

# Psychology of Violence

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Elizabeth A. Yeater, Teresa A. Treat, Richard J. Viken, and Angela D. Bryan

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# Risk Processing and College Women's Risk for Sexual Victimization

Elizabeth A. Yeater  
University of New Mexico

Teresa A. Treat  
University of Iowa

Richard J. Viken  
Indiana University Bloomington

Angela D. Bryan  
University of Colorado Boulder

**Objective:** Sexual assault is a widespread problem among college women. Interventions effective in reducing college men's sexually aggressive behavior are scarce making research with at-risk women a necessary adjunct to work with men. This study examined whether individual differences in decoding risk information and making decisions about risky situations prospectively predicted sexual victimization 6 months later, as well as whether these cognitive processes mediated the association between baseline and follow-up victimization. **Method:** Participants were 481 freshman undergraduate women aged between 18 and 24 years, who were heterosexual or bisexual, and unmarried. At baseline, participants completed tasks measuring decoding and decision-making about victimization risk in written vignettes describing risky social situations. They also completed the Sexual Experiences Survey to measure the severity of victimization experiences at baseline and follow-up. **Results:** Less effective decision-making at baseline prospectively predicted more severe follow-up victimization. Judging more situations as high risk at baseline, as well as relying more on risk cues when judging risk at baseline, indirectly predicted less severe follow-up victimization via more effective decision-making. Less effective decision-making at baseline partially accounted for the strong prospective link between victimization severity at baseline and follow-up. **Conclusion:** Risk-related decoding and decision-making processes either directly or indirectly prospectively predicted the severity of future sexual victimization of college women. Cognitive-training methods designed to enhance college women's detection of and response to victimization risk should be explored as a potential preventative strategy for the reduction of women's risk for sexual violence.

**Keywords:** sexual victimization, revictimization, risk judgment, response ability

Approximately 25% of college women report an attempted or completed rape during their college years (Cantor et al., 2015). Women who are sexually victimized, either in childhood or emerging adulthood, are at increased risk for sexual revictimization (for reviews, see Classen, Palesh, & Aggarwal, 2005; Pittenger, Huit, & Hansen, 2016), with about two thirds of sexually victimized women reporting repeated victimization (Classen et al., 2005).

Notably, existing work has failed to advance meaningfully the development of efficacious preventative interventions for women.

Only a handful of programs for college women have shown promise in reducing rates of victimization (Senn et al., 2015, 2017), and the majority of these have been ineffective at preventing assault among at-risk women (e.g., previously victimized women). Such interventions are especially relevant, given that work on men's sexual aggression, while making significant progress in understanding the etiology of this behavior (Abbey, Wegner, Woerner, Pegram, & Pierce, 2014; Farris, Treat, & Viken, 2010), has yet to produce a viable prevention approach for reducing sexually aggressive behavior (DeGue et al., 2014). Bystander sexual assault interventions, which teach skills for intervening in peers' high-risk behavior (Banyard, Plante, & Moynihan, 2004), show promise in changing behaviors that presumably would decrease rates of sexual assault on college campuses (Senn & Forrest, 2016). Nonetheless, rates of sexual victimization among college women have remained steady (Cantor et al., 2015), suggesting that additional work is needed to elucidate etiological variables that may be incorporated into intervention efforts. Thus, although the responsibility for sexual aggression lies solely with the perpetrator, the current state of our prevention science necessitates work that will inform the development of risk-reduction strategies for women.

Most research examining potential etiological variables linked to sexual revictimization has been cross-sectional and retrospec-

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Elizabeth A. Yeater, Department of Psychology, University of New Mexico; Teresa A. Treat, Department of Psychological and Brain Sciences, University of Iowa; Richard J. Viken, Department of Psychology and Neuroscience, Indiana University Bloomington; Angela D. Bryan, Department of Psychology and Neuroscience, University of Colorado Boulder.

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Correspondence concerning this article should be addressed to Elizabeth A. Yeater, Department of Psychology, University of New Mexico, Albuquerque, MSC03, NM 87131. E-mail: [eyearer@unm.edu](mailto:eyearer@unm.edu)

tive in design, making it difficult to establish whether the identified correlates are causes or consequences of recurring victimization (Classen et al., 2005; Pittenger et al., 2016). Moreover, few studies have attempted to test prospectively theoretical frameworks that illuminate the linkages among key etiological variables, even though researchers have called for such work (Classen et al., 2005; Pittenger et al., 2016).

In this work, we used a social information processing model (SIP; McFall, 1982) as an overarching framework for conceptualizing women's risk for sexual victimization. We tested prospectively whether SIP predicted the severity of sexual victimization and revictimization among college women (Figure 1). Severity was characterized along a conventional ordinal spectrum ranging from no victimization to completed rape, with intermediate experiences of unwanted sexual contact, sexual coercion, and attempted rape (Koss, Gidycz, & Wisniewski, 1987). This sequential model posited that (a) decoding (i.e., reception, judgment, and interpretation of risk-relevant information) would influence variation in decision-making (i.e., generation and selection of risk-reducing responses), which subsequently would increase victimization severity, and (b) decoding and decision-making would mediate the association between prior and future victimization severity.

The SIP model has been used successfully in cross-sectional studies to identify cognitive processes associated with a variety of clinical problems, including previous work examining the linkages between women's risk processing and a prior history of sexual victimization (Yeater, Hoyt, Leiting, & Lopez, 2016; Yeater, McFall, & Viken, 2011; Yeater & Viken, 2010; Yeater, Treat, Viken, & McFall, 2010). However, to our knowledge, this is the first study to explore whether these relationships emerge also when examined prospectively. Overall then, our work uses established theory in an innovative way that may inform the targeting and

tailoring of preventative interventions for at-risk college women. The evidence for our model follows.

### Risk Judgment

Individual differences in women's risk judgment have been a predominant focus in research examining risk factors for sexual victimization (see Rinehart & Yeater, 2015 for a recent review). Despite disparate findings, several studies support the potential relevance of individual differences in risk judgment in understanding women's risk for victimization. For instance, (a) previously victimized women required the presence of significantly more ambiguous risk factors in a hypothetical written vignette before they indicated they would feel "on guard" (Norris, Nurius, & Graham, 1999); (b) victimized women, relative to nonvictimized women, took longer to indicate that a man had "gone too far" in an audiotaped date rape vignette (Soler-Baillo, Marx, & Sloan, 2005); (c) a delay in responding to risk in a hypothetical written vignette depicting an acquaintance situation prospectively predicted rape and sexual revictimization at 8-month follow-up (Messman-Moore & Brown, 2006); (d) women assigned to a high-dose alcohol condition, relative to a low-dose alcohol condition, showed reduced ability to detect the risky behaviors of a male confederate (Parks, Hequembourg, & Dearing, 2008); and (e) women in an alcohol condition, as compared with a no alcohol condition, were less likely to detect risk cues in a high-risk video vignette, measured by key presses indicating their level of discomfort or concern (Parks, Levonyan-Radloff, Dearing, Hequembourg, & Testa, 2016).

Whereas these studies focused exclusively on women's average risk judgments, Yeater et al. (2010) used an explicit risk classification task to distinguish two *specific* cognitive processes that

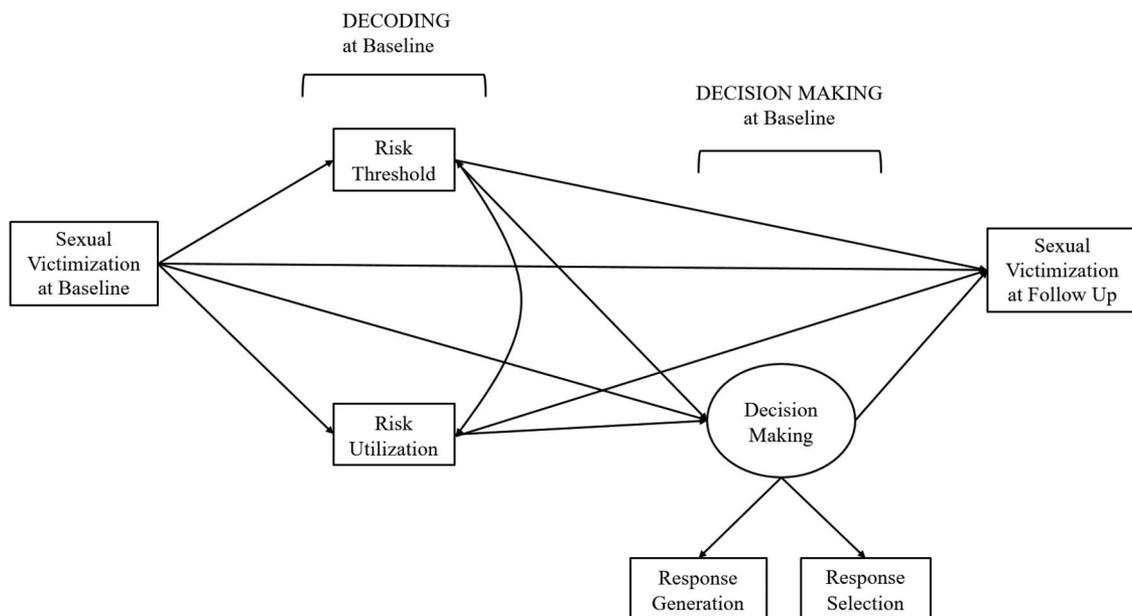


Figure 1. Schematic depiction of pathways from victimization severity at baseline to follow-up via decoding processes (as operationalized by risk threshold and risk utilization measures) and decision-making processes (as operationalized by response generation and response selection measures).

could influence women's risk judgments. Perceptual sensitivity refers to the ability to distinguish levels of risk, as indicated by the degree of utilization or reliance on risk-related information when judging risk. Decisional bias refers to how liberal or conservative risk judgments are, as indicated by the threshold or cutoff at which a woman judges a situation as risky (MacMillan & Creelman, 2005). In this study, college women made dichotomous risk judgments (high or low) of a large number of vignettes depicting situations that varied in their degree of risk. Yeater et al. (2010) found that women with more severe victimization histories (a) perceived fewer situations as high risk, demonstrating a higher or more conservative threshold for perceiving risk, and (b) showed reduced risk sensitivity by utilizing risk information less when judging risk (Yeater et al., 2010), although results using different methods have not always been consistent (Rinehart, Yeater, Treat, & Viken, 2018). In the current work, we used the Yeater et al. (2010) task and obtained estimates of the concepts of sensitivity and bias (i.e., utilization and threshold measures) as indices of participants' cognitive processing.

### Decision-Making

Individual differences in women's ability to respond effectively in risky situations has also been at the forefront of work in this area. In general, this work posits that women who respond less effectively to sexually aggressive men may be at increased risk for victimization. There is considerable support for this hypothesis, both from cross-sectional (VanZile-Tamsen, Testa, & Livingston, 2005; Yeater & Viken, 2010; Yeater et al., 2011, 2016) and prospective studies (Livingston, Testa, & VanZile-Tamsen, 2007; Testa, VanZile-Tamsen, & Livingston, 2007). Notably, this work has often used measures of sexual refusal assertiveness to examine the correspondence between women's responses to risky situations and their risk for sexual victimization. Work by Yeater and colleagues has focused instead on assessing women's generation and selection of actual responses to a broad array of hypothetical social situations that are representative of the types of situations that college women may face in their dating and social lives. This work found more severe victimization history was associated with (a) choosing less resistant responses to hypothetical social situations (Yeater & Viken, 2010) and (b) generating responses to these situations that were judged by sexual violence research experts as less effective in decreasing victimization risk (Yeater et al., 2016).

### Study Overview and Aims

This prospective study assessed college freshman women between the ages of 18 and 24 at baseline and again 6 months later. Freshman women were recruited because they report higher rates of near-term incidence of sexual victimization than older college women (Cantor et al., 2015) and because women younger than 25 are at high risk for sexual victimization (Bureau of Justice Statistics, 2013). Women also were required to be unmarried and interested in dating opposite sex partners, as the task stimuli described situations that such women might face when interacting socially with men. At baseline, participants completed tasks assessing their decoding and decision-making processes (described in the methods section), as well as a questionnaire measuring severity of past victimization experiences. A total of 6 months later, at a follow-up

assessment, participants reported on the severity of their victimization experiences during the prior 6-month period.

The aim of the study was to examine whether decoding and decision-making predicted future victimization, for all women, regardless of victimization history, and whether these processes mediated the association between past and future victimization. This work is innovative in several ways. First, it responds to calls within the literature to test theoretical models for women's risk for sexual victimization (Pittenger et al., 2016). Second, it utilizes unique tasks assessing women's risk judgments and responses to stimuli designed to be representative of a range of problem situations that undergraduate women are likely to experience in their social lives (described in the following). As noted by Parks et al. (2016), this is particularly important because previous work has relied primarily on stimuli of unknown reliability and validity. Finally, few prospective studies have used the integrative theoretical approach described in this study.

We predicted that (a) more severe victimization history at baseline would be associated with reduced sensitivity to risk-relevant information, more conservative thresholds for judging situations as high risk, and less effective decision-making; (b) reduced sensitivity to risk-relevant information, more conservative thresholds, and less effective decision making at baseline would prospectively predict more severe victimization experiences at follow-up; and (c) reduced risk sensitivity, more conservative thresholds, and less effective decision-making would mediate the relationship between prior and future victimization severity. Because prospective studies have found a robust association between prior and future victimization severity (Bryan et al., 2016; Najdowski & Ullman, 2011), we expected also that (d) more severe victimization at baseline would predict more severe victimization at follow-up.

## Method

### Participants

Participants were 481 freshman women at a medium-sized Southwestern university. A total of 691 women responded initially to our recruitment strategies (described in the Procedure section), 612 were screened for eligibility, and 493 were eligible to participate. Participants who enrolled in the study had a mean age of 18.20 ( $SD = .53$ ; range: 18–23), and the majority were unmarried (99.8%,  $n = 480$ ). Their self-reported sexual orientations were heterosexual (88.8%,  $n = 427$ ) and bisexual (11.2%,  $n = 54$ ). The sample was ethnically diverse, including 43.3% Hispanic/Latina ( $n = 208$ ), 39.5% White ( $n = 190$ ), 4.8% African American ( $n = 23$ ), 2.5% American Indian/Alaskan Native ( $n = 12$ ), 6.0% Asian ( $n = 29$ ), and 4.0% "other" ( $n = 19$ ). A total of 453 ( $N = 453$ ) of the 481 women who completed baseline returned at the 6-month follow-up, resulting in an attrition rate of 5.8%. Attrition was unrelated to demographic variables or self-reported victimization severity at baseline (all  $ps > .05$ ).

Simulations by Fritz and MacKinnon (2007) showed that our sample of 451 would have power greater than .8 to detect the indirect (mediational) effects of interest if one path was at least a conventionally defined small effect (.14) and the other path was midway between a conventional small effect and a conventional medium effect (.26). Thus, the sample had sufficient power to detect relatively modest effects.

## Procedure

The study was conducted in compliance with the university's institutional review board. Participants were recruited through freshman orientation and a mass e-mail sent to all freshman women. The study was described as examining college women's judgment of and responses to dating and social situations. A research assistant screened participants for eligibility, and if eligible, they were scheduled to complete informed consent and the baseline tasks and questionnaires. Participants completed the tasks and questionnaires in private assessment rooms, using *Opinio*, an online survey program. At baseline, participants completed the risk judgment task, followed by the response generation and selection tasks and the Sexual Experiences Survey (SES, described in the following text). The baseline consent and data collection took approximately 70 min. At the 6-month follow-up, participants completed the SES, again in private assessment rooms using *Opinio*. The follow-up assessment took approximately 15 min. Participants were compensated monetarily for their participation (\$20 at baseline, \$40 at follow-up).

Participants were allowed to discontinue participation if they did not want to respond to task or measure items; however, no participant opted to do so. Thus, there were no missing data.

## Self-Report Measures

**Demographic questionnaire.** This self-report measure collected participants' demographic information. Specifically, participants were asked to indicate their age, marital status, sexual orientation, race and ethnicity, and academic status.

**Sexual Experiences Survey.** The SES is a 10-item self-report questionnaire that measures the severity of sexual victimization since age 14 (Koss et al., 1987). The SES uses behaviorally specific definitions of sexual assault and asks participants to indicate whether the event did or did not occur. Koss and Gidycz (1985) reported an internal consistency of  $\alpha = .74$ , a 1-week test-retest reliability of  $r = .93$ , and a correlation of  $r = .73$  with interview responses.

Using a common ordinal scoring procedure for the SES (Edwards et al., 2014; Koss et al., 1987; Yeater et al., 2010), participants were assigned a value for victimization severity based on the most severe experience they reported having since age 14 (at baseline assessment) and during the prospective period (at 6-month follow-up; 0 = *no unwanted experiences*, 1 = *unwanted sexual contact*, 2 = *sexual coercion*, 3 = *attempted rape*, and 4 = *rape*). Responses to the SES were positively skewed; however, the estimation strategy used in our analyses (described in the following text) is recommended for ordered categorical data and robust to violations of normality (Kline, 2011).

At baseline, 37.4% ( $n = 180$ ) of participants reported no victimization since age 14, 18.1% ( $n = 87$ ) reported unwanted sexual contact, 23.9% ( $n = 115$ ) reported sexual coercion, 4.6% ( $n = 22$ ) reported attempted rape, and 16.0% ( $n = 77$ ) reported completed rape. At 6-month follow-up, and of the 453 participants who returned, 52.5% ( $n = 238$ ) of participants reported no victimization, 16.6% ( $n = 75$ ) reported unwanted sexual contact, 18.5% ( $n = 84$ ) reported sexual coercion, 2.9% ( $n = 13$ ) reported attempted rape, and 9.5% ( $n = 43$ ) reported completed rape. Across time points, 29.4% ( $n = 133$ ) of participants reported no victimization, 23.2% ( $n = 105$ ) reported victimization at baseline only,

8.2% ( $n = 37$ ) at follow-up only, and 39.3% ( $n = 178$ ) at baseline and follow-up.

## Social Situation Vignettes for the Decoding and Decision-Making Tasks

In a series of preliminary studies (Yeater et al., 2010, 2011), 81 written vignettes were developed that describe a range of problem situations that college women might face when interacting socially with men. The vignettes were developed through a series of steps to ensure their ecological validity. Undergraduate women first provided qualitative data on the types of situations they face when interacting socially with men. A separate group of undergraduate women then rated how risky each situation was with respect to ending in forced sexual activity, and both sets of data were used to develop the vignettes. Once written, the vignettes were rated by a separate sample of undergraduate women (Yeater et al., 2011) on three different dimensions: commonness, difficulty, and seriousness. Vignettes that were rated as reasonably common, difficult, and serious were retained for future use.

The vignettes vary in their degree of sexual victimization (low to high risk), and normative risk ratings collected from sexual violence research experts support the presence of this underlying dimension (Yeater et al., 2010). Experts were chosen to provide these ratings as they would presumably be particularly cognizant of the risk information in the vignettes. In the previous work, experts were asked to evaluate how risky each situation was in terms of the woman having an unwanted sexual experience (1 = *not risky*; 5 = *completely risky*). An unwanted sexual experience was defined as one in which the woman is verbally or physically coerced into having sexual contact of any kind with a man. In a subsequent study (Yeater et al., 2011), undergraduate women provided the same risk ratings as experts. The intraclass correlation across experts was .96; reliability between experts and undergraduate women was  $r = .90$ . The expert ratings reflect subjective rather than absolute estimates of risk. However, our analyses assume that the scores assigned by the experts reflect a meaningful gradient in relative risk across vignettes, and we use correlational methods appropriate to measures that vary in relative position on this dimension.

Because of these efforts to ensure ecological validity, analyses of participants' responses to the vignettes likely provide representative and precise estimates of their ability to process and respond to them. Notably, these stimuli have been used successfully in previous studies examining women's judgments of and responses to victimization risk (Yeater et al., 2010, 2011, 2016). See Table 1 for sample vignettes and their relative risk ratings.

**Description of the risk judgment task.** This task estimated participants' risk-related sensitivity and bias when making risk judgments. As noted, sensitivity refers to the ability to distinguish levels of risk; bias refers to the liberal versus conservative nature of the risk threshold that distinguishes high-risk versus low-risk judgments. Participants read each of the 81 vignettes (presented in random order and written in second person) and imagined being in the situation. Following the standard procedures of signal detection methods (Macmillan & Creelman, 2005), participants classified each vignette dichotomously as either low or high risk in terms of how risky it was for having an unwanted sexual experience. An unwanted sexual experience was defined as one in which she may

Table 1

*Example Vignettes With Corresponding Expert Mean Victimization Risk Ratings*

|   |      |
|---|------|
| 1. You're at a bar with a group of female friends. After you're there for about an hour, a couple of guys come over and bring all of your drinks from the bar. They ask if it would be all right for them to sit down with all of you and talk for a while.   | 1.13 |
| 2. You go out on a date with a guy that you have liked for some time. After dinner, the guy suggests that you stop by a party that his friends are having that night. While at the party, you notice that his friends drink a lot and make several rude comments about women. At the end of the date, he asks you out again.  | 2.13 |
| 3. Things in your life have been going really well lately. You go to a friend's house to hang out with a group of other people. There are several people there that you don't know. After a while, people start to play quarters and get pretty drunk. At the end of the evening, you notice that your friends have left or are asleep. You are alone with one of the guys that you just met that evening.  | 3.50 |
| 4. You go out on a date with a guy that you've liked for several months. You go to dinner and the movies. He makes several sexual comments during dinner that indicate that he really wants to have sex with you. During the movie, he cannot seem to keep his hands off of you. When he takes you home, he asks whether he can come in for a while.  | 3.88 |
| 5. You've been dating a guy for about a month. You really like him. He's very attractive and lots of women on campus want to date him. You've felt kind of special that he has chosen you rather than someone else. One night, you're making out with him and things start to get pretty hot. You don't want to have sex with him yet, but you can tell he's really into it. The guy says that he's really committed to the relationship, and if you were too, you would be willing to have sex with him. | 4.75 |

Note. Relative risk ratings made by experts. Scale was 1 = *not risky*, 2 = *slightly risky*, 3 = *moderately risky*, 4 = *very risky*, 5 = *completely risky*.

be verbally or physically coerced into having sexual contact of any kind with the man. Paralleling the approach used in Yeater et al. (2010), estimates of risk utilization and risk threshold (i.e., the analytical terms for sensitivity and bias, respectively) were derived using mixed-effects modeling (described in the Data Preparation section).

**Description of the decision-making tasks.** These tasks evaluated women's generation and selection of responses to social situations and included 10 of the 81 vignettes. These 10 were chosen because they were rated by sexual violence research experts in previous work as depicting moderate to high victimization risk (Yeater et al., 2010). For the response generation task (given first), participants read each vignette (presented randomly), imagined being in the situation, and provided a single, open-ended typed response to the question "What would you do or say now if you were in this situation?" Responses were coded by graduate research assistants trained by the first author using an established, reliable coding manual (Yeater et al., 2011, Yeater et al., 2016) for their effectiveness in decreasing risk of sexual victimization (1 = *highly ineffective* to 6 = *highly effective*). Each response was coded by two randomly assigned coders, and ratings were averaged. Reliability across raters ranged from  $r = .77$  to  $.97$ .

For the response selection task, participants read the same 10 vignettes, but this time each vignette (presented randomly) had a set of six corresponding response options (also presented randomly) that varied in their degree of effectiveness in decreasing victimization risk (from ineffective to effective). Participants then selected the response that best represented how they would respond in that situation. Responses were collected from college women in prior work (Yeater et al., 2011), and each response was rated by three sexual violence research experts for their degree of effectiveness in decreasing victimization risk (1 = completely ineffective to 6 = completely effective). The intraclass correlation across experts was  $.76$ .

## Results

### Data Preparation

**Risk judgment task.** A mixed-effects model was fit to participants' risk judgments using the lmer function in the lme4

package in R (Bates, Maechler, Bolker, & Walker, 2015). In a logistic-regression model, standardized normative values for risk obtained from experts in previous work were used to predict participants' dichotomous risk judgments for the 81 vignettes (Yeater et al., 2010). This analysis provided subject-specific estimates of two decoding processes that corresponded to the intercept and the risk-related slope in the equation. The intercept quantified the log odds of a high-risk classification for the average-risk situation. We used the additive inverse of the intercept (i.e.,  $-1 \times$  The Intercept) as an estimate of risk threshold, which decreases as the probability of a high-risk classification increases. Thus, a low risk threshold score indicates that many situations are classified as high-risk. This means that the respondent is setting a more liberal threshold for risk (i.e., a lower threshold for identification of risky situations), or in commonly used language, a bias to view situations as risky relative to other participants. In contrast, a high risk threshold score indicates that few situations are classified as high-risk. This indicates that the respondent is setting a more conservative threshold for risk (i.e., a higher threshold for identification of risky situations) or shows a bias to view situations as not risky, relative to other participants. Thus, a higher Risk threshold score should confer greater risk for unwanted sexual experiences, as fewer situations would be identified as potentially problematic. Second, risk utilization (the slope in the regression equation) quantified the degree of sensitivity to risk information when making risk judgments. These subject-specific indices of risk utilization and risk threshold were used to operationalize the concepts of risk-related sensitivity and bias, as in Yeater et al. (2010).

**Decision-making tasks.** Indices of the two decision-making processes were computed from responses to the response generation and response selection tasks. Response generation indexed the average effectiveness of a participant's generated responses; response selection indexed the average effectiveness of a participant's selected responses. These indices were highly correlated ( $r = .689$ ), suggesting that the two tasks were measuring a similar construct.

### Structural Model

**Estimated model.** The structural model (Figure 1) evaluates whether decoding of and decision-making (a) prospectively predict

sexual victimization at follow-up and (b) account for any relationship between sexual victimization at baseline and follow-up. All variables are regressed onto victimization severity at baseline, the only exogenous variable in the model. Decoding and decision-making variables are potential mediators of the relationship between victimization severity at baseline and follow-up. Decoding is assessed by two measured indicators of risk-related bias and sensitivity that covary: risk threshold,  $-\log$ -odds of a high-risk classification at baseline, for which lower values indicate a more liberal threshold and higher values indicate a more conservative threshold; and risk utilization, or reliance on risk information when judging risk at baseline. Response Generation (average effectiveness of generated responses) and Response Selection (average effectiveness of selected responses) serve as two measured indicators of the latent variable of Decision Making, given their very strong empirical association ( $r = .689$ ). Decision Making and Victimization Severity at Follow Up are regressed onto the Decoding processes, and Victimization Severity at Follow Up is regressed onto Decision Making.

Five indirect effects are evaluated within this model. Two of these indirect effects evaluate whether decision-making accounts for the prospective prediction of victimization severity at follow-up from risk threshold (or risk utilization). The third indirect effect specifies that decision-making accounts for the prospective prediction of victimization severity at follow-up from victimization severity at baseline. The fourth and fifth indirect effects of interest indicate that the risk threshold (or risk utilization) and subsequent decision-making account for the prospective prediction of victimization severity at follow-up from victimization severity at baseline.

**Model fit.** The model was fit to the data using robust maximum-likelihood procedures and full-information maximum likelihood estimation within Mplus 8.00 (Muthén & Muthén,

2017). The model fit well, as would be expected given its saturated nature and the simplicity of the measurement model. The root mean square error of approximation was 0.000, CFI was 1.000, and the standardized root-mean-square residual (SRMR) was .005. The chi-square test of model fit was not significant,  $\chi^2_{(3)} = 1.021$ ,  $p = .796$ .

**Path estimates (Hypotheses 1, 2, and 4).** Figure 2 presents standardized path coefficients for all structural paths. Victimization severity at baseline positively predicted victimization severity at follow-up to a moderate-to-large degree and negatively predicted decision-making to a small degree (i.e., more severe victimization at baseline was associated with less effective decision-making at baseline). Victimization severity at baseline was unrelated to decoding of risk-related information, as assessed by Risk threshold and risk utilization. Risk threshold strongly negatively predicted decision-making, such that women who judged fewer situations to be risky (i.e., who had more conservative thresholds) at baseline made less effective decisions at baseline. Risk utilization weakly positively predicted decision-making at baseline, indicating that women who relied more on risk-related information also made more effective decisions. Neither risk threshold nor risk utilization directly prospectively predicted victimization severity at follow-up. Decision-making at baseline weakly prospectively predicted victimization severity at follow-up.

**Indirect effects (Hypothesis 3).** Three of the five estimated indirect effects were significant. First, the indirect effect of risk threshold at baseline on victimization severity at follow-up through decision-making at baseline was significant,  $z = 2.854$ ,  $p < .01$ . Judging a larger proportion of social situations to be high-risk at baseline was associated with more effective decision-making at baseline, which prospectively predicted less severe sexual victimization at follow up. Second, the indirect effect of risk utilization at baseline on victimization severity at follow-up through

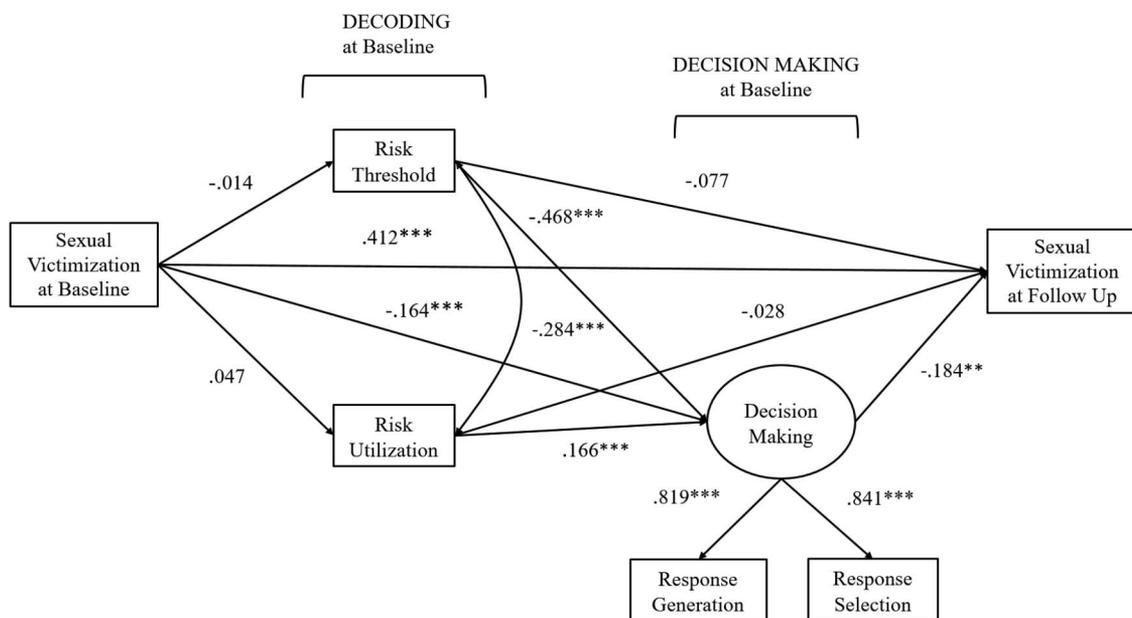


Figure 2. Overarching model with standardized estimates. Estimated errors for endogenous variables are excluded to simplify the figure. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

decision-making was significant,  $z = -2.003, p < .05$ . Relying more on risk when judging risk at baseline correlated with more effective decision-making at baseline, which prospectively predicted less severe sexual victimization at follow-up. Third, the indirect effect of victimization severity at baseline on victimization severity at follow-up through decision-making was significant,  $z = 2.305, p < .05$ . More severe victimization at baseline prospectively predicted more severe sexual victimization at follow-up, accounted for in part by less effective decision-making at baseline. Fourth and fifth, the indirect effects of victimization severity at baseline on victimization severity at follow-up through both risk threshold (or risk utilization) and decision-making at baseline were not significant.

## Discussion

This study extends work in the sexual violence research area in several important ways. First, few studies have tested theoretical frameworks that identify key etiological variables that may explain women's risk for sexual victimization and revictimization. In the current work, we tested whether patterns of SIP, specifically, decoding and decision-making, mediated the relationship between prior and future victimization. We examined also whether these patterns, independent of victimization history, predicted victimization experiences at the 6-month follow up. Second, we used tasks assessing women's risk judgments and responses to stimuli designed to be representative of the types of problem situations women experience in their social lives.

With respect to the prediction of future victimization from risk-related information processing patterns, we found partial support for Hypotheses 1 and 2. As expected, more effective decision-making at baseline, that is, responses that were rated as more effective in decreasing risk for sexual victimization, was associated with less severe victimization at baseline and follow-up. This finding dovetails nicely with findings from both cross-sectional (VanZile-Tamsen et al., 2005; Yeater & Viken, 2010; Yeater et al., 2016) and prospective work (Livingston et al., 2007; Testa et al., 2007) demonstrating that women's ability to identify effective solutions for managing risky situations is important in understanding their victimization risk. However, to our knowledge, this is the first study to examine whether aspects of SIP, as specified in the SIP model (McFall, 1982), predict sexual victimization severity prospectively. Our results show that decision-making predicts future sexual victimization even when accounting for the effects of prior victimization.

We did not find support for our prediction that decoding, as measured by our indices of risk utilization and risk threshold, would be directly associated with baseline and follow-up victimization. However, we did find that judging a larger proportion of the social situations as high risk and relying more on risk-relevant information when judging risk indirectly predicted less severe follow-up victimization via effective decision-making at baseline. This finding suggests that the effects of risk judgment on subsequent victimization occur via its effect on decision making. It highlights also the importance of sampling multiple processes concurrently, as the relevant effects may not be observed in isolation.

We also found partial support for Hypothesis 3, that risk processing would mediate the relationship between baseline and follow-up victimization. Specifically, we found that more severe baseline victimization predicted more severe follow-up victimization, which was accounted for in part by less effective decision-

making at baseline. However, the relationship between baseline and follow-up victimization was not explained by decoding through decision-making at baseline. This finding suggests that individual differences in decision-making may be particularly relevant for college women and perhaps more so for at-risk women (i.e., those with a previous victimization history). That is, decision-making was more proximal to victimization outcomes than the perceptual processes specified in our model. As noted, the extant literature reflects a reliable relationship between women's responses and victimization risk, even when response ability is measured and defined in disparate ways (Livingston et al., 2007; Yeater et al., 2011; Yeater & Viken, 2010). Why might decision-making be more strongly associated with victimization risk? Nurius and Norris (1996) posited that women may detect risk but opt not to respond assertively because the costs of doing so (e.g., rejection) outweigh the benefits. However, they also theorized that women might initially fail to recognize risk due to alcohol intoxication or because the rewarding aspects of a situation might distract them from attending to cues signaling risk. Thus, it may be that risk detection is more or less important depending on the woman and situation, whereas individual differences in behavioral responses may be linked more proximally to victimization risk.

As has been found in related studies (Bryan et al., 2016; Najdowski & Ullman, 2011), more severe victimization at baseline predicted more severe victimization at follow-up (Hypothesis 4). Thus, although decision-making processes accounted for some of the variability in explaining follow-up victimization, the direct link between pre- and postvictimization was one of the strongest associations in the model. Clearly, more work remains to be done to elucidate etiological variables that may explain more fully the victimization–revictimization relationship. Promising mediators might include alcohol problems (Messman-Moore, Ward, Zerubavel, Chandley, & Barton, 2015), sexual attitudes (Yeater et al., 2010), emotion regulation skills (Walsh, DiLillo, & Messman-Moore, 2012), and exposure to high-risk environments, such as bars (Testa, Hoffman, & Livingston, 2010).

## Limitations

As with any study, there are limitations to our work. First, ecological validity was key in developing the vignettes used in the tasks; as a result, they contain multiple contextual cues of victimization risk. Because of their complexity however, it is difficult to identify which aspects of the stimuli influenced women's information processing. Second, our findings may not generalize to other populations, including women in the community, college women in different areas of the country (and/or outside of the United States), lesbian women, and women from other races/ethnicities underrepresented in the sample. Finally, although we found evidence to support our theoretical model, we did not investigate all of the relevant processes suggested by contemporary research, and further elaborations will be necessary to fully explain the victimization–revictimization relationship.

## Prevention Implications

These findings also suggest that college women, including previously victimized women, might benefit from preventative interventions focused on shaping and enhancing the quality of their

responses to high-risk situations. For example, women could be asked to make decisions about how to respond to a variety of risky situations and then receive feedback from experts regarding the effectiveness of their responses in decreasing victimization risk. For situations in which participants chose less than effective responses, they could be asked to consider alternative, more effective responses to similar situations. The vignettes also could be tailored to the types of situations that participants encounter in their social lives. Research suggests that similar approaches may be effective in helping women reduce their risk for sexual victimization (Senn et al., 2015, 2017).

Because decoding of victimization risk lies upstream from decision-making, our findings suggest also that college women may benefit from training programs that enhance their ability to appraise this risk. Both cognitive-training methods and personalized risk feedback might be helpful in this regard. Cognitive training might entail first providing explicit instruction about cues associated with increased risk and then giving women the opportunity to enhance the accuracy of their judgments by making numerous judgments of social situations and receiving trial-by-trial feedback from the perspective of expert judges. This instruction-plus-feedback strategy has been used successfully to enhance the accuracy of men's judgments of women's sexual interest (Treat, Viken, Farris, & Smith, 2016). Previous work has also demonstrated that a related feedback-based strategy increased women's sensitivity to risk on a subsequent task (Yeater et al., 2010). Thus, we would expect in the current context that instruction-plus-feedback would increase women's reliance on risk information and increase the percentage of situations identified as high-risk. Providing personalized feedback regarding women's level of risk (e.g., risky sexual behavior and alcohol use) also might reduce decisional thresholds for determining risk. Evidence from related areas shows that receipt of personalized feedback reduces college women's alcohol use and increases their safe-sex practices (Neighbors et al., 2010).

## Research Directions

Our findings point also to other avenues for future work examining the relationship between women's SIP and victimization risk. Previous work has shown that the presence of alcohol and sexual activity in the vignettes influence negatively the effectiveness of women's responses (Yeater & Viken, 2010; Yeater et al., 2011). Thus, future work could isolate the contextual cues that are most relevant in determining women's risk judgments and response choices. Those cues then could become the focus of the cognitive training programs described previously.

Importantly, the SIP model (McFall, 1982) posits several other aspects of decision-making that we did not examine, including *repertoire search* (evaluating one's ability to carry out a proposed solution) and *utility evaluation* (evaluating how likely one would be to carry out a proposed solution, as well as the likelihood of being successful in doing so). Yeater et al. (2016) found a negative association between a sexual victimization history and a task that measured repertoire search. Thus, it may be profitable in future work to examine the prospective relationships among these processes and victimization risk.

Finally, given the robust association between binge drinking and risk for sexual victimization (Parks, Hsieh, Bradizza, & Romosz, 2008), future work should examine the influence of alcohol on SIP. Indeed, when experimentally induced, alcohol intoxication negatively

affects women's ability to both perceive and respond to risky situations (Parks et al., 2016), suggesting that, for women who regularly binge drink, the quality of their information processing in high-risk drinking environments may be especially relevant in reducing victimization risk. Future work could use the tasks in this study to evaluate the influence of binge drinking on SIP, as well as performance on these tasks in alcohol challenge studies.

In spite of the development of numerous interventions aimed at decreasing the incidence of sexual violence among college students, our preventative efforts remain inadequate, making sexual assault in this population a persistent and critical problem (DeGue et al., 2014). Of particular relevance is our lack of failsafe solutions for reducing men's sexually aggressive behavior, necessitating a continued focus on factors that increase women's risk. Additional work testing the SIP model may illuminate cognitive and behavioral processes that place women at risk for victimization, which then could be used to develop preventative interventions to reduce women's risk for victimization.

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