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Research paper

Internalizing Symptoms, Alcohol Use, and Protective Behavioral Strategies: Associations with Regretted Sexual Experiences of College Students

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ABSTRACT

One of the most pervasive forms of regret, often connected to alcohol use, is sexual regret. Lifetime rates of regretted sexual experiences (RSE) for college students is between 29%-71.9%, with 31.8% endorsing past year RSE and 31.7% stating alcohol negatively influenced decision making. While past research has focused on psychological symptoms following sexual assault, psychological effects and subsequent outcomes of RSE remains under-studied. Whether a history of sexual regret is associated with mental health symptoms, alcohol use, and protective behavioral strategy (PBS) use in the past month was analyzed. Participants (n = 1,394; 57.68% females, 26.96% racial/ethnic minority) reported on internalizing symptoms (anxiety, depression, trauma symptoms, and suicidal ideation) and externalizing and protective behaviors (problematic alcohol use and PBS). It was hypothesized that those with a history of RSE would report heightened current psychological symptoms compared to those without a history of RSE, regardless of when the RSE occurred. Of the n = 1,394 participants, 39.96% reported sexual regret and 26.11% endorsed a history of sexual victimization. Results indicate that among participants with an RSE, past month symptoms of anxiety, depression, trauma, and suicidal ideation were heightened. A similar pattern emerged for problematic alcohol use, as those with a history of RSE engaged in more problematic alcohol use in the past month. For PBS, those with a history of RSE engaged in fewer PBS than those without. Understanding these factors may provide novel insight for mental health prevention efforts and intervention targets for individuals who experience sexual regret.

Regret is a negative emotion construct that often involves self-blame linked to past experiences and behaviors (Connolly & Zeelenberg, 2002; Gilovich & Medvec, 1995). Regrets are thoughts one has about how they might change a past action or have achieved a better outcome than what resulted (Roese et al., 2009). Adults, including college students, experience regret in many areas of life. According to one study, regrets of love (romance and family) were most commonly endorsed by adults, followed closely by regrets of both career and education (Morrison et al., 2012). Regret can lead to heightened psychological distress (Landman, 1987; Lecci et al., 1994; Wrosch et al., 2005) as well as impact a wide range of decision-making, judgments, and other health outcomes (Inman et al., 1997). Previous research shows that regrets that leave the largest impact include those marked by high opportunity for positive action (e.g., being able to correct the regretful experience; Roese & Summerville, 2005). Regrets concerning love are rated with higher intensity than regrets concerning work, with self-blame being the most common reason people endorse regrets of love (Morrison et al., 2012; Ordonez & Connolly, 2000).

One of the most pervasive and disruptive forms of regret, often related to alcohol use, is sexual regret. Lifetime rates of regretted sexual experiences (RSE) for college students is between 29%-71.9%, with 31.8% endorsing past year RSE (Merrill et al., 2018; Oswalt et al., 2005). A recent study reported female (18.47%) and male (15.20%) college student RSE in the past six months (Peterson et al., 2020). Reasons for RSE include inconsistencies between sexual decision making and morals (36.8%), decision making being influenced by alcohol at the time (31.7%), and women often feeling pressured by their partner to have sex (23.0%; Oswalt et al., 2005). Engaging in sexual intercourse once (i.e., a one night stand) and having sexual intercourse with someone known for less than 24 hours are additional reasons individuals reported experiences of sexual regret (Eshbaugh & Gute, 2008). In 2005, Oswalt and colleagues requested future research on what emotions are experienced

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after sexual regret, such as guilt or anxiety. Previous research has evaluated negative affect and experiences following casual sex/hook-ups, but do not differentiate between regretted and non-regretted sex (Bersamin et al., 2014; Larimer et al., 1999; Owen et al., 2011; Welsh et al., 2006). It was further noted that, while the majority of college students may not experience unintended pregnancy or a sexually transmitted infection, the majority will likely experience sexual regret at some point during their time in college (Oswalt et al., 2005). Students are more likely to experience sexual regret when involved in a fraternity or soroity, college athletics, and with a history of sexual victimization (Johnson et al., 2020). Given the fact that regret in general can lead to heightened psychological distress (Landman, 1987; Lecci et al., 1994; Wrosch et al., 2005), it is important to understand factors associated with RSE and subsequent internalizing symptoms and behaviors.

While overlap exists, RSE is an inherently different construct from risky sex and sexual victimization, due to the fact that regret is related to self-perception and is an emotional construct (Roese et al., 2009). Regret is viewed as an affective, almost cognitive, phenomenon and has the potential to lead to a unique type of psychological sequalae when compared to risky sex and sexual victimization, such as heightened symptoms of anxiety and depression (Roese et al., 2009). Important past research has found sexual violence can lead to a variety of adverse psychological sequalae (e.g., poorer mental health in general and less use of responsible drinking behaviors; Brahms et al., 2011) and risky sex is primarily aligned with risk-related health behaviors (e.g., STIs, unwanted pregnancies; Brown & Vanable, 2007; MacDonald et al., 1996). Investigations of the link between RSE and maladaptive personal self-evaluation, symptoms of anxiety, or symptoms of depression are limited (Oswalt et al., 2005). Sexual victimization, risky sex, and RSE are inherently intertwined with one another. Studying the unique effects of RSE in addition to risky sex and sexual victimization could yield a potentially unique profile of psychological symptomatology.

1. Internalizing Symptoms

Internalizing psychiatric symptoms can be conceptualized as symptoms of anxiety, (such as uncontrollable feelings of fear), and depressive symptoms, (such as symptoms of depressed mood, anhedonia, and irritability; American Psychiatric Association, 2013; Kendler et al., 2003). These disorders have only increased among college students in recent years (American College Health Association, 2016; Bravo et al., 2018; Hunt & Eisenberg, 2010). The American College Health Association-National College Health Assessment reported students were treated for anxiety (16.9%) and depression (13.2%) within the past year (American College Health Association, 2016). In a worldwide study, Auerbach et al., (2018) reported symptoms of Major Depressive Disorder present in 21.2% of college students (lifetime prevalence) and 18.5% for 12-month prevalence. For Generalized Anxiety Disorder, 18.6% of college students indicated lifetime and 16.7% indicated 12-month prevalence (Auerbach et al., 2018). Symptoms of anxiety and depression, including Major Depressive Disorder, have been associated with regret in previous studies (Chase et al., 2010; Roese et al., 2009).

In addition to anxiety and depression, college students are at risk of experiencing the internalizing symptoms of trauma and suicidal ideation. According to one study, 85% of undergraduate students reported experiencing a traumatic event at some point in their lifetime, with 21% of students experiencing a traumatic event within a 2-month period of college (Frazier et al., 2009). Furthermore, students diagnosed with anxiety and depressive disorders are at increased risk of suicidal ideation and attempts (Becker et al., 2018; Hirsch et al., 2019). A World Health Organization study found that 17.2% of college students engaged in suicidal thoughts and behaviors in the past year (32.7% lifetime), with onset of these thoughts occurring before the age of 16 years for three-fourths of the participants (Bruffaerts et al., 2019; Mortier et al., 2018). Meaning that by the time they enter college, students who experience suicidal thoughts and behaviors have already been dealing with these issues.

2. Externalizing and Protective Behaviors

Alcohol use is widespread throughout college campuses across the United States, creating a culture of drinking that leads to more problematic alcohol use among college students (Dvorak et al., 2020). Auerbach et al., (2018) reported that worldwide, 6.8% of colleges students indicated lifetime Alcohol Use Disorder, with 6.3% indicating 12-month AUD prevalence. Alcohol is commonly involved with RSE (Orchowski et al., 2012; Oswalt et al., 2005). One study on college women found that 35% reported regretting a sexual situation linked to drinking (Moorer et al., 2013). In another sample of college students, 25% reported at least one alcohol-related RSE in the past month (Orchowski et al., 2012). It remains unclear if rates of RSE differ between RSEs that occur in the context of alcohol versus without alcohol being involved.

Alternative to externalizing behaviors, which are typically thought of as negative/acting out behaviors, protective behavioral strategies (PBS) can be conceptualized as engagement in positive behavioral strategies to aid in reducing negative consequences (LaBrie et al., 2009; Martens et al., 2007). PBS are specific harm reduction strategies, implemented individually, that reduce both the rate of consumption and severity of negative alcohol-related outcomes (Pearson, 2013a). Alcohol PBS include three subtypes as commonly measured by the Protective Behavioral Strategies Survey: 1) Manner of Drinking; MD, 2) Stopping/Limiting Drinking; SLD, and 3) Serious Harm Reduction; SHR (Treloar et al., 2015). Examples of each subtype include: MD; avoiding "pre--gaming," SLD; having a friend let you know when you have had enough to drink, and SHR; only going out with people you know and trust (Treloar et al., 2015; Martens et al., 2005). Cross-sectional and longitudinal research has shown an inverse relationship between PBS and drinking behavior such that college students who report implementing alcohol related PBS also report lower alcohol consumption and fewer negative alcohol-related outcomes (Cronce et al., 2011; Lewis et al., 2010; Pearson et al., 2013b; Prince et al., 2013; Treloar et al., 2015). A recent study found that alcohol use was positively associated with RSE (meaning higher levels of alcohol use were associated with higher instances of sexual regret); with MD and SLD negatively associated with alcohol use, and SHR yielding a direct inverse relationship with regretted sex for females, but not for males (Peterson et al., 2020). Thus, an association between PBS use, decreased alcohol use, and fewer instances of RSE is indicated.

3. Study overview

The current study investigated three hypotheses. Hypothesis 1 (H1) examined whether a history of sexual regret was associated with heightened past month psychological symptoms compared to no experience of RSE, regardless of when the RSE occurred. Hypotheses 2 and 3 (H2 and H3) examined externalizing and protective behaviors. It was hypothesized that problematic alcohol use would be heightened among those with a history of sexual regret, and the magnitude of this being more robust for those with a recent RSE (H2); and that individuals with a history of sexual regret would utilize fewer PBS, regardless of when the RSE occurred (H3).

Method

3.1. Participants

The analysis sample (n = 1,394) consisted of primarily White (73.04%) females (57.68%). Data for this study was collected between September 2019 to April 2020. Participants ranged in age from 18-57 years old (Mean = 19.78, SD = 3.56). Of the n = 1,394 participants, 56.35% reported current sexual activity, 34.22% reported sexual regret in their lifetime (former), 5.74% reported sexual regret in the past

month (recent) and 26.11% endorsed a history of sexual victimization. Additional detailed descriptive statistics and bivariate correlation data are provided in Tables 1 and Table 2, respectively. All participants were treated in accordance with the American Psychological Association ethical guidelines for research (Sales & Folkman, 2000).

3.2. Procedures

Participants were recruited though a university research pool and completed a cross-sectional survey titled "College Student Experiences of Regret." No identifying information was collected and course credit was offered for participation. Participants were asked to provide information on RSE, history of sexual victimization, internalizing symptoms and behaviors. Internalizing symptoms included symptoms of anxiety, depression, trauma, and suicidal ideation. Behaviors included alcohol use and engagement in protective behavioral strategies.

3.3. Measures

Demographics. Participants reported age, biological sex, sexual orientation, current sexual activity, race and ethnicity. Descriptive statistics are depicted in Table 1.

Regretted Sexual Experiences. Regretted sexual experiences were assessed using two 'yes' or 'no' questions. The first question asked, "Have you ever had a sexual experience you later regretted?" This item was adapted from the Young Adult Alcohol Consequences Questionnaire (YAACQ; Read et al., 2006) and a modified version of the sex-related alcohol negative consequences subscale (e.g., Larimer et al., 1999; Lewis et al., 2010; Wood et al., 2001) of the Young Adult Alchol Problem Screening Test (YAAPST; Hurlbut & Sher, 1992). This single consequence item has been utilized in past research to analyze previous RSE (Peterson et al., 2020; Simons et al., 2010). The YAACQ and the YAAPST have been validated for use with college populations (Hurlbut & Sher, 1992; Read et al., 2006). The second question asked, "Did this regretted sexual experience occur in the last month." This allowed for the creation of three RSE groups: recent RSE (occurring in the past month), former RSE (indicating lifetime), and no RSE.

Current Sexual Activity. Participants responded to the question "Are you currently sexually active" with response options of 'yes' or 'no.'

Sexual Assault. The Sexual Experiences Survey-Short Form Victimization (SES-SFV) assesses lifetime sexual victimization (Koss et al., 2007). In the present study, participants were asked to respond to each question with either "yes" or "no" to whether they had experienced any of the scenarios of victimization either "In the past 12 months" and "From age 14 until 1 year ago." The SES is one of the most commonly used and accepted measures of adult sexual victimization (Koss et al., 2007). Response options were rated on a dichotomous (0 = no, 1 = yes) scale. Typically, the SES-SFV is coded ordinally by six mutually exclusive groups: nonvictim, unwanted sexual contact, attempted coercion, coercion, attempted rape and rape; for the purposes of this study, one outcome was dichotomized to represent any sexual victimization versus no sexual victimization.

Anxiety Symptoms. Symptoms of anxiety in the past month were measured using the Generalized Anxiety Disorder-7 Item Screen (GAD-7; Spitzer et al., 2006; Swinson, 2006). The GAD-7 questionnaire has seven items that assesses the severity of anxiety symptoms according to DSM-5 criteria (e.g., worrying too much about different things). Items are rated on a scale from 0 (Not at all) to 3 (Nearly every day), with higher scores indicating more severity. Four categories of symptom severity exist for a total GAD-7 scale score, including: 0-4 (minimal), 5-9 (mild), 10-14 (moderate) and 15-21 (severe) anxiety symptoms. The GAD-7 has established reliability and validity for use with the general population (Lowe et al., 2008). The GAD-7 showed good overall internal consistency in the current study (α = .93).

Depressive Symptoms. Symptoms of depression in the past month were measured using the Patient Health Questionnaire-9 Item Depression Screen (PHQ-9; Kroenke et al., 2001). The PHQ-9 questionnaire has nine items that assess the severity of depression symptoms according to DSM-5 criteria (e.g., having little interest or pleasure in doing things). Items are rated on a scale from 0 (Not at all) to 3 (Nearly every day), with higher scores indicating more severity. Five categories of symptom severity exist for a total PHQ-9 scale score, including: 0-4 (minimal), 5-9 (mild), 10-14 (moderate), 15-19 (moderately severe) and 20-27 (severe) depressive symptoms. The PHQ-9 has established reliability and validity for use with college students (Keum et al., 2018). The PHQ-9 showed good overall internal consistency in the current study (α = .90).

Trauma Symptoms. Symptoms of trauma in the past month were measured using the Posttraumatic Stress Disorder Checklist for DSM-5 (PCL-5; Weathers et al., 2013). The PCL-5 questionnaire has twenty items that assess the severity of trauma symptoms according to DSM-5 criteria. Items are rated on a scale from 0 (Not at all) to 4 (Extremely), with a score of 33 indicating clinical trauma symptoms. The PCL-5 has established reliability and validity for use with college students (Blevins et al., 2015). The PCL-5 showed good overall internal consistency in the

Table 1
Descriptive Statistics.

Variables	All(N = 1,394)	Females(n = 804)	Males(n = 590)	Total Skew	Lower Limit	Upper Limit
	n (%)	n (%)	n (%)			
Biological Sex	–	804 (57.68%)	590 (42.32%)	0.31	0	1
Victimization	364 (26.11%)	290 (36.07%)	74 (12.54%)	1.09	0	1
No RSE	837 (60.04%)	429 (53.36%)	408 (69.15%)	-0.37	0	1
Recent RSE	80 (5.74%)	51 (6.34%)	29 (4.92%)	3.85	0	1
Former RSE	477 (34.22%)	324 (40.30%)	153 (25.93%)	0.69	0	1
Sexual Activity	785 (56.31%)	470 (58.46%)	315 (53.39%)	-0.26	0	1
	All, M (SD)	Females, M (SD)	Males, M (SD)	Total Skew	Lower Limit	Upper Limit
Age	19.78 (3.56)	19.79 (3.78)	19.76 (3.24)	5.01	18	57
Anxiety	1.92 (0.77)	2.08 (0.80)	1.70 (0.66)	0.89	1	4
Depression	1.77 (0.66)	1.87 (0.68)	1.63 (0.59)	0.94	1	4
Trauma Symptoms	1.79 (0.85)	1.90 (0.91)	1.64 (0.73)	1.38	1	5
Suicidal Ideation	0.18 (0.38)	0.20 (0.40)	0.14 (0.34)	1.71	0	1
AUDIT score	4.06 (4.74)	4.04 (4.53)	4.08 (5.02)	1.96	0	40
MD PBS	3.85 (1.56)	4.01 (1.50)	3.62 (1.62)	-0.18	1	6
SLD PBS	3.76 (1.52)	3.95 (1.46)	3.50 (1.56)	-0.21	1	6
SHR PBS	4.98 (1.31)	5.24 (1.14)	4.62 (1.44)	-1.8	1	6

Note. MD PBS = Manner of Drinking Protective Behavioral Strategies; SLD PBS = Stopping/Limiting Drinking Protective Behavioral Strategies; SHR PBS = Serious Harm Reduction Protective Behavioral Strategies; SD = Standard Deviation. Coding: Biological sex coded as 0 = female, 1 = male; Sexual activity coded as 0 = no, 1 = yes; Suicidal ideation coded as 0 = no, 1 = yes; Victimization coded as 0 = no, 1 = yes. Percentages are based on observations coded as 1.

current study (α = .96).

Suicidal Symptoms. Participants completed the Columbia–Suicide Severity Rating Scale (C-SSRS) as a measure of suicidal ideation (Posner et al., 2011). Responses included 'yes' or 'no,' with six questions total (e.g., "In the past month, have you wished you were dead or wished you could go to sleep and not wake up"). Responses were dichotomized for purposes of the current study, with '0' indicating no endorsement of any suicidal ideation on all six questions, and '1' indicating a yes to any of the six questions asked, signifying some level of suicidal ideation. The C-SSRS has been validated for use in clinical and research settings (Posner et al., 2011). The C-SSRS showed good overall internal consistency in the current study (α = .87).

Problematic Alcohol Use. Participants completed the Alcohol Use Disorders Identification Test-10 items (AUDIT) as a measure of problematic alcohol use, including consumption and problems, in the past year (Saunders et al., 1993). Questions are rated on a 0 (Never) to 4 (Daily or Almost Daily) scale, with higher scores indicating more alcohol use problems. Questions on the AUDIT include "How often do you have a drink containing alcohol" and "How often during the last year have you been unable to remember what happened the night before because you had been drinking?" Harmful or hazardous drinking is indicated by a score of 8 or more, and alcohol dependence is indicated by a score of 13 or more for women, and 15 or more for men. The AUDIT has been validated for use with college students (Demartini & Carey, 2012), and showed good overall internal consistency in the current study (α = .84).

Protective Behavioral Strategies. The Protective Behavioral Strategy Survey-20 (PBSS-20) assesses the three subtypes of harm reduction strategies used to drink less and/or to mitigate negative consequences from drinking alcohol: Manner of Drinking, Stopping/Limiting Drinking, and Serious Harm Reduction (Martens et al., 2005; Treloar et al., 2015). PBS use in the past month was assessed on a six-point scale (1 = Never, 6 = Always) and began with the heading of "Please indicate the degree to which you engage in the following behaviors when using alcohol or partying." Questions include, "How often do you use a designated driver?" and "How often do you leave the bar/party at a predetermined time?" Previous research supports the reliability and validity of the PBSS-20 in a general population (Richards et al., 2018), including college students, as well as test-retest reliability and criterion validity, with improved content validity for the SHR scale (Treloar et al., 2015). The PBSS-20 showed good overall internal consistency in the current study (MD α = .88, SLD α = .90, and SHR α = .92).

3.4. Data Preparation and Analysis Overview

Participants were classified into three groups based on their history of RSE to analyze rates of internalizing symptoms and behaviors. Sexual regret group status included whether the RSE was experienced: in the past month (recent RSE; n = 80 [5.74%]), in their lifetime, but not the past month (former RSE; n = 477 [34.22%]), and never experienced (no RSE; n = 837 [60.04%]). Sexual victimization was assessed via the SES-SFV. This outcome was dichotomized to represent any sexual victimization versus no sexual victimization. Biological sex, sexual victimization, current sexual activity and age were added to all analyses to control for these items in the context of RSE. Data was examined for potential outlying values as well as leverage and influence. No observations were found to be exerting excessive leverage or influence.

The analysis was divided into four models to examine internalizing, externalizing, and protective behavioral outcomes. Three internalizing outcomes (anxiety, depression, and trauma symptoms) were examined in a multiple-dependent variable regression model allowing for the simultaneous analysis of these continuous outcomes. The suicidal ideation outcome was heavily skewed with 82.80% of the sample endorsing no suicidal ideation. To examine this outcome, we dichotomized the variable to represent any suicidal ideation in the past month with a logistic regression model. Problematic alcohol use is often a skewed variable, as was the case in these data as well. However, examination of the residuals indicated a normal distribution and thus was analyzed using a linear regression model. Use of alcohol PBS subtypes were simultaneously examined using a multiple-dependent variable regression model. Missing data was rare, ranging from 0.43% to 5.09% across all measures, and was handled using full information maximum likelihood.

4. Results

4.1. Descriptive and Bivariate Statistics

Descriptive and Bivariate Statistics are listed in Table 1 and Table 2, respectively. High correlations are indicated by values above 0.7, compared to low correlations, which are indicated by a value of 0.1 or below. Significant positive correlations were observed among the internalizing variables (anxiety, depression, trauma symptoms and suicidal ideation). Positive correlations among the PBS subtypes were observed, as were negative correlations between PBS and alcohol use. Male biological sex was associated with less internalizing symptoms across all measures, as well as fewer PBS, but not problematic alcohol use. A history of sexual victimization was associated with heightened levels of internalizing symptoms (anxiety, depression, trauma symptoms and suicidal ideation), more problematic alcohol use, and less use of the Manner of Drinking PBS subtype. Positive associations occurred between problematic alcohol use and all four internalizing symptoms, indicating more problematic alcohol use among those who indicated higher severity levels of the four internalizing symptoms (anxiety, depression, trauma symptoms and suicidal ideation). Thus, as problematic alcohol use increases, so do internalizing symptoms at a linear rate. Inverse associations exist between MD PBS and depression and MD PBS and trauma symptoms, meaning as one increases, the other decreases. Similarly, an inverse association exists between SLD PBS and depression and SLD PBS and suicidal ideation. Biological sex was not equally distributed across the groups (χ^2 [2] = 35.87), with more females in each of the groups: former RSE (Females: n = 324; 40.30%, Males: n = 153; 25.93%), recent RSE (Females: n = 51; 6.34%, Males: n = 29; 4.92%), and no RSE (Females: n = 429; 53.36%, Males: n = 408; 69.15%), see Table 1. Statistically significant differences were also observed between biological sex and history of victimization (χ^2 [1] = 97.52, p < .001) with more females than males with a history of victimization (Females: n = 290, 20.80%, Males: n = 74, 5.31%). Statistically significant differences were also observed between history of victimization across the RSE groups (χ^2 [2] = 232.95, p < .001), with more history of victimization in the former (48.43%) and recent (46.25%) RSE groups than the no RSE group (11.47%). For current sexual activity, statistically significant differences were observed for RSE group (χ^2 [2] = 114.21, p < .001), with 54.96% of individuals in the no RSE group reporting no current sexual activity; as well as for history of victimization (χ^2 [1] = 34.09, p < .001), with 38.26% of individuals without a history of victimization reporting current sexual activity. No differences were observed between biological sex and current sexual activity.

4.2. Anxiety, Depression, and Trauma Symptoms

Hypothesis 1 examined whether a history of sexual regret was associated with heightened past month psychological symptoms compared to no experience of RSE, regardless of when the RSE occurred. Symptoms of anxiety, depression, and trauma were analyzed using a multiple dependent variable regression model for continuous outcomes while controlling for biological sex, history of sexual victimization, current sexual activity and age: anxiety (F[7, 1392] = 30.41, p < .001, R^2 = .116), depression (F [7, 1392] = 22.34, p < .001, R^2 = .088), and trauma symptoms (F [7, 1392] = 23.83, p < .001, R^2 = .094; see Table 3). Biological sex was inversely associated with symptoms of anxiety (b = -0.28, p < .001), depression (b = -0.16, p < .001), and

Table 2
Bivariate Correlations.

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	–											
2. Biological Sex	-0.00	–										
3. Victimization	0.12*	-0.26*	–									
4. Sexual Activity	0.11*	-0.05	0.16*	–								
5. Anxiety	0.03	-0.24*	0.26*	0.02	–							
6. Depression	0.03	-0.18*	0.25*	-0.01	0.78*	–						
7. Trauma Symptoms	0.04	-0.15*	0.27*	0.01	0.77*	0.82*	–					
8. Suicidal Ideation	-0.02	-0.09*	0.18*	-0.05	0.27*	0.39*	0.34*	–				
9. AUDIT score	0.02	0.00	0.23*	0.25*	0.13*	0.16*	0.18*	0.08*	–			
10. MD PBS	0.05	-0.12*	-0.09*	-0.13*	-0.04	-0.08*	-0.07*	-0.07	-0.31*	–		
11. SLD PBS	0.03	-0.15*	-0.02	-0.02	-0.03	-0.07*	-0.04	-0.08*	-0.12*	0.77*	–	
12. SHR PBS	-0.00	-0.23*	-0.03	0.05*	0.02	-0.03	-0.03	-0.07	0.02	0.65*	0.71*	–

Note. AUDIT = Alcohol Use Disorders Identification Test; MD PBS = Manner of Drinking Protective Behavioral Strategies; SLD PBS = Stopping/Limiting Drinking Protective Behavioral Strategies; SHR PBS = Serious Harm Reduction Protective Behavioral Strategies; SD = Standard Deviation.
Coding: Biological sex coded as 0 = female, 1 = male; Sexual activity coded as 0 = no, 1 = yes; Suicidal ideation coded as 0 = no, 1 = yes; Victimization coded as 0 = no, 1 = yes.
*$p \leq .05$

Table 3
Multivariate Dependent Variable Model - Internalizing Symptoms: Anxiety, Depression, and Trauma.

Internalizing Symptoms	Coefficient	Standard Error	p	95% Confidence Interval	
Panel A: Anxiety					
Recent RSE	0.18	0.09	0.04	0.01	0.35
Former RSE	0.24	0.05	< 0.001	0.15	0.34
Biological Sex	-0.28	0.04	< 0.001	-0.36	-0.20
Victimization	0.27	0.05	< 0.001	0.18	0.37
Current sexual activity	-0.09	0.04	0.028	-0.18	-0.01
Age	-0.01	0.01	< 0.735	-0.01	0.01
Constant	1.82	0.03	< 0.001	1.77	1.88
Panel B: Depression					
Recent RSE	0.18	0.76	0.017	0.03	0.33
Former RSE	0.15	0.40	< 0.001	0.07	0.23
Biological Sex	-0.16	0.04	< 0.001	-0.23	-0.09
Victimization	0.27	0.04	< 0.001	0.18	0.35
Current sexual activity	-0.10	0.04	0.007	-0.16	-0.03
Age	-0.00	0.00	0.920	-0.01	0.01
Constant	1.71	0.02	< 0.001	1.67	1.72
Panel C: Trauma Symptoms					
Recent RSE	0.29	0.10	0.003	0.10	0.49
Former RSE	0.23	0.05	< 0.001	0.12	0.33
Biological Sex	-0.14	0.05	0.003	-0.23	-0.05
Victimization	0.38	0.06	< 0.001	0.27	0.49
Current sexual activity	-0.10	0.05	0.025	-0.19	-0.01
Age	0.00	0.01	0.935	-0.01	0.01
Constant	1.69	0.03	< 0.001	1.63	1.75

Note. RSE = Regretted Sexual Experience.

trauma (b = -0.14, p = .003). Thus, males and females experienced anxiety, depression, and trauma at a different rate from one another, with females experiencing higher levels of all three symptoms. A history of sexual victimization was also associated with symptoms of anxiety, (b = 0.27, p < .001), depression (b = 0.27, p < .001), and trauma (b = 0.38, p < .001). Current sexual activity was associated with lower symptoms of anxiety, (b = -0.09, p = .028), depression (b = -0.10, p = .007), and trauma (b = -0.10, p = .025).

Using the no RSE group as the comparison, statistically significant differences were observed (see Table 3 and Fig. 1, Panels A, B, and C). Symptoms were higher for anxiety: b = 0.24, p < .001; Cohen's d = 0.34 [former RSE], b = 0.18, p =.039; Cohen's d = 0.25 [recent RSE]; depression: b = 0.15, p < .001; Cohen's d = 0.24 [former RSE], b = 0.18, p = .017; Cohen's d = 0.29 [recent RSE], and for trauma symptoms: b = 0.23, p < .001; Cohen's d = 0.28 [former RSE], and b = 0.29, p = .003; Cohen's d = 0.36 [recent RSE]. Using the former RSE group as the comparison, no statistically significant differences occurred between those with recent or former RSE for anxiety (b = -0.06, p = .471), depression (b = 0.03, p = .679), or trauma (b = 0.07, p = .499). Whether the RSE occurred in the past month (recent) or earlier in their lifetime (former) was not significantly associated with the severity of symptoms occurring in the past month. Symptoms were still heightened regardless of when the RSE occurred.

4.3. Suicidal Ideation

A logistic regression was used to analyze symptoms of suicidal ideation (χ^2 = 65.91, p < .001, R^2 = .051). Suicidal ideation was significantly associated with a history of sexual victimization (OR = 2.25, p < .001) and current sexual activity (OR = 0.58, p < .001), but not biological sex (OR = 0.79, p = .145). There was an increased likelihood of experiencing suicidal ideation in the recent RSE group relative to the no RSE group after controlling for past sexual victimization, biological sex, and current sexual activity for the former RSE group (OR = 1.65, 95% CI = 1.17-2.30, p = .004) and the recent RSE group (OR = 1.98, 95% CI = 1.10-3.56, p = .022). The two RSE groups did not differ from each other (OR = 1.20, 95% CI = 0.68-2.12, p = .520), see Fig. 1, Panel D.

4.4. Problematic Alcohol Use

Hypotheses 2 predicted that problematic alcohol use would be heightened among those with a history of sexual regret, and the magnitude of this would be more robust for those with a recent RSE. Problematic alcohol use, assessed via the AUDIT, was regressed onto the three sexual regret groups, F(6, 1386) = 38.44, p < .001, R^2 = .143. Problematic alcohol use was associated with biological sex (b = 0.79, p < .001), history of sexual victimization (b = 1.51, p < .001), and current sexual activity (b = 1.69, p < .001). Relative to the no RSE group, statistically significant differences were observed for those with a former

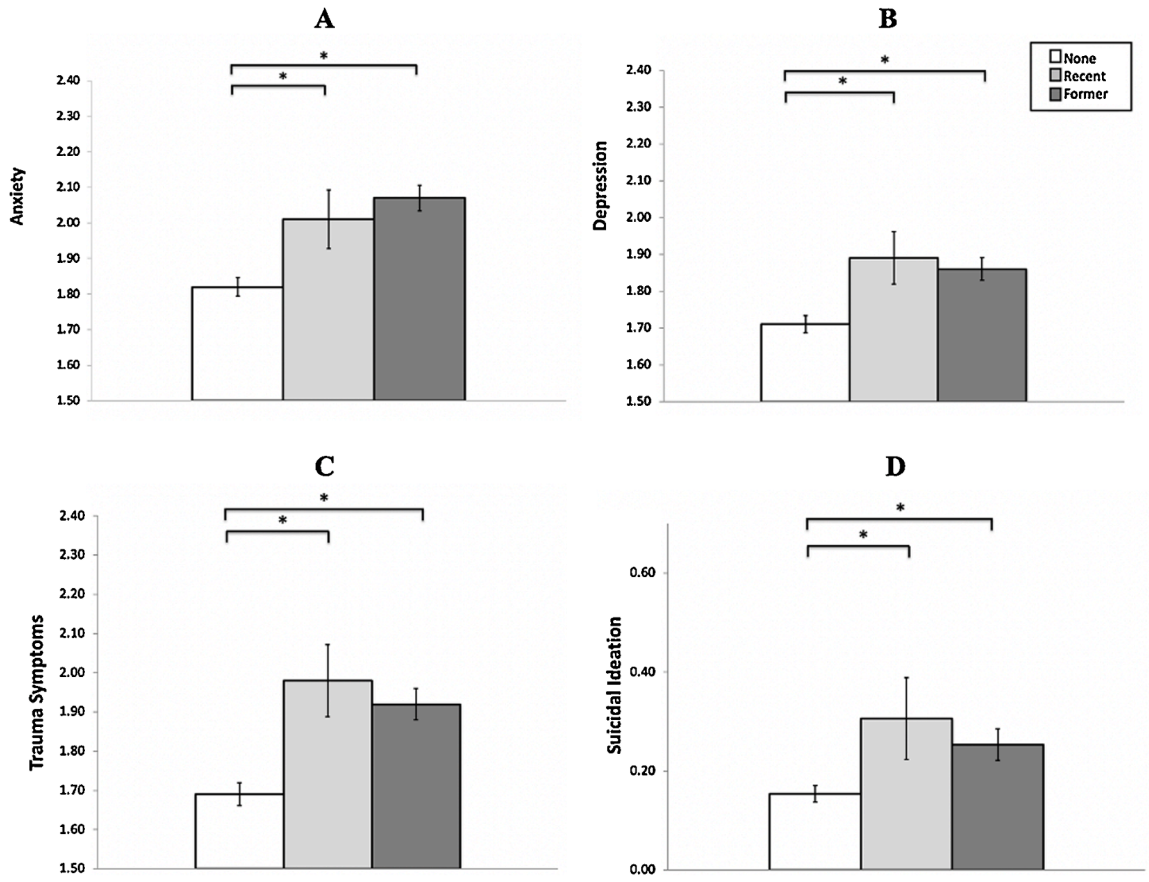

Fig. 1. Internalizing Symptoms Across RSE Groups.
*p < .05.

RSE (b = 1.88, p < .001; Cohen's d = 0.41) and recent RSE (b = 3.06, p < .001; Cohen's d = 0.67), see Fig. 2, Panel A. Both former RSE and recent RSE differed from one another as well, with those with a recent RSE experiencing more problematic alcohol use than those with former RSE (b = 1.18, p = .027; Cohen's d = 0.26).

4.5. Alcohol Protective Behavioral Strategies

Hypotheses 3 examined whether individuals with a history of sexual regret would utilize fewer PBS, regardless of when the RSE occurred. Use of PBS were analyzed using a multivariate regression model for continuous outcomes while controlling for victimization, biological sex, and current sexual activity: MD PBS (F [7, 1376] = 14.74, p < .001, R^2 = .061), SLD PBS (F [7, 1376] = 7.02, p < .001, R^2 = .030), and SHR PBS (F [7, 1376] = 13.97, p < .001, R^2 = .058). Biological sex was inversely associated with SLD PBS (b = -0.52, p < .001), SHR PBS (b = -0.64, p < .001), and MD PBS (b = -0.53, p < .001). History of sexual victimization was also associated with MD PBS (b = -0.32, p = .002), as was current sexual activity (b = -0.33, p < .001). For MD PBS, statistically significant differences were found for the former RSE group (b = -0.35, p = .001; Cohen's d = -0.23), relative to those with no RSE. Thus, individuals who have experienced sexual regret are less likely to engage in MD PBS. However, no statistically significant differences were found for SLD PBS and SHR PBS across RSE groups, see Table 4 and Fig. 2, Panels B, C, and D.

4.6. Supplemental Analysis

By reviewer request, all analyses were additionally conducted simultaneously in a single model given potential multicollinearity. The results of this analysis are presented in supplemental online materials. In short, only small changes in parameter estimates existed, with no changes to overall interpretation of the results using this approach.

5. Discussion

Investigating consequences of regretted sexual experiences is quite novel. While there are studies that have assessed reasons why sexual regret occurs (Fisher et al., 2012; Johnson et al., 2020; Kennair et al., 2018; Oswalt et al., 2005; Uecker & Martinez, 2017), research on emotions experienced after sexual regret is warranted. Broadly, the current study found that RSE are associated with maladaptive symptoms and behaviors including internalizing symptoms (anxiety, depression, trauma symptoms, and suicidal ideation) and engagement in externalizing and protective behaviors (alcohol and PBS use).

5.1. Internalizing Symptoms: Anxiety, Depression, Trauma Symptoms, and Suicidal Ideation

Regarding internalizing symptoms, any history of RSE was associated with significantly increased symptoms for all four internalizing symptoms (anxiety, depression, trauma symptoms and suicidal ideation). No statistically significant differences were observed between individuals who experienced RSE either recently or formerly in their lifetime. When the RSE occurred does not appear to be important when considering whether internalizing symptoms were heightened in the current study, compared to individuals without a history of RSE. Given that all emotional symptoms were heightened for both groups, this may suggest the toll that heightened internalizing symptoms play on the risk for suicide across time. Perhaps following an RSE, individuals begin

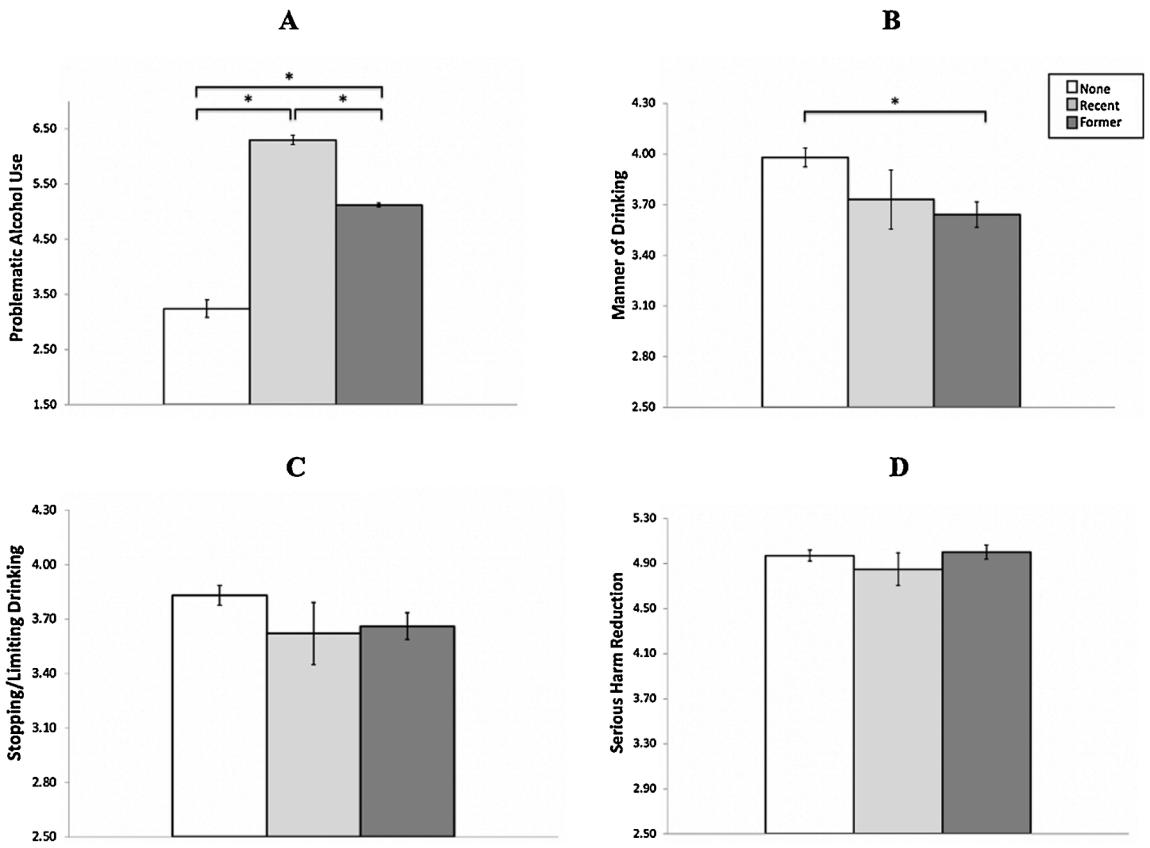

Fig. 2. Behaviors Across RSE Groups.
*p < .05.

experiencing a cascade of internalizing symptoms which do not appear to remit across time. Consequently, this history of built up internalizing symptoms may equate to a heightened propensity for suicidal ideation. Given the cross-sectional nature of the current data, this remains a question for future research. Regardless, these effects of increased suicidal ideation highlight the importance of considering the treatment of individuals who have experienced RSE compared to those who have not, and may suggest early intervention could be especially beneficial at reducing both long-term emotional distress as well as future suicidal ideation.

5.2. Behaviors: Problematic Alcohol Use and Use of Protective Behavioral Strategies

For behaviors, findings differ slightly from internalizing symptom findings. Scores remain relatively stable across the different behaviors (problematic alcohol and PBS use) for both the recent and former regretted sex groups. While regret is associated with problematic alcohol use and lower use of PBS, as seen in previous research, it is likely a reciprocal relationship in that alcohol use is also associated with increased RSE, and vice versa (Johnson et al., 2020; Orchowski et al., 2012). Of note, problematic alcohol use was dramatically higher in the recent RSE group, relative to both no RSE and former RSE. As most RSE occurs in the context of alcohol use, there is the question of which occurs first, the RSE or the problematic alcohol use. Individuals who have experienced RSE engage in significantly less of the PBS sub-type Manner of Drinking, which includes behaviors such as "avoiding drinking games" and "avoiding mixing different types of alcohol." Thus, it may be that alcohol was used to cope with the RSE, or, alternatively, it could be that the problematic alcohol use put the individual at increased risk of experiencing sexual regret (Looby et al., 2019). Another possibility could be that manner of drinking is most often associated with reduced drinking compared to the other two PBS sub-types, which could account for reasons why reduced PBS MD use may lead to heightened RSE (Pearson, 2013a). This is not a question that can be answered with our cross-sectional study and remains an important area for future research.

5.3. Clinical Implications

Managing reactions following RSE could prove useful in preventing the development of internalizing symptoms, as well as the maintenance for such symptoms. For example, research has shown that hookups that were associated with penetrative sex were associated with higher negative affect or more distress (Fielder & Carey, 2010; Lewis et al., 2012). Future research should determine how, if at all, these short-term emotional reactions to RSE may transition into longer-term internalized symptoms. Similarly, screening and brief interventions for alcohol use could potentially lead to reductions in alcohol use immediately following RSE, increase overall PBS use, or even prevent RSE when they occur in the context of alcohol use.

5.4. Limitations

Limitations exist within the current study. First, the data is cross-sectional which precludes causal inferences regarding the associations between RSE group status, internalizing symptoms, and behaviors. Survey time-frames varied, with information collected from both lifetime (former RSE) and past month (recent RSE) experiences. Additionally, due to the lack of follow-up, it is not possible to tease apart whether the RSE occurred both in the past month as well as prior to the past month. Furthermore, the nature of the question used to parse out RSE group does not provide more than information of occurrence. Thus, development of a new measure to assess sexual regret is warranted. Within the context of the single-item question (adapted from the

Table 4
Multivariate Dependent Variable Model - Behaviors: Protective Behavioral Strategies.

Behaviors	Coefficient	Standard Error	p	95% Confidence Interval	
Panel B: Manner of Drinking					
Recent RSE	-0.25	0.19	0.18	-0.61	0.11
Former RSE	-0.35	0.10	< 0.001	-0.54	-0.15
Biological Sex	-0.53	0.09	< 0.001	-0.70	-0.36
Victimization	-0.32	0.10	0.002	-0.52	-0.11
Current sexual activity	-0.33	0.09	< 0.001	-0.50	-0.16
Age	0.04	0.01	0.001	0.01	0.06
Constant	3.98	0.06	< 0.001	3.87	4.09
Panel C: Stopping / Limiting Drinking					
Recent RSE	-0.21	0.18	0.253	-0.57	0.15
Former RSE	-0.17	0.10	0.084	-0.36	0.02
Biological Sex	-0.52	0.08	< 0.001	-0.69	-0.35
Victimization	-0.17	0.10	0.111	-0.37	0.04
Current sexual activity	-0.03	0.09	0.698	-0.20	0.13
Age	0.02	0.01	0.157	-0.01	0.04
Constant	3.83	0.05	< 0.001	3.73	3.94
Panel D: Serious Harm Reduction					
Recent RSE	-0.13	0.16	0.416	-0.43	0.18
Former RSE	0.03	0.08	0.729	-0.13	0.19
Biological Sex	-0.64	0.07	< 0.001	-0.78	-0.49
Victimization	-0.13	0.09	0.151	-0.30	0.05
Current sexual activity	-0.13	0.07	0.070	-0.01	0.27
Age	-0.00	0.01	0.770	-0.02	0.02
Constant	4.97	0.05	< 0.001	4.88	5.06

Note. RSE = Regretted Sexual Experience.

YAACQ; Read et al., 2006) we are unable to assess the actual impact of the RSE. A small sample size led to an underpowered analysis of biological sex differences for the past month RSE group. Another limitation is the nature of the sexual victimization covariate, which was coded by collapsing the five victimization groups into a single dichotomous variable. A total score for victimization could have been calculated, but given the limited sample size, we felt it more prudent to calculate victimization dichotomously. Future research should analyze these rates within the more nuanced victimization groups. An additional limitation in regard to the covariate of current sexual activity exists in that this question was subjective, leaving it up to the participant to decide whether or not they felt they were currently sexually active by simply answering 'yes' or 'no.' Finally, the sample of participants included in this study was recruited from a large, predominantly Caucasian, southeastern university in the United States. Therefore, these findings should be generalized with caution. Similarly, the nature of data procurement utilized (i.e., self-report surveys) is subject to both self-report and memory (i.e., retrospective recall) biases.

Suggestions for future research in this area include the ability to analyze associations longitudinally, or via Ecological Momentary Assessment, to better understand the temporal association between alcohol use and RSEs. Similarly, mixed methods approaches that integrate more specific information on the reasons for RSE and amount of regret, and how these might impact results could prove useful. Another limitation is the absence of assessment of potentially confounding, third variables such as: receiving sexual education, whether discussions between close friends and family took place on topics such as love and consent, emotional intelligence as well as other emotional problems including ignorance/naivety. Additional assessment of internalizing symptoms not present in the current study (e.g., guilt, self-blame) may provide a more complete profile of the impact RSE has on the individual. It is also important to consider how individuals label their sexual experience. Whether an adverse sexual outcome is labeled as assault or not may depend on whether schemas about assault (e.g., with a known partner, rather than stranger) are present, therefore indicating more self-blame in some cases.

6. Conclusion

While investigating sexual regret is quite novel, and sexual regret appears to be associated with adverse psychological and behavioral consequences, understanding factors that result from RSE is important. Given the fact that a history of RSE is associated with past month symptoms of anxiety, depression, trauma symptoms, suicidal ideation, problematic alcohol use, and engagement in PBS, further research is warranted. These factors may provide insight into both prevention efforts and intervention targets for individuals who experience regretted sex, including assessment of internalizing symptoms, suicide awareness and prevention, screening and brief intervention for alcohol use and promotion of engagement in protective behavioral strategies.

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Declaration of Competing Interest

Authors have no competing interests to disclose.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jad.2021.01.077.

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