"; "*Posted hurtful or offensive comments about you or pictures of you that were sexual in nature on a social networking Web site* (e.g., *Facebook, MySpace, or Twitter*)"). Respondents rated each item for their experiences in school (in high school at baseline, college for subsequent waves) as occurring "never (0)," "once (1)," or "more than once (2)" at each time point (α = 0.85 to 0.88 across all waves).

2.2.3. Depression—Depressive symptomatology (past 7 days) was measured by seven items from the Center for Epidemiologic Studies Depression (CES-D) scale which were utilized in research by Mirowsky and Ross (1990) due to their high correlation with the overall CES-D (α = 0.83 at Baseline; 0.89 at T4).

2.2.4. Anxiety—Anxiety (past 7 days) was measured by the nine item tension-anxiety factor of the Profile of Mood States (McNair et al., 1981) (α = 0.87 at Baseline and T4).

2.2.5. Binge drinking—We measured binge drinking using an item from Wilsnack and colleagues (Wilsnack et al., 1991), revised to measure drinking in the past 12 months.

Students were asked "*About how often in the last 12 months did you have 5 or more drinks (males)/4 or more drinks (females) of any alcoholic beverage on the same occasion?*" (binge drinking). Participants responded at Baseline and T4 using a seven-point scale (0 = never in the last 12 months, 7 = 5 times or more per week).

2.2.6. Marijuana use—Participants were asked to indicate whether or not they had ever used "marijuana or hashish (pot, grass)" during their lifetime at Baseline. They were also asked to indicate their marijuana use in the last 12 months at T4. However, the response options were expanded to a 7-point scale to capture more variability in responses (1 = never, 4 = several times a month, 7 = every day). The T4 measure was recoded into a binary response (0 = never, 1 = any use) in order to be consistent with the baseline measure and in order to reduce skewness in this dependent variable.

2.3. Data analysis plan

2.3.1. Growth model—In order to accommodate longitudinal data with a preponderance of zeroes and missingness, two-part longitudinal modeling was implemented to examine growth of SH victimization over time from baseline to T3 (L. K. Muthén & Muthén, 1998–2012). In the binary aspect of the model (part one), data is coded as "0" (no victimization ever) and "1" (any victimization ever). In the continuous aspect of the model (part two), the magnitude of growth of those coded as "1" in the binary model is examined (L. K. Muthén & Muthén, 1998–2012). Scores in the continuous part of the model are automatically log transformed in Mplus. After establishing overall growth in the two-part model, we then examined possible heterogeneity in the growth of SH victimization using latent class growth analysis (LCGA) (B. Muthén and Muthén, 2000). As preliminary analyses indicated that the design effect for clustering at the school level was greater than 2, we implemented the type = complex option to correct for independence violations (L. K. Muthén & Muthén, 1998–2012).

In order to determine how many classes gave the best model fit, we used several assessments: the Log Likelihood, the Bayesian information criterion (BIC), the Sample Size Adjusted BIC (SSABIC), entropy, posterior class probabilities, and the Adjusted Lo-Mendell-Rubin (LMR) test (Duncan et al., 2006; B. Muthén and Muthén, 2000; Tofighi and Enders, 2008). Lower BIC and SSABIC values indicate better model fit, and are appropriate indicators to use when comparing GMMs that vary in the number of classes being estimated. Similarly, higher Log Likelihood values are a descriptive way to identify the best fitting model. Entropy values and posterior class probabilities (along the diagonal) closer to 1 indicate better classification by the model. Significant LMR values reflect that the current solution fits better than the solution with one fewer class. Additionally, we took into account the uniqueness and stability of the emerging classes, as well as their predictive utility (B. Muthén and Muthén, 2000). After the most likely LCGA model was established, the latent class growth mixture model (LGMM) was estimated in piecemeal fashion by freeing variance parameters (e.g., intercept, slope, quadratic, intercept and slope covariance, etc.). However, we set any parameters to zero if the model suggested that the variance was essentially zero (Jung and Wickrama, 2008).

2.3.2. Mediational model—In the mediational model (see Fig. 1), T4 mental health outcomes (anxiety, depression) and T4 substance use outcomes (binge drinking, marijuana use) were regressed on SH class (measured using baseline – T3 measurements), gender, race (dummy coded to represent comparisons among four racial/ethnic groups to White participants), sexual orientation, lifetime stress and respective baseline measures. SH class was simultaneously regressed onto gender, race, sexual orientation, lifetime stress and baseline measures of outcomes to account for potential bidirectionality in the model (omitted from the figure for readability). Indirect effects among risk factors/baseline/control measures, SH class (i.e., mediator) and the four outcomes were obtained (L. K. Muthén & Muthén, 1998–2012).

3. Results

Descriptive statistics of all study variables by wave are presented in Table 1.

3.1. Growth model results

A two-class, two-part quadratic growth model representing those who were either **Chronically** or **Infrequently** sexually harassed fit the data best according to the model fit indices (see Table 2). We then attempted to estimate the variances and covariances of these classes. The variance of the intercepts for the continuous aspect of both classes was successfully estimated (see Table 3). The variance was significant for the **Chronic Class**, but not the **Infrequent Class**. Estimation problems (e.g., Heywood cases, model nonconvergence) occurred when attempting to estimate the variances for linear and quadratic growth, as well as binary variance components. Thus, all remaining variances (and subsequent covariances) were fixed at zero.

After we determined the final 2-class LGMM model, we noted that the latent classes may include missing data that was non-ignorable, such that the missingness was potentially dependent on the latent harassment classes. In other words, we believed it was possible that those who placed in the latent chronic harassment class were more likely to drop out of the study and/or provide missing data due to their chronic harassment experiences. Thus, we conducted a Roy Latent Dropout Pattern-Mixture Modeling analysis (Muthén et al., 2011; Roy, 2003) to account for this potential non-ignorable missingness. The resulting model yielded comparable fit indices observed in the initial 2-class LGMM model (see Table 2).

In both the **Infrequently** and **Chronically** victimized classes, the likelihood to experience any SH (i.e., linear growth) decreased over time, but this decrease waned over time (i.e., quadratic growth; there was a resurgence in self-reported SH) (see Table 2, Fig. 2). In a similar fashion, the magnitude of those SH experiences also decreased initially, but increased over time. However, the intercept was higher and the linear decrease was less steep for the **Chronic Class** in this continuous aspect of the model. Approximately 64.9% of the sample was classified into the **Infrequent Class**, and 35.1% were classified into the **Chronic Class** (see Fig. 2). Chi-squared analyses indicated that being White, African American, or Other/multiracial race ($\chi^2(4) = 33.63$, $p < 0.001$), female ($\chi^2(1) = 84.83$, $p < 0.001$), and a sexual minority (i.e., any category other than exclusively hetereosexual) ($\chi^2(3)$

= 60.38, $p < 0.001$) was linked to a greater probability of being classified into the Chronic (vs. Infrequent) sexually harassed class (see Table 4).

3.2. Mediational model results

SH class significantly predicted all outcomes, such that Chronic class membership was linked to elevated anxiety, depression, binge drinking, and marijuana use at T4. Gender, sexual orientation, and being White (as compared to Asian/Pacific Islander and Hispanic/Latino dummy participants) predicted Chronic SH (see Table 5). All indirect effects among main model demographic predictors, Chronic SH, and T4 outcomes were statistically significant (p's < 0.05), supporting the mediating effect of Chronic SH between demographic variables and outcomes (see Table 6). Additionally, sexual (minority) orientation directly and positively predicted increased depression, anxiety, and marijuana use. Being female directly predicted elevated anxiety and depression levels, and being male was linked to elevated binge drinking and marijuana use. Being White directly predicted increased binge drinking (compared to all other racial/ethnic groups) and marijuana use (compared to Asian/Pacific Islander and Hispanic/Latino participants). Relative to White participants, being African American and Hispanic/ Latino directly predicted elevated T4 depression, whereas being Asian/Pacific Islander directly predicted elevated T4 anxiety. All baseline measures were directly and positively associated with respective T4 outcomes. In the test of model bidirectionality (see 2.3.2), baseline measures (except for binge drinking) significantly predicted Chronic SH (Table 4). Indirect effects among respective these baseline measures, Chronic SH and T4 outcomes were only significant for anxiety and depression (Table 6).[1]

4. Discussion

4.1. Overview of the growth model results

The purpose of this study was twofold: to examine latent developmental trajectories of undergraduate SH experiences, and to test a mediational model of the extent to which increased substance use and decreased mental health during the initial years of college among certain groups of students may be explained by level of exposure to SH. This represents the first study to date to examine latent developmental trajectories of SH experiences in this population using state of the art latent growth modeling techniques. Our study revealed that SH victimization is a chronic problem for many college students. Two

[1]We also considered the possibility that an analysis of the sexual harassment (SH) subscales could yield distinct classes and predictive utility relative to overall SH. Thus we conducted a piecemeal analysis of SH subscales, such that the two-part mixture model analysis was examined separately for each SH subscale, and a single subscale class variable was entered into the final mediational model in lieu of overall SH. However, this subscale analysis posed some concern as the cyber-harassment and sexual coercion subscales had notably lower variability than the gender harassment and unwanted sexual attention subscales. The analysis of the latent classes requires some variability in just those reporting any type of this SH (i.e., those reporting no subscale SH are only included in the "binary" aspect of the model and not the "continuous" aspect of the model). It is likely that both the number of items within the subscales (cyber-harassment: 2 items) as well as the nature of the SH (e.g., sexual coercion) contributed to this low variability. Across all waves, 4–11% percent of the sample reported any sexual coercion and 3–12% reported any cyber-harassment across. Conversely, 15–36% of the sample reported any gender harassment across all waves, and 20–42% reported any attention harassment across all waves. Thus, we only conducted the subscale analysis on the two more common subtypes of SH. We did not find substantively different results in terms of the number and predictive utility of the subscale classes. Again, a 2-class solution representing infrequent and chronic SH best fit the data for both subscales. Only two minor changes were found in the mediational model: in the gender harassment subscale analysis, baseline marijuana use was only marginally related to SH class ($p = 0.06$); in the unwanted sexual attention subscale analysis, the Latino dummy code was only marginally related to SH class ($p = 0.08$). Given the pattern of results, the fact we had no a priori hypotheses regarding how individual subscales would perform, and that SH is best defined by concurrently considering the multiple subscales (i.e., content validity concerns), we only report the full-scale SH results in the current paper.

latent classes of SH growth emerged over time: **Infrequent** and **Chronic** SH similar to previous research on adult workers (McGinley et al., 2011). Both classes typically experienced decreases in SH experiences upon college entry, though SH experiences rebounded between the end of the first year of college and the beginning of the second year of college (T3). This initial decrease and subsequent increase is supported by previous studies (McMaster et al., 2002; Petersen and Hyde, 2013a). Moreover, the percentage of students classified into the **Chronic class** (35%) corroborates with SH rates reported in previous studies of undergraduates (e.g., 28–60%) (Cortina et al., 1998; Fitzgerald et al., 1988; Kalof et al., 2001; Shepela and Levesque, 1998). Thus, while students may experience some initial "relief" in SH victimization upon college entry, it should be noted that moderately increasing levels of victimization are typical in the first few years of college, and a notable percentage of students face persistent elevated levels of SH victimization. Future studies should take into account the complex changing nature of SH victimization throughout the college student experience.

While the decline and rebound in SH experiences was similar across the two latent trajectories, the two groups diverged in important ways. First, the **Chronic Class** was more likely to report ever being sexually harassed, and if they were harassed, they experienced greater mean SH across the four time points when compared to the **Infrequent Class**. Further, the **Chronic Class** did not experience as steep of a drop in SH experiences as the **Infrequent Class**. Demographic predictors of growth parameters further distinguished the two groups; female, White, and sexual minority students had an increased risk of being classified into the **Chronic Class** (relative to the **Infrequent Class**). Finally, membership in the **Chronic Class** predicted future mental health and substance use outcomes.

We do note that the initial decrease and minor quadratic trend in the data could be a function of the reference periods for SH recall. The reference period at baseline and T3 was 12 months, whereas for T1 and T2 the reference period was the past 4 months (though we did account for these varying time periods in the growth model). However, levels at T3 still did not rival the levels of SH measured at baseline, so we are confident in the observation of the initial decrease at college entry. Moreover, the shape of the trajectory does not affect our main interpretation that a subgroup of students experiences chronic levels of SH.

4.2. Overview of the mediational model results and demographic risk factors

This study is the first to simultaneously examine demographic risk factors for SH and associations between SH and mental health and substance use outcomes in a manner to confirm potential indirect links between these constructs. The examination of demographic risk factors of SH supported that gender, sexual orientation, and race are all significant predictors of SH for undergraduate students. In turn, **Chronic Class** membership predicted increased depression, anxiety, binge drinking and marijuana use in the mediational model, supporting previous studies linking SH and deleterious mental health and substance use outcomes in college students (Huerta et al., 2006; Monks et al., 2010; van Roosmalen and McDaniel, 1998). Additionally, demographic risk factors were indirectly linked to these outcomes via SH class membership, even after controlling for direct and bidirectional effects in the model. All indirect effects involving demographic risk factors and outcomes were

found to be statistically significant, suggesting that the link between demographic risk factors and mental health problems and substance use are partly explained by the experience of chronic SH.

While relations between gender and SH have been mixed in the previous literature (Berdahl and Moore, 2006; Das, 2009; Hand and Sanchez, 2000; Kalof et al., 2001; McGinley et al., 2011; McMaster et al., 2002; Petersen and Hyde, 2009a,b; Rospenda et al., 2000; Wei and Chen, 2012), this study suggests that collegiate women are at a heightened risk for being a member of the **Chronic Class**. Notably, whereas being male directly predicted future substance use, being female was *also* related to future substance use indirectly, via chronic SH experiences. Thus, this study provides the first empirical evidence that SH plays an important role in explaining why substance use has increased among collegiate women. Future studies should similarly go beyond simple bivariate relations among gender and substance use to help explain patterns in college women's drinking behaviors over time.

White students also had an increased risk of belonging to the **Chronic Class** as compared to Hispanic/Latino and Asian/Pacific Islander students, reflecting some earlier research (Ho et al., 2012; Kearney and Gilbert, 2012; McGinley et al., 2011; Rospenda et al., 2000). One explanation for this finding is that *tolerance* of SH may be heightened in ethnic/racial minority individuals (e.g., Kearney and Gilbert, 2012). Scholars have also found that minority women, based on their experiences and priorities, may not readily label some behaviors as sexual harassment. For example, experiences of SH by minority women are often confounded with harassment due to race, and may be seen as less serious than racial discrimination (Welsh et al., 2006). However, since the current study could not provide insight to whether or how participants differed in tolerance and perceptions of SH across race and gender, future studies should make a concerted effort to understand and account for these individual differences.

Finally, sexual minorities were also at increased risk of belonging to the **Chronic Class**. This study is consistent with earlier studies linking sexual minority status with increased SH victimization, subsequent distress or substance use (Cortina et al., 1998; Gruber and Fineran, 2008; Mitchell et al., 2014; Nawyn et al., 1999; Williams et al., 2003, 2005). However, this was the first study to formally examine relations among these variables using a mediational model in a longitudinal framework. Additionally, only Cortina et al. (1998) had examined how female college student orientation was related to sexual harassment experiences; other studies had focused on high school or adult populations. Thus, this is the first study to focus on how sexual orientation of a general college population relates to SH. Cortina et al. (1998) suggested that individuals who identify as a sexual minority may also possess more feminist attitudes, thus heightening their awareness of sexually harassing behaviors. Additionally, these individuals may have fewer resources to help cope with these sexually harassing behaviors, thus leading to increased internalizing behaviors and substance use. Future research should focus on understanding what experiences, attitudes and coping resources can better explicate the relations uncovered among sexual orientation, chronic SH, and negative outcomes in the current study.

We note that those belonging to the **Chronic Class** had reported significantly greater drinking, anxiety and depression at baseline. We speculate that this could be because those who chronically experience SH in college also experience chronic SH in high school, thus leading to poorer outcomes at baseline. Alternatively, those who experience anxiety and depression in high school could have a heightened sensitivity to harassing experiences, and consequently are more likely to report sexual harassment than peers with fewer mental health concerns. Regardless, our study examined whether or not continued chronic SH can still uniquely contribute to negative outcomes throughout college. Indeed, after controlling for baseline measures and lifetime stress, chronic SH class membership continued to predict depression, anxiety and substance use.

4.3. Limitations

While this study addresses gaps in the existing literature on SH, some limitations should be noted. First, although the collegiate sample examined in the current study is large and diverse, the current findings may not be generalizable to collegiate samples outside the Midwestern United States, or to similarly aged adults not attending college. Second, outcome measures used to assess mental health and substance use do not reflect clinical diagnoses of mental illness or substance dependence, nor whether these outcomes may affect student performance outcomes (e.g., grades in school, graduation rates).

A third set of limitations involve measurement issues related to our assessment of SH. SH was objectively defined as the number of harassing experiences reported; since previous literature has noted that results may depend on defining SH as a “distressing” versus objective event (Goldstein et al., 2007; Petersen and Hyde, 2009a,b, 2013a), future efforts should assess both objective and subjective experiences of SH over time. Further, we did not assess whether or not individuals experiencing sexual harassment had also experienced sexual assault as related to these experiences. Future examinations should adequately assess both harassment and assault in order to better determine how these experiences contribute to problematic outcomes.

Finally, we used the SEQ to assess SH, which has been the subject of some critique (Gutek et al., 2004). While an exhaustive enumeration of the limitations of the SEQ is not appropriate here (interested readers are referred to Gutek et al., 2004), we address the limitations of this measure that are most relevant to the interpretation of our results. First, the SEQ has been critiqued for a lack of standardization (i.e., different studies use different versions). While standardization is a critical issue when comparing results of different studies, our goal was rather to examine how individuals' experiences that could be interpreted as sexually harassing change over time, using the same set of questions at each data collection point. Standardization in the general sense is therefore not a major problem for the present study, although it is an issue that needs to be considered for future research that aims to compare prevalence across studies.

Gutek et al. (2004) also noted that the psychometric properties of the SEQ have not been adequately established, most critically reliability and validity. While Gutek et al. acknowledge that the internal consistency reliability of the overall SEQ is generally good, as it was in the present study, the reliability of the subscales, particularly the sexual coercion

subscale, is often lower, most likely as a result of fewer subscale items and lower base rate of sexual coercion overall. We focused our analyses on the overall SEQ because we were interested in the general construct of sexual harassment, and had no a priori hypotheses regarding differential effects for subscales (which are correlated, and thus looking at individual subscales in isolation may give misleading results). Thus, reliability of individual subscales is not an issue for the present study. However, researchers who have a theoretical basis for examining individual subscales as independent predictors of outcomes would be advised to explore more reliable measures of sexual coercion than that contained in the SEQ.

Regarding validity, Gutek et al.'s (2004) central concern was that the criterion-related validity of the SEQ (i.e., the extent to which the SEQ assesses whether one has been subjected to sexual harassment in the legal sense) has not been established. However, the aim of the present study was to examine the effects of chronic exposure to experiences that may be considered to be sexually harassing, consistent with a psychological rather than legal definition of harassment. The SEQ has been shown to predict a wide variety of job-related, mental health, and physical health outcomes in ways predicted by theory (Willness et al., 2007), supporting the validity of the SEQ as a measure of the psychological construct of SH. The present study adds to that literature by demonstrating that negative outcomes such as alcohol misuse occur to a greater extent among college students when they are exposed to chronic SH. However, it is critical that future research investigates whether SEQ scores are a valid predictor of legal determinations of sexual harassment, and if not, new measurement tools should be developed for use in the context of SH litigation and research in the legal arena.

4.4. Implications for prevention and intervention

The results of this study also have several implications for SH prevention efforts, particularly in light of recent clarification of Title IX requirements in the area of the prevention of sex discrimination, which includes sexual harassment and sexual violence, and passage of the Campus Sexual Violence Elimination (SaVE) Act as part of the 2013 Violence Against Women Act (Violence Against Women Reauthorization Act of 2013; P.L. 113-4). First, because our data did not show that SH substantially declined over time, our data support a reinvigoration of attention to SH prevention on college campuses from an administrative standpoint, as well as a call to action for sexual harassment researchers to reinvigorate research on this phenomenon in college environments. Of particular importance is the need for evaluation research to determine the effectiveness of prevention efforts over time in reducing the prevalence of sexual harassment and sexual violence, as well as evaluation of treatment programs for targets to determine which are most effective in ameliorating health and mental health consequences, and for reducing the impact of sexual harassment and violence on academic outcomes for students. One possibility for future research in light of the passage of the SaVE Act would be to evaluate school reports of sexual harassment and sexual violence prevalence pre- and post-passage of the Act. On the one hand, prevalence may appear to increase, due to a larger variety of acts of sexual violence that schools must report. On the other hand, the hope is that prevalence will decrease over time if prevention efforts mandated under the stronger laws are effective in raising awareness and reducing occurrence of sexual violence on campus.

Second, while all schools receiving federal funding are required to have SH prevention efforts in place, including requirements for having in place a non-discrimination statement, a Title IX coordinator to ensure compliance with Title IX, and published grievance procedures for filing complaints of sexual harassment and violence, our research clearly shows that current prevention efforts have failed to remedy the problem, and there are still students experiencing chronic SH while attending college. This suggests that students are either not reporting their SH experiences, or schools are not adequately responding to reports. Prevention efforts should 1) make it clear that SH is not tolerated on campus, 2) inform students of their right to an educational environment free of sex discrimination, including sexual harassment and sexual violence, under Title IX of the Education Amendments of 1972, and 3) should create a safe environment for student reporting, i.e., a simple reporting process that is easy to access, and that is free of victim-blaming and retaliation. Our research supports Title IX guidance that sexual harassment prevention efforts need to be proactive, including training students to identify and report sexual harassment and violence, and should occur in an ongoing fashion throughout students' college careers.

Third, our data showed that being White, having a minority sexual identity, or being female increased risk for chronic SH, suggesting that demographic profiles of students may be a useful component in SH prevention efforts in terms of determining where SH prevention efforts might be most needed, and avenues for best reaching these students (e.g., sexual minority students might be reached partly through on-campus organizations focusing on LGBTQ issues; one avenue for reaching women might be through sororities).

Finally, our data have implications for prevention and intervention efforts geared towards mental health and substance misuse on college campuses. Our findings that chronic SH mediated the relationship between demographic factors and mental health and substance use outcomes suggest, like other research which has found that incivility mediates the relationship between sexual identity and alcohol misuse (Woodford et al., 2012), that substance use and mental health interventions should involve an assessment of students' experiences of sexual harassment and other experiences of mistreatment, and that merely addressing the substance misuse or mental health issue may not get at the root of the problem contributing to these manifestations of distress. School counseling centers should be well versed in helping students identify and report sexual harassment and other forms of mistreatment in order to improve the health of the student body.

4.5. Conclusions

In an examination of the latent growth in sexual harassment (SH) victimization in undergraduates, we found that SH decreases upon college entry, but slowly increases across the first two years of school. However, heterogeneity in this growth was notably evident; SH was experienced either **Chronically** or **Infrequently** by college students, as defined by latent growth mixture model trajectories. Students who were female, White or a sexual minority were at greater risk for being a member of the **Chronic SH class**. In turn, being a member of the **Chronic SH class** was related to poorer mental health (depression, anxiety) and substance use (binge drinking, marijuana use) outcomes. Taken together, future research should continue to examine these demographic risk factors in investigations on SH

victimization over time. Given the prevalence, chronic nature, and detrimental outcomes of SH experienced by college students, college administrators should engage in an increased effort to prevent SH from occurring on campus, and school counseling centers should be educated on how SH may impact mental health and substance use behaviors. Addressing contributing factors such as SH that increase likelihood of substance use should be considered as part of a comprehensive approach to student wellness.

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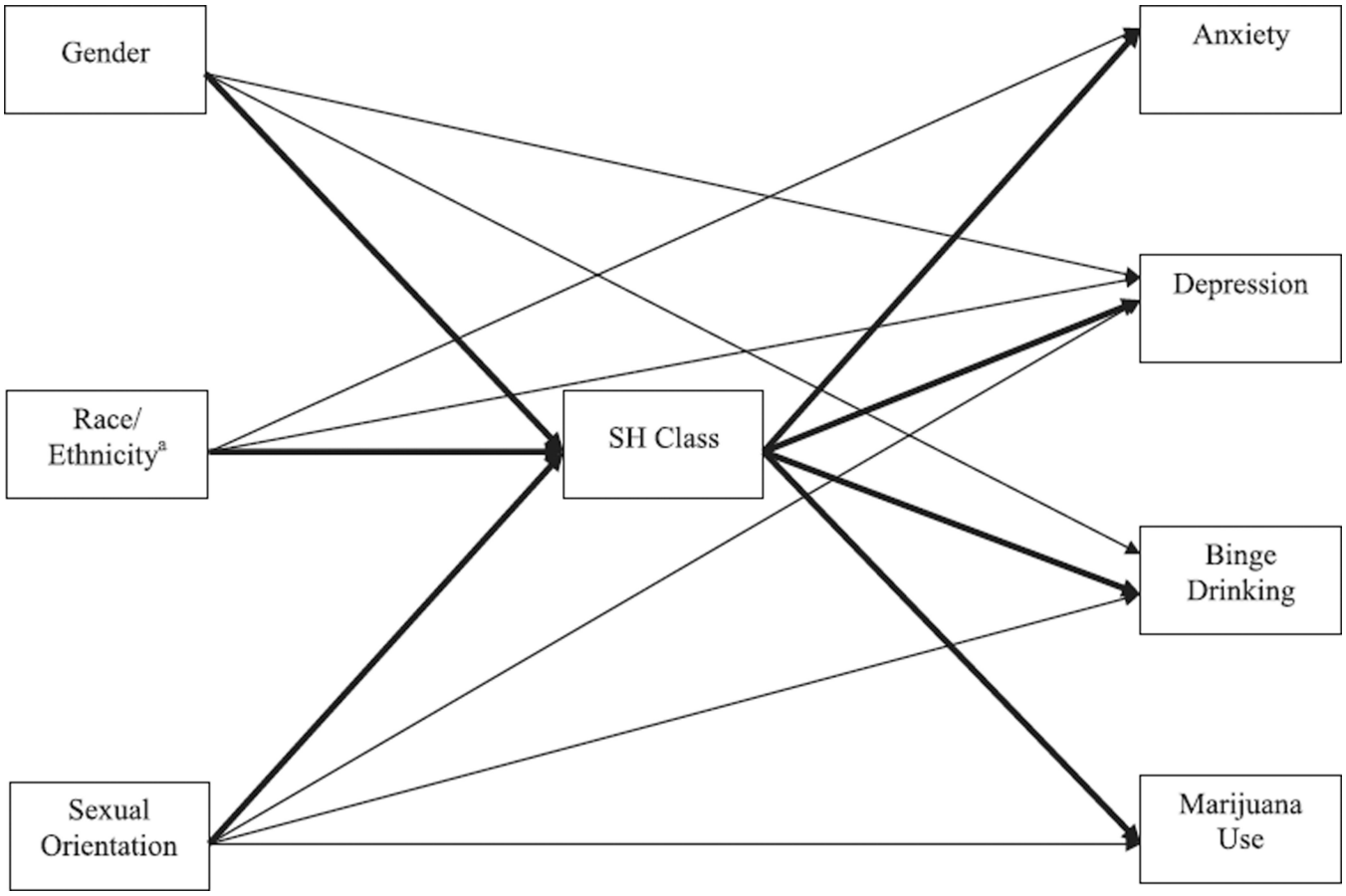

Fig. 1.

Direct and Indirect Effects tested in the Mediational Model. *Note*. Bold lines represent tested indirect effects. Bidirectional paths are not presented in the above figure to improve figure clarity.

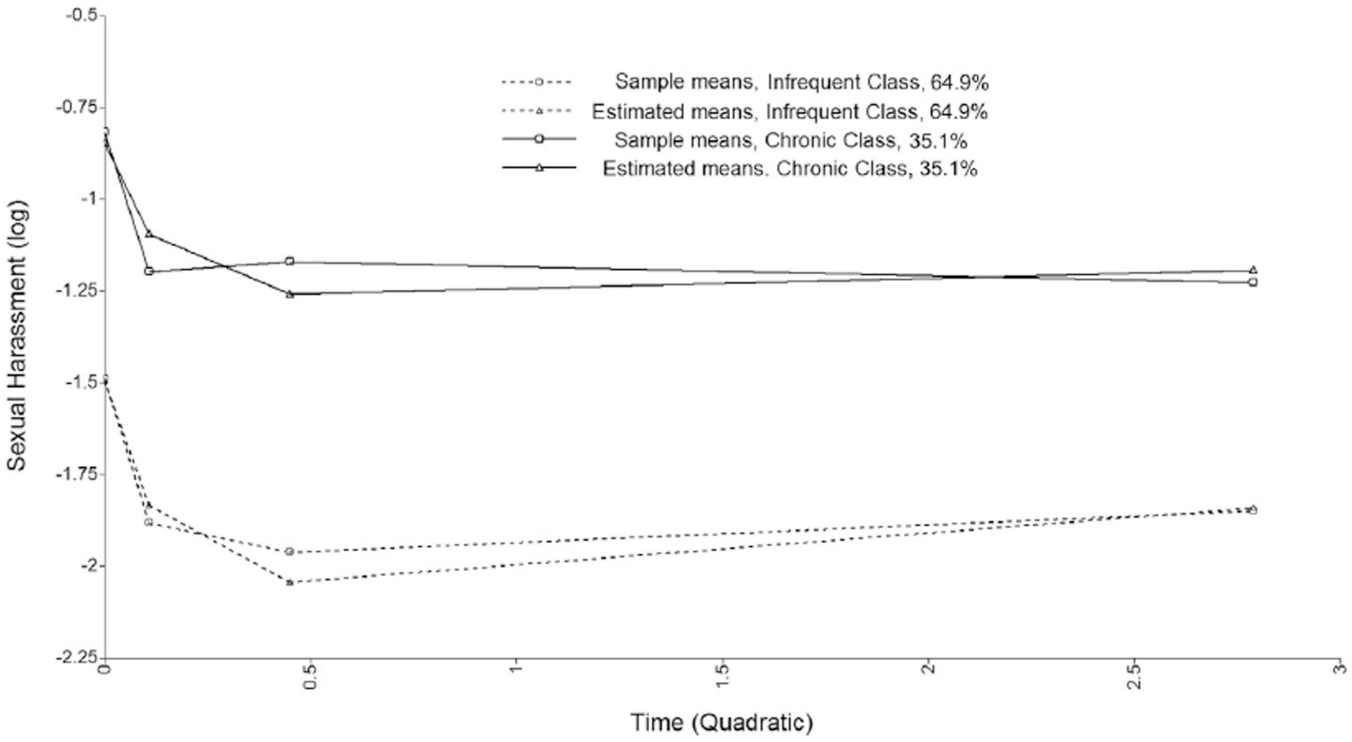

Fig. 2.
Growth mixture model classes (with estimated and sample means) for sexual harassment.

Table 1

Means and standard deviations for sexual harassment, depression, anxiety, and binge drinking, and percentage of use for any marijuana use (vs. no use) across all waves.

	Baseline	T1	T2	T3	T4
Sexual harassment	0.24(0.38)	0.13(0.27)	0.09(0.24)	0.09(0.22)	0.10(0.26)
Depression	1.97(0.67)	2.09(0.69)	2.01(0.75)	1.92(0.75)	1.95(0.75)
Anxiety	2.26(0.78)	2.36(0.83)	2.28(0.76)	2.13(0.81)	2.36(0.82)
Binge drinking	1.02(1.48)	1.06(1.18)	1.20(1.19)	1.80(1.86)	2.16(1.85)
Any marijuana use	31.7%	24.0%	30.5%	30.5%	30.0%

Note. Marijuana Use is coded and 0 = no use, 1 = any use. Time frame for T1 and T2 SH, Binge Drinking, and Marijuana Use measures include the past 4 months instead of the past 12 months.

Table 2

Latent class growth analysis (LCGA) and latent class growth mixture model (LGMM) fit indices for sexual harassment.

	Log likelihood	Number of parameters	BIC	SSA BIC	Entropy	Posterior possibilities	Adjusted LMR test
LCGA models							
1 class	−9113	7	18,282	18,260	–	–	–
2 classes	−8637	14	17,385	17,341	**0.63**	**0.84/0.91**	**936.27 (*p*<0.01)**
3 classes	**−8550**	21	**17,269**	**17,202**	0.57	0.77/0.70/0.85	168.84 (*p* = 0.22)
LGMM solution							
2 classes	−8567	16	17,262	17,212	0.59	0.88/0.86	–
2 classes + Roy drop out model[a]	−8561	18	17,265	17,208	0.59	0.89/0.86	–

Bold values indicate lowest BIC or SSABIC value, or highest Log Likelihood, Entropy or Posterior possibilities value.

Note. The 2 class model was retained given the relative poorer fit according to Entropy, Posterior Possibilities and Adjusted LMR test. Additionally, although the Log Likelihood, BIC, and SSABIC were lower for the 3 class model, the relative drop in these fit indices was much greater when increasing the model from 1 to 2 classes vs. 2 to 3 classes.

[a]The continuous intercept variance for the infrequent group was set at zero as the solution resulted in a negative variance (i.e., Heywood case). This variance was not significant in the LGMM solution, but was retained as model estimation terminated normally.

Table 3

Growth mixture model unstandardized parameters for the final 2-class LGMM solution.

	Sexual harassment classes	
	Infrequent	**Chronic**
Binary model		
Latent mean/slopes		
Intercept	−2.47**	–
Linear growth	−3.51**	−2.69**
Quadratic growth	1.42**	1.09**
Variance/covariances		
Intercept	–	–
Continuous model		
Latent mean/slopes		
Intercept	−1.51**	−0.84**
Linear growth	−1.20**	−0.91**
Quadratic growth	0.60**	0.42**
Variance/covariances		
Intercept	–	0.23**

** $p < 0.01$.

Note. Parameters that could not be estimated due to model identification or nonconvergence are represented with a blank (–). Linear and Quadratic variances and covariances are not presented due to model nonconvergence.

Table 4

Results of Chi-square Tests for Sexual Harassment (SH) class by Race/Ethnicity, Gender, and Sexual Orientation.

	SH class	
	Infrequent	**Chronic**
Race/Ethnicity		
Asian/Pacific Islander	364 (19.2%)	112 (12.2%)
African American	141 (7.5%)	89 (9.7%)
Hispanic/Latino	269 (14.2%)	100 (10.9%)
White	985 (52.1%)	538 (58.7%)
Other/multiracial	132 (7.0%)	77 (8.4%)
Gender		
Male	914 (47.6%)	274 (29.5%)
Female	1006 (52.4%)	656 (70.5%)
Sexual orientation		
Exclusively heterosexual	1691 (89.9%)	720 (79.1%)
Mostly heterosexual	115 (6.1%)	116 (12.7%)
Bisexual	36 (1.9%)	38 (4.2%)
Mostly/Exclusively Lesbian/Gay	39 (2.1%)	36 (4.0%)

Table 5

Unstandardized regression model results (Standard errors) for model direct effects.

	Chronic SH	Time 4 mental health and substance use outcomes			
		Anxiety	Depression	Binge drinking	Marijuana use
Model predictors					
Chronic sexual harassment	–	0.18(0.05) **	0.19(0.02) **	0.32(0.09) **	0.28(0.06) **
Gender	0.67(0.14) **	0.14(0.05) **	0.07(0.02) **	−0.26(0.05) **	−0.28(0.11) **
Sexual orientation	0.25(0.05) **	0.13(0.04) **	0.09(0.03) **	0.07(0.11)	0.24(0.11) *
African American	0.05(0.12)	0.03(0.06)	0.11(0.05) *	−0.86(0.14) **	−0.03(0.19)
Hispanic/Latino	−0.49 (0.14) **	0.05(0.07)	0.08(0.04) *	−0.60(0.15) **	−0.30(0.14) *
Asian/Pacific islander	−0.37(0.09) **	0.09(0.03) **	0.07(0.04)	−0.96(0.12) **	−0.62(0.08) **
Other/multiracial	−0.03(0.20)	−0.05(0.05)	0.02(0.07)	−0.39(0.17) *	0.35(0.19)
Lifetime stress	0.05(0.04)	0.01(0.00) **	0.01(0.01)	0.00(0.03)	0.00(0.02)
Baseline anxiety	0.35(0.05) **	0.29(0.05) **	–	–	–
Baseline depression	0.41(0.09) **	–	0.36(0.03) **	–	–
Baseline binge drinking	0.05(0.04)	–	–	0.49(0.05)**	–
Baseline marijuana use	0.25(0.11)*	–	–	–	1.74(0.12)**

Note. Chronic Sexual Harassment class coded as *0 = Infrequent, 1 = Chronic*.
Gender coded as 0 = *male*, 1 = *female*.
Race/Ethnicity dummy code comparison group is White.

* $p < 0.05$,

** $p < 0.01$.

Table 6

Unstandardized mediational model results (Standard errors) for model indirect effects.

	Time 4 mental health and substance use outcomes			
	Anxiety	**Depression**	**Binge drinking**	**Marijuana use**
Main model indirect effects via chronic SH				
Gender	**0.006(0.002)**	**0.006(0.001)**	**0.011(0.004)**	**0.001 (0.001)**
Sexual orientation	**0.002(0.001)**	**0.002(0.001)**	**0.003(0.001)**	**0.001 (0.000)**
African American	–	–	–	–
Hispanic/Latino	**−0.003 (0.001)**	**−0.003 (0.001)**	**−0.005 (0.001)**	**−0.001 (0.000)**
Asian/Pacific islander	**−0.002 (0.001)**	**−0.002 (0.001)**	**−0.004 (0.001)**	**0.000 (0.000)**
Other/multiracial	–	–	–	–
Control variable indirect effects				
(Respective) Baseline measure	**0.003(0.001)**	**0.003(0.001)**	–	0.001 (0.001)
Lifetime stress	–	–	–	–

Note. Chronic Sexual Harassment class coded as *0 = Infrequent, 1 = Chronic*.
Gender coded as *0 = male, 1 = female*.
Race/Ethnicity dummy code comparison group is White.
We do not report the results for African/American, Other/multiracial, Lifetime Stress and Binge Drinking at Baseline as these variables were not related to SH class in the overall regression model.
Bolded coefficients represent significant ($p < 0.05$) indirect effects.