

BRIEF REPORT

A laboratory examination of risky sexual behavior among female sexual trauma survivors

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Sexual violence against women is highly prevalent on college and university campuses; approximately 1 in 5 women report experiencing at least one incident of sexual assault during their time in college (see Muehlenhard et al., 2017, for a review). A history of childhood sexual abuse (CSA) is a strong predictor of adult sexual assault (e.g., Roodman & Clum, 2001). It is, therefore, important to consider lifetime incidents of sexual victimization while conducting research with adult sexual assault survivors, as the risk of revictimization tends to be extraordinarily high.

Abstract

Sexual violence against women is highly prevalent on college campuses. Survivors of sexual violence often engage in coping strategies such as risky sexual behavior. The present study used a behavioral task to measure sexual risk-taking following experiences of positive or negative affect and an emotion suppression experimental manipulation. Sexually active adult female undergraduates ($N = 175$) completed measures of sexual traumatization and affective experiences as well as an autobiographical recall task and a delay discounting task for hypothetical sexual outcomes. Half of the participants ($n = 87$) were asked to suppress their emotional response to the autobiographical recall task. The findings indicate that sexual traumatization had a significant effect on risky sexual decision-making, $F(1, 167) = 23.27, p < .001, \eta_p^2 = .12$, but affective condition, $F(1, 167) = .57, p = .451$, and emotion suppression, $F(1, 167) = .69, p = .412$, exhibited no significant associations with sexual risk-taking. These findings suggest other factors may underlie the association between sexual trauma and risky sexual behavior, but further research is warranted.

Risky sexual behavior and sexual victimization

Trauma-exposed individuals sometimes engage in maladaptive coping strategies to manage overwhelming trauma-related distress. One paradoxical but common maladaptive avoidant coping behavior is risky sexual behavior, which includes increased promiscuity, engaging in sexual intercourse without a condom, and early sexual activity (e.g., Levy et al., 2009). These behaviors increase the risk of sexually transmitted infections, HIV and AIDS, and unexpected pregnancy (Bryan et al., 2012). Women

with a history of CSA, adolescent sexual victimization, and/or adult sexual assault have been shown to engage in more risky sexual behavior (e.g., Messman-Moore et al., 2010) than women without these histories. Thus, risky sexual behavior may be an important target for clinical intervention following exposure to sexual trauma.

Sexual violence exposure and emotion regulation

One psychological mechanism that may underlie the association between sexual trauma and risky sexual behavior is emotion regulation. Sexual victimization is associated with a range of emotion regulation problems, including increased difficulty identifying and labeling emotions, nonacceptance of emotions, and lack of emotional awareness (Walsh et al., 2011).

Emotion regulation also appears to be tied to impulsivity, which likely underlies risky sexual behavior. For example, Ceschi et al. (2014) found that trauma-exposed participants with a strong propensity for impulsivity tended to use more maladaptive emotional regulation strategies than other participants. Further, Messman-Moore et al. (2010) observed that emotion dysregulation predicted risky sexual behavior in a sample of college women. Moreover, negative urgency, defined as the tendency to engage in potentially risky or impulsive behaviors while experiencing negative affect, is likely related to emotion regulation such that individuals who are desperate to reduce experiences of negative emotion are likely to engage in impulsive behavior to alleviate distress. Indeed, among individuals high in neuroticism, Augustine and Larsen (2011) found that higher levels of negative affective reactions to negative primes (i.e., mood induction) led to higher rates of impulsivity. Thus, there appears to be a strong association between impulsive behaviors—including risky sexual behavior—and emotion regulation in the context of sexual assault victimization.

One aspect of emotion regulation that has received little experimental study is how the experience of emotion influences health-related decisions, specifically for sexual trauma survivors. Given the relationship between impulsive behavior and emotion regulation outlined above, laboratory measures of impulsive choice may be a potential avenue of exploration. These experimental instruments may help determine how emotional experiences influence risky sexual behavior in this clinical population.

Delay discounting

The most common laboratory-behavioral measure of impulsive choice is delay discounting. Delay discounting

refers to devaluing a reward based on its delay (Green & Myerson, 2004), where the value of a reward diminishes as a function of how long one waits to receive it. Patterns of choice are modeled mathematically, and impulsive choice is indicated by a pattern of preference for smaller sooner outcomes over larger delayed outcomes and a steeper “rate” of discounting the value of the reward across delays. Impulsive choice patterns can be determined for rewards such as sexual outcomes (e.g., Johnson & Bruner, 2012; Lawyer & Mahoney, 2018).

Affective experiences can influence decision-making processes. For example, individuals with high levels of depressive symptoms have been shown to demonstrate lowered inhibitory control, which is associated with impulsive decisions (Moriya & Tanno, 2008). Emotion regulation biases can influence decisions in that individuals experiencing positive affect may attempt to maximize pleasure, whereas those experiencing negative affect may attempt to minimize or reduce emotional or psychological pain (i.e., emotion regulation; Oreg & Bayazit, 2009). Thus, when experiencing negative affect, individuals may be willing to engage in any strategy to alleviate associated psychological distress.

Given that sexual trauma survivors tend to experience emotion dysregulation difficulties (e.g., Walsh et al., 2011), and emotion dysregulation is related to risky sexual behavior (Filipas & Ullman, 2006), it may be relevant to manipulate emotion regulation processes to further understanding of the etiology of risky sexual decision-making for female trauma survivors. Previous research has demonstrated that trauma is associated with emotion suppression (e.g., Kucharska, 2018), which is likely an attempt to minimize or reduce psychological distress from negative affective experiences that stem from traumatic events (American Psychiatric Association, 2013; Oreg & Bayazit, 2009). This is a strategy that involves the behavioral or physiological suppression (i.e., numbing) of experiences of positive and negative emotions (Dan-Glauser & Gross, 2011). Gross and John (2003) found that suppression is counterproductive, as it can lead to a reduction of positive emotions and higher levels of negative emotions. Therefore, emotion suppression could have negative effects among sexual assault survivors, particularly if it leads to increased risky sexual decision-making as a resultant coping behavior. To our knowledge, no previous studies have compared the effects of emotion suppression among sexual trauma survivors versus individuals without a sexual trauma history; thus, there is a need to explore whether the combination of sexual violence and emotion suppression heightens the risk of this health-risk behavior. These efforts will hopefully inform and enhance existing assessment practices and targeted interventions to replace risky sexual decisions with

adaptive coping skills to address trauma-related negative affect.

Present study

The primary goal of the present study was to use a laboratory analog measure to examine whether the experience or suppression of emotion would increase the likelihood of risky sexual decisions among female sexual trauma survivors compared with non-sexual trauma-exposed women in a laboratory context. This is important, as self-report measures of sexual risk-taking measure past sexual behavior and do not allow for experimental investigation regarding how contextual and emotional factors influence present risk behavior. We hypothesized that the data would support significant main effects of sexual trauma, affect, and emotion suppression in increasing the likelihood of risky sexual decision-making. Further, we expected to observe a significant three-way interaction wherein the suppression of negative affect would significantly increase the preference for risky sexual decisions among survivors of sexual trauma.

METHOD

Participants

Participants were sexually active adult female undergraduate students from a university in the northwestern United States who identified as heterosexual ($N = 175$). The average participant age was 22.47 years ($SD = 6.54$, range: 18–59), and 73.1% of the sample identified as Caucasian. Participants were recruited through either psychology courses and compensated with extra credit ($N = 104$) or through classroom visits and compensated with entry into a raffle for one of 20 gift cards valued at \$50 each ($N = 71$). Two samples were recruited for the present study: women with a history of sexual assault ($N = 88$) and women without any history of sexual trauma ($N = 87$). Regarding the breakdown of sexual trauma survivors by recruitment method, 49 women who were compensated with extra credit were sexual trauma survivors compared with 39 women who were compensated with entry into the gift card raffle.

Procedure

After completing screening measures, all participants were split into groups based on their sexual assault history (i.e., sexual trauma or no sexual trauma) and assigned randomly

to an affect group (i.e., positive affect or negative affect) and an emotional suppression group (i.e., suppression or no suppression); this created eight different experimental conditions. The procedures applied those used previously in the literature for both the mood induction and emotional suppression experimental manipulations (Augustine & Larsen, 2011). Participants first completed the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) to establish baseline affect and then engaged in the mood induction procedure to evoke positive or negative affect.

An autobiographical recall procedure was used for mood induction. Autobiographical narrative sheets were provided for participants to write about a sad (i.e., negative affect) or happy (i.e., positive affect) event for 7 min. For participants in the suppression conditions, the research assistant also read a script derived from previous mood suppression research (Evers et al., 2010). Regardless of suppression condition, participants completed the PANAS again following the narrative exercise to establish if the mood induction procedure and/or the emotion suppression manipulation had produced the intended changes in affect. All methods and materials were approved by the Idaho State University Human Subjects Committee prior to data collection.

Measures

Demographic characteristics

An eight-item questionnaire was administered to gather information on participants' age, sexual activity, ethnicity, sexual orientation, relationship status, religious preferences, level of educational attainment, and household income.

Sexual victimization experiences

The 10-item, self-report Sexual Experiences Survey-Short Form Victimization (SES-SFV; Koss et al., 2007) was used to assess various victimization experiences of sexual coercion, aggression, and violence across the life span. Items consist of sexual assault incidents varying in severity and context. The SES-SFV has demonstrated good psychometric properties, with excellent construct validity found through fit statistics and evaluations of the item hierarchy (Koss et al., 2007). For this study, participants were categorized in the sexual trauma group if they endorsed any instance of nonconsensual penetration.

Positive and negative affect

The PANAS (Watson et al., 1988) is a 20-item self-report measure used to assess the intensity of positive and negative affect. The measure contains 10 items each for positive and negative affect and can be used to measure current and past reports of subjective affect (Hirsh et al., 2010). Items are rated on a Likert scale ranging from 1 (*very slightly or not at all*) to 5 (*extremely*). Scores on both the Positive Affect and Negative Affect subscales range from 10 to 50, with higher scores reflecting higher levels of positive and negative affect, respectively. The Positive Affect (Cronbach's α = .84–.87) and Negative Affect subscales (α = .86–.90) have demonstrated good internal reliability estimates, with low correlations between the two subscales (r s = $-.12$ to $-.23$) and good test–retest reliability (Watson et al., 1988). In the present study, PANAS scores demonstrated good internal reliability before the mood induction procedure, Cronbach's α = .82, as well as after its implementation, Cronbach's α = .79.

Delay discounting for sexual rewards

The Sexual Discounting Task (SDT; Johnson & Bruner, 2012) was used to assess delay discounting for sexual rewards. Participants were shown photographs of specific hypothetical sexual partners. After choosing one specific male photograph among 30 choices and reading a vignette of a casual and consensual sexual encounter with the target, participants were asked to complete a paper-and-pencil questionnaire consisting of eight visual analog scale (VAS) lines, with the photograph in sight. The VAS lines ranged from “I will definitely have sex with this person now *without* a condom” to “I will definitely wait [delay] to have sex with this person *with* a condom,” with the initial line as a 0-delay trial to determine the likelihood (0%–100%) of using sexual protection if it was immediately available. For the remaining seven VAS delay trials, participants were asked to rate their likelihood of waiting for protected sexual intercourse after a definitive period of time when no condom was initially accessible, with the delays increasing in ascending order. Participants were also asked to imagine that the condom would be their only form of birth control. The SDT has been validated and has demonstrated strong test–retest reliability, and the data are described well by standard discounting functions (Johnson & Bruner, 2012).

Data analysis

An a priori power analysis was conducted based on an analysis of variance (ANOVA) model examining main effects, three two-way interactions, and a three-way interaction, with an alpha level of .05, power of .80, and a large effect size ($f = .40$) for eight groups. This power analysis indicated that a total sample of 97 female participants (i.e., approximately 13 women per group) would be necessary to obtain a large effect with sufficient power. After examining the descriptive statistics for each group, chi-square analyses and independent t tests were conducted to identify potential differences between groups. To determine if the mood induction task was effective in evoking positive and negative affect at both assessment points as well as whether emotion suppression had an effect on affect at both points, repeated measures ANOVAs were conducted for all participants.

For the present study, individual discounting data were indexed using area under the curve (AUC) values (Myerson et al., 2001). AUC estimates range from 0 to 1; tend to be normally distributed; and lower AUC values indicate a relative preference for immediate, unprotected sex. Group median likelihood data for the eight conditions, separated by positive and negative affect, with two-parameter hyperboloid functions (Green et al., 1994) were fit to the median data. Lastly, individual patterns of responding were characterized as systematic or nonsystematic using Johnson and Bickel's (2008) algorithms.

A 2 (Sexual Trauma/No Sexual Trauma) \times 2 (Positive Affect/Negative Affect) \times 2 (Suppression/No Suppression) factorial ANOVA was used to test the study hypotheses. The main effects of sexual traumatization, affective experiences, and emotion suppression, as well as interaction effects, were examined based on this analysis. There were no missing data, as each measure was reviewed for completion at the end of the experiment.

Results

Demographic data

Chi-square analyses and independent t tests revealed no significant differences between women exposed and unexposed to sexual trauma with regard to demographic characteristics. In addition, there were no significant demographic differences across the eight experimental conditions (see Table 1).

TABLE 1 Descriptive data for demographic variables, by sexual discounting task and trauma exposure group

Variable	PA/S			NA/S			PA/NS			NA/NS				
	M	SD	n	%	n	%	M	SD	n	%	M	SD	n	%
<i>Sexual trauma-exposed women</i>														
Age (years)	21.38	3.76	14	66.7	23.18	9.69	22.91	7.53	17	77.3	23.82	7.56	14	63.6
Caucasian ethnicity			14	66.7	18	81.8			17	77.3			14	63.6
<i>Non-sexual trauma-exposed women</i>														
Relationship status			3	14.3	8	36.4			9	40.9			10	45.5
Single			16	76.1	14	63.6			13	59.1			12	54.5
Committed			13.76	2.05	13.55	1.87	13.18	1.40	13.45	1.57				
Educational attainment (years)	20.18	2.44	17	77.3	25	8.17	22.23	5.39	21	3.60			18	81.8
Age (years)			17	77.3	14	63.6			16	72.7			18	81.8
Caucasian ethnicity			8	36.4	6	27.3			7	31.8			5	22.7
Relationship status			14	63.7	14	63.7			14	63.7			15	68.1
Single			13.27	1.12	12.73	1.03	13.36	1.29	12.91	1.23				
Committed														
Educational attainment (years)														

Note: PA = positive affect; NA = negative affect; S = suppression; NS = no suppression.

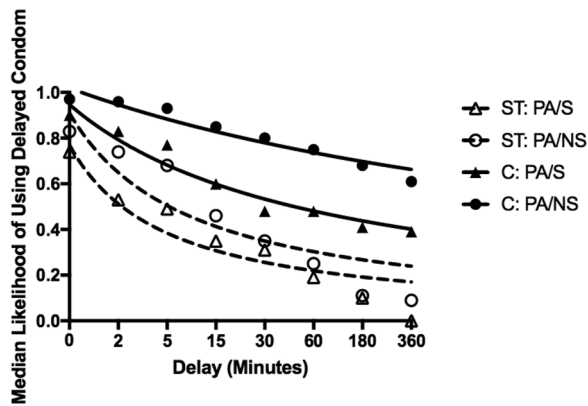


FIGURE 1 Discounting curves for all positive affect groups
Note: ST, sexual trauma; PA, positive affect; S, suppression; NS, no suppression; C, control.

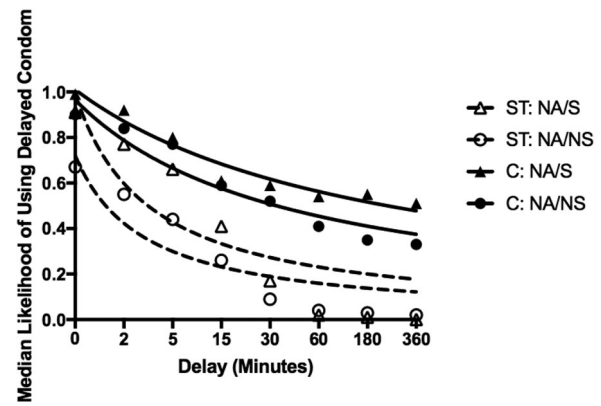


FIGURE 2 Discounting curves for all negative affect groups
Note: ST, sexual trauma; NA, negative affect; S, suppression; NS, no suppression; C, control.

Mood induction and emotion suppression

First, the data were examined for significant mean differences with regard to inducing positive and negative affect using three-way repeated-measures ANOVAs. Significant mean group differences in positive affect, Wilks' $\lambda = .96$, $F(1, 170) = 6.62$, $p = .036$, $\eta_p^2 = .04$, and negative affect, Wilks' $\lambda = .87$, $F(1, 170) = 26.57$, $p < .001$, $\eta_p^2 = .14$, over time were observed for all women in these groups, suggesting that these participants experienced significant increases in affect within their respective conditions. Second, the data were examined for significant mean differences surrounding emotion suppression, using a three-way repeated-measures ANOVA. No significant mean group differences were found when comparing suppression and no suppression conditions for both positive, Wilks' $\lambda = .99$, $F(1, 171) = 1.08$, $p = .303$, and negative affect, Wilks' $\lambda = .99$, $F(1, 171) = 0.65$, $p = .427$. These findings indicate that the suppression manipulation had no effect on affective experiences for participants within those conditions.

Characterizing discounting patterns

Figures 1 and 2 show SDT group median likelihood data for the eight conditions, separated by positive and negative affect, with two-parameter hyperboloid functions. Individual sexual discounting functions were described generally well by the hyperboloid discounting equation. Nonlinear regression resulted in R^2 values that ranged from .77 to .95. Overall, 15 (8.6%) sexual discounting functions were non-systematic. Of these functions, most were participants for whom only a single indifference point of the eight delays was nonsystematic.

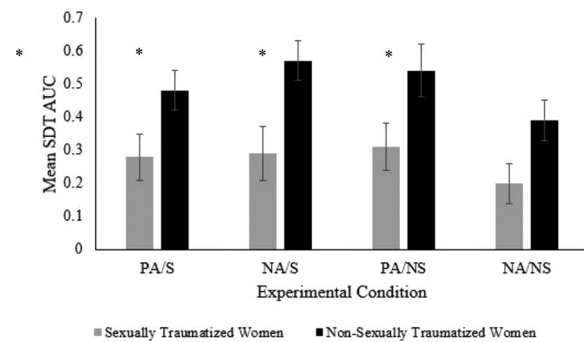


FIGURE 3 Mean area under the curve (AUC) for the sexual discounting task (SDT), by experimental group
Note: Error bars represent standard errors. PA, positive affect; NA, negative affect; S, suppression; NS, no suppression. * $p < .05$.

Sexual discounting task comparisons

There was a significant main effect of sexual traumatization, $F(1, 167) = 23.27$, $p < .001$, with a medium effect, $\eta_p^2 = .12$. This indicates that sexual trauma survivors ($M = 0.27$, $SD = 0.32$) exhibited significantly higher rates of sexual discounting (i.e., risky sexual decision-making) than non-sexual trauma-exposed women ($M = .50$, $SD = .31$; see Figure 3).

However, the three-way ANOVA revealed no significant main effects or interactions in the context of the affect or suppression conditions, indicating no differences in sexual discounting as a function of affect or suppression. Specifically, the main effects of affect, $F(1, 167) = 0.57$, $p = .451$, and suppression $F(1, 167) = 0.69$, $p = .412$, were nonsignificant. The interaction terms for affect and suppression, $F(1, 167) = 2.89$, $p = .094$; affect and sexual traumatization, $F(1, 167) = 0.52$, $p = .473$; and suppression and sexual traumatization, $F(1, 167) = 0.02$, $p = .899$, also were nonsignificant. The three-way interaction also was not significant.

$F(1, 167) = 0.33, p = .564$, indicating that sexual trauma-exposed women did not exhibit more sexually risky choices when suppressing negative affect.

DISCUSSION

The present study examined responses on a laboratory-based measure of hypothetical risky sexual decision-making following the induction of positive and negative affect and emotion suppression among sexual trauma-exposed and non-sexual trauma-exposed women. The findings suggest that sexual trauma-exposed women are significantly more likely to indicate a preference for hypothetical risky sexual outcomes than those who have not experienced sexual trauma. Our use of a novel behavioral measure of sexual risk-taking provides a strong methodological complement to the extant findings that have used self-report measures of risky sexual behavior.

These findings are consistent with several previous studies indicating that CSA and adolescent sexual victimization and adult sexual assault are associated with risky sexual behavior (e.g., Messman-Moore et al., 2010). The findings can be understood in the context of risky sexual behavior as a form of avoidant coping to avoid and/or reduce posttraumatic negative internal emotional experiences. This could explain why sexual trauma-exposed women are more likely to engage in risky sexual behavior than women without this trauma history.

However, we did not observe significant associations between affect and risky sexual decision-making or between emotion suppression and risky sexual decision-making. These findings disconfirm our hypothesis and contradict previous studies (Oreg & Bayzit; 2009). However, it is worth noting that the present study used a laboratory-based, real-time measure of sexual decision-making that was empirically tied to sexual risk behavior rather than self-report assessments of past risky sexual behaviors; this may explain the differences in our findings relative to previous work. It is also possible that despite significant increases in positive and negative affect, these levels of affect were not sufficiently salient to influence rates of sexual risk-taking.

In addition, contrary to our expectations, affective suppression had no effect on risky sexual decision-making in the present study, providing no support for this hypothesis. Thus, the present findings do not support those reported in previous studies (Messman-Moore et al., 2010; Filipas & Ullman, 2006). Given that emotion suppression had no effect on affective experiences, it is likely that suppression did not reduce positive emotionality or increase negative emotionality among women in the present sample. This would negate the need to engage in sexual risk-taking as an

impulsive coping behavior. Future studies should examine the impact of specific components of emotion dysregulation (see Gratz & Roemer, 2004) on sexual decision-making processes for female sexual trauma survivors in comparison to a control group. These studies could also benefit from the use of ecological momentary assessment (EMA) to track real-time variations in affective experiences, emotion dysregulation, and risky sexual decision-making to elucidate how these processes interact on a daily basis.

Some limitations of this study should be noted. First, the mood induction procedure may have limited the data in that it asked participants to write about “one of the happiest or saddest memories” of their lives. However, asking sexual trauma-exposed participants to instead write about “the worst or most traumatic experience” of their lives may have elicited negative emotionality associated with their sexual trauma history. Second, the suppression prompt asked participants to suppress any overt, external signs of emotion, including their body language and facial expressions. This prompt likely could be strengthened with the addition of instructions to suppress covert, internal experiences of emotional arousal to prompt effective suppression of emotional expression. Third, the presence of psychopathology was not assessed in this sample. Experiencing symptoms of or meeting the diagnostic criteria for a mood, anxiety, or trauma-related disorder (i.e., posttraumatic stress disorder [PTSD]) may impact sexual decision-making processes. Future experimental research would benefit from grouping individuals by their history of sexual trauma as well as the presence or absence of these symptoms and mental disorders. Fourth, the sample was restricted to heterosexual women, as the SDT was validated in a heterosexual sample. Future studies should establish the psychometric properties of this task in sexual minority samples and determine if our findings are maintained across the spectrum of sexual attraction. Fifth, our sample of women with sexual trauma experiences was restricted to completed rape. However, the form and timing (i.e., childhood, adolescence, adulthood) of the sexual assault or assaults may impact risky sexual decision-making and, thus, could be important covariates for future research. Lastly, our study findings may have been limited by insufficient power. Although we conducted an a priori power analysis to determine the necessary sample size for each group and the total sample prior to participant recruitment, we may have overestimated our expected effects based on previous literature. Given that our main effect of sexual traumatization was small, future research may benefit from replicating this methodology with a much larger sample of women based on a small effect size for all of the main effects and interactions.

Although the present findings present substantive evidence to support the association between sexual

traumatization and risky sexual decision-making using a novel behavioral task in an experimental setting, future studies should further examine this phenomenon given the lack of effects of affective condition and emotion suppression. Considering the potential for negative health sequelae of risky sexual behavior (i.e., sexually transmitted infections, unwanted pregnancy) and the increased risk of revictimization among sexual trauma-exposed women (e.g., Messman-Moore et al., 2010), it is imperative to elucidate underlying factors that may be influencing this relationship (e.g., substance use, PTSD symptoms, social reactions). Targeting these factors and others through the development of evidence-based therapeutic interventions and public health initiatives may substantially prevent the likelihood of this health risk behavior for female sexual trauma survivors.


OPEN PRACTICES STATEMENT

The study reported in this article was not formally preregistered. Neither the data nor the materials have been made available on a permanent third-party archive; requests for the data or materials should be sent via email to the lead author at cmahoney@uccs.edu.

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