



Family Science Review

FSA
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ISSN: 2331-6780

Journal: <https://www.familyscienceassociation.org/journal/>

Hindsight Bias in Perceptions of Sexual Assault

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ABSTRACT. This investigation explored hindsight bias in college students' perceptions of sexual assault. Participants read a vignette about a man and woman who met at a party with the conditions varied across the vignettes: the alcohol use of the characters, the outcome of the vignette, and in the rape outcome, the victim's actions after the assault. Hindsight bias was assessed using both the posttest-only method and the pretest/posttest method and for both the outcome of the vignette and post-outcome events. Results revealed significant evidence for the existence of hindsight bias with the pretest/posttest method. Additionally, results revealed some evidence for hindsight bias contamination in perceptions of vignette characters, but in ways contrary to those predicted by the Defensive Attribution Hypothesis (Shaver, 1970).

Keywords: hindsight bias, sexual assault, vignette

Cite this article (APA 7):

Maurer, T. W. (2023). Hindsight bias in perceptions of sexual assault. *Family Science Review*, 27(2). <http://doi.org/10.26536/UNUJ1629>

Published online: 31 July 2023

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Hindsight Bias in Perceptions of Sexual Assault

Rates of sexual assaults in the United States remain high, especially among college-aged women, and most victims know their assailants (Cantor et al., 2020; Fedina et al., 2018; Gilbert et al., 2019). One of the most common reactions of third parties to sexual assaults is victim-blaming, the belief that the victim asked for, wanted, or deserved to be assaulted because of her behavior or character (Koss et al., 1994). However, there is little consensus in the literature on the influences of individual and situational factors on victim-blaming attitudes toward sexual assault victims (Grubb & Harrower, 2008; Grubb & Turner, 2012; Russell & Hand, 2017). In particular, three areas have been identified as having inconclusive or contradictory results, a paucity of research, or both a) the influence of hindsight bias (Malle et al., 2014), b) individuals' perceived similarity to the victim (Grubb & Harrower, 2008), and c) the presence/absence of alcohol use among the victim/perpetrator (Gravelin et al., 2019).

The Influence of Hindsight Bias on Victim-Blaming

Hindsight bias is the belief that an outcome is more predictable or foreseeable once it becomes known than before it was known (Giroux et al., 2015; Roesse & Vohs, 2012). Hindsight bias is ubiquitous, hard to avoid, and has detrimental consequences in applied settings (Hoffrage & Pohl, 2003; Blank et al., 2007). It makes the consequences of people's actions appear more foreseeable than they are, and because individuals judge the foreseeability of an outcome as more likely in hindsight (when they know it occurred) (Evelo & Greene, 2013), this has serious implications for negative outcomes in criminal trials (Blank et al., 2007). Further, the more severe the negative outcome, the more foreseeable individuals perceive the outcome to be (Harley, 2007), and the more foreseeable an outcome was, the more the actor—or victim—is considered blameworthy (Nestler et al., 2010). In fact, compared to individuals who are ignorant of event outcomes, individuals who know that an event ended in a negative outcome are more likely to think that actors should have taken precautions to avoid those outcomes, which is a form of blame for the outcome (Felson & Palmore, 2018; Malle et al., 2014). Additionally, one of the most serious consequences of hindsight bias is a form of victim-blaming: myopia, where individuals fail to perform a thorough search for explanations for outcomes and instead focus on the actions of actors, placing more blame on actors than is warranted (Roesse & Vohs, 2012).

Although hindsight bias has been extensively investigated in many areas of research (see Guilbault et al., 2004, for a meta-analysis), and believing that a sexual assault was foreseeable uniquely explains significant variance in victim-blaming (McCaul et al., 1990), only four studies (Carli, 1999; Carli & Leonard, 1989; Janoff-Bulman et al., 1985; Marchal et al., 2013) have assessed hindsight bias in perceptions of sexual assault. Using a vignette methodology common to sexual assault blame attribution studies (van der Bruggen & Grubb, 2014), all four prior studies found that hindsight bias increased individuals' perceptions of blame towards victims of sexual assault: participants who read a vignette with a rape outcome saw a rape outcome as more probable in hindsight than participants who did not read that outcome.

However, all four of these studies used either the between-subjects posttest-only/independent groups design or a variant thereof to assess hindsight bias. This method asks participants to estimate the likelihood of events only in hindsight. In contrast, the within-subjects pretest/posttest method used in other areas of hindsight bias research (Guilbault et al., 2004) asks participants to estimate the likelihood of events both *before* and *after* learning the outcome and allows for the determination of *change* in perceptions. Prior research is mixed on the effectiveness of using the pretest/posttest design compared to the posttest-only design to detect hindsight bias in other areas of research: some research suggests

hindsight bias is smaller in pretest/posttest designs than posttest-only designs (Hoffrage & Pohl, 2003), whereas other research suggests no difference in either significant effects or effect sizes (Guilbault et al., 2004). It is unexplored if hindsight bias would exert equally detectable or equally large effects on victim-blaming behaviors in perceptions of sexual assault with either method.

The Influence of Perceived Similarity to the Victim on Victim-Blaming

The Defensive Attribution Hypothesis (Shaver, 1970) posits that the amount of blame directed at a victim is related to individuals' perceived similarity to the victim. Specifically, individuals' need to protect themselves from the blame of others should result in those individuals locating sexual assault victims more distally from themselves and seeing them as “different” or “other” and thus deserving of blame (van der Bruggen & Grubb, 2014). Although several studies have documented that individuals do locate sexual assault victims more distally from themselves (Johnson, 1995; Miller et al., 2011), there is little research in this area, the findings are not consistent, and there are important methodological shortcomings to the existing studies (Gravelin et al., 2019, Grubb & Harrower, 2008). Most notably (Grubb & Harrower, 2008), the correlational nature of many of these studies cannot provide insight into whether individuals are locating victims more distally *after* those individuals have first determined the victim is blameworthy, as predicted by the Defensive Attribution Hypothesis, or if individuals are *first* locating victims more distally and subsequently blaming them. Untangling the nature of this influence requires assessing individuals' perceptions of similarity to the victim before learning she is a victim (i.e., in foresight), and comparing it with those who already know she is a victim (i.e., in hindsight). Two studies suggest that this methodological approach has merit, both with findings consistent with the predictions of the Defensive Attribution Hypothesis.

The first, Amacker and Littleton (2013), used a pretest/posttest design to query participants about their perceived similarity to a female victim at three points during the presentation of an audio vignette. Their results revealed that participants decreased their ratings of similarity to the victim after learning of her assault as a result of holding her responsible for her assault. The second, Marchal et al. (2013), used a posttest-only design and reported that in hindsight, individuals identified less with the victim than in foresight. Taken together, these findings suggest that hindsight bias may influence perceptions of similarity to victims in a way that is consistent with the Defensive Attribution Hypothesis (Shaver, 1970), but further replication is necessary.

The Influence of Alcohol Use on Victim-Blaming

Alcohol use by the victim, perpetrator, or both is a common feature in sexual assault vignettes (Gravelin et al., 2019). Results from the literature have frequently—but not universally (Henry et al., 2022)—documented that intoxicated male perpetrators of sexual assaults are blamed less than sober male perpetrators, yet intoxicated female victims are actually blamed more than sober female victims (Celniker et al., 2022; Finch & Munro, 2005; Romero-Sanchez et al., 2012). The typical explanation for this finding is that individuals assume that women's alcohol use can be interpreted as a proxy for sexual intent (Farris et al., 2008; Lindgren et al., 2009; Pegram et al., 2018), which increases their responsibility for the outcome. In contrast, men's alcohol use is interpreted to excuse them from responsibility for their actions. However, most of this literature has investigated perceptions of vignette characters and their intent retrospectively (i.e., after reading that the outcome of the vignette is sexual assault). After learning the outcome, participants are asked how much the characters wanted or intended for the outcome to happen, but because the outcome is sexual assault, not consensual sex, such questions cannot accurately assess perceptions of sexual intent. Further, because these perception questions are

asked retrospectively, they may be contaminated by hindsight bias, as suggested by the limited literature on the influence of hindsight bias on perceptions of similarity to the victim.

Maurer and Robinson (2008) reported a unique design in which participants were asked about vignette characters' sexual intent before reading the outcome of the vignette, thus eliminating the possibility of hindsight bias contamination. They found that participants perceived the same level of sexual intent from a female vignette character when she abstained from alcohol as when she consumed alcohol. Thus, the alcohol consumption of the vignette characters no longer yielded the predicted effects on perceptions of sexual intent in the absence of hindsight bias. Unfortunately, because Maurer and Robinson (2008) did not explicitly investigate hindsight bias, they were unable to compare their results to those of participants who were asked the same questions in hindsight as opposed to foresight and thus unable to conclusively demonstrate that the effects they observed were *caused* by the elimination of hindsight bias contamination. The present study sought to do so.

Method

This investigation used a factorial questionnaire and a male-on-female sexual assault vignette to explore hindsight bias in college students' perceptions of sexual assault. Using both posttest only and pretest/posttest designs (Guilbault et al., 2004), this quantitative analysis assessed hindsight bias in outcome likelihood. This design expanded upon the limited existing literature by exploring not only the effect of hindsight bias in outcome likelihood but also hindsight bias in post-outcome event likelihood. That is, (some) participants received additional information about post-outcome events (e.g., did the victim report the assault to the police or not) and corresponding questions to assess the degree of hindsight bias in post-outcome event likelihood.

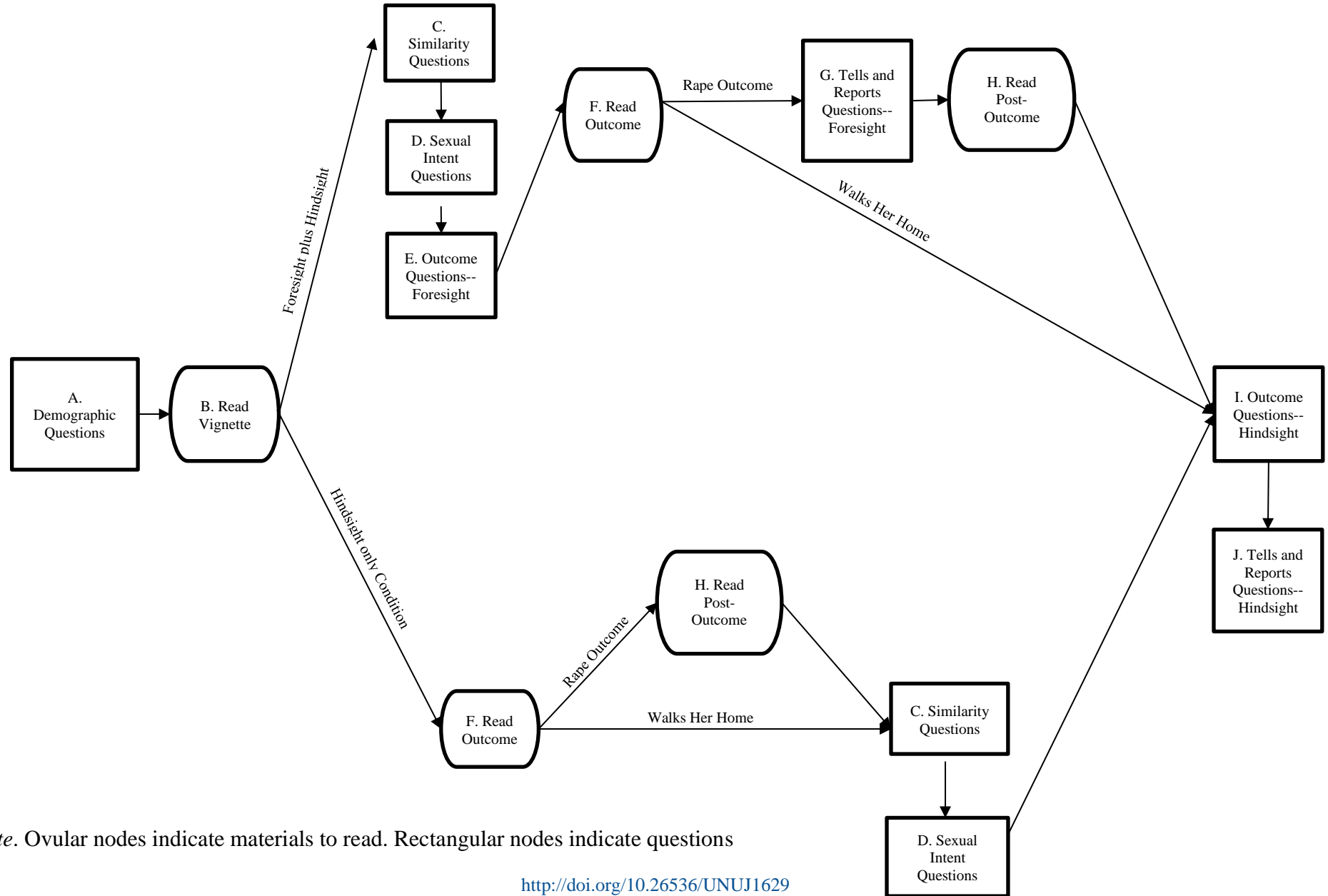
Additionally, this investigation explored the effect of hindsight bias on both perceived similarity to the vignette characters and perceptions of the vignette characters' prospective sexual intent, explicitly testing the assertion that individuals interpret women's alcohol use as a proxy for sexual intent. Further, unlike the prior research on hindsight bias in sexual assault, a more complex factorial design was used to incorporate different levels of character alcohol use.

Participants received a base vignette with multiple conditions systematically varied across the vignettes: the alcohol use of the characters (four conditions), the outcome of the vignette (two conditions), and in the case of the rape outcome, the post-outcome events (two conditions). Additionally, participants were assigned to one of two hindsight conditions: foresight plus hindsight (pretest/posttest) or hindsight only (posttest only). Participants in the foresight plus hindsight condition were asked prospectively about the similarity to the vignette characters and the characters' sexual intent and both prospectively and retrospectively about the vignette outcomes (and post-outcome events, as applicable). Participants in the hindsight-only condition were asked retrospectively about all questions. See Figure 1.

Perceptions were assessed with 10 quantitative dependent variables: two questions about the perceived similarity to the vignette characters, two questions about the vignette characters' sexual intent, four questions about the likelihood of different vignette outcomes, and two questions about the likelihood of different post-outcome events (as applicable)

Figure 1

Flowchart example of participant progression through materials.



Note. Ovular nodes indicate materials to read. Rectangular nodes indicate questions

<http://doi.org/10.26536/UNUJ1629>

Family Science Review, Volume 27, Issue 2, 2023

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I hypothesized:

H1: Using the posttest-only method (Carli, 1999; Carli & Leonard, 1989; Janoff-Bulman et al., 1985; Marchal et al., 2013), participants will demonstrate significant hindsight bias in outcome likelihood. At posttest, participants will estimate a higher likelihood for:

H1a: the outcome they read than the outcomes they did not read.

H1b: the post-outcome events they read than the post-outcome events they did not read.

H2: Using the pretest/posttest method (Guilbault et al., 2004), participants will demonstrate significant hindsight bias in outcome likelihood. From pretest to posttest, participants' estimates of the likelihood of:

H2a: the outcomes will change such that the outcome they read will be perceived as more likely at posttest than pretest.

H2b: the post-outcome events will change such that the events they read will be perceived as more likely at posttest than pretest (rape outcome only).

H3: Hindsight bias will contaminate perceptions of the vignette characters (Amacker & Littleton, 2013).

H3a: Participants asked in foresight will perceive greater similarity to each of the vignette characters than participants asked in hindsight.

H3b: Participants asked in foresight will perceive less sexual intent from the vignette characters than participants asked in hindsight.

Additionally, the alcohol use of the vignette characters was used as an independent variable but given the absence of such manipulations from the existing literature on hindsight bias in sexual assault (Carli, 1999; Carli & Leonard, 1989; Janoff-Bulman et al., 1985; Marchal et al., 2013) and the contradictory findings reported by Maurer and Robinson (2008) in using a similar vignette, specific predictions were not made.

Procedure

As part of a large undergraduate course on family development or lifespan development at a southeastern American public university with an enrollment of 20,000, students in multiple sections of the courses completed a questionnaire measure about perceptions of a sexual assault vignette. As noted above, 12 different versions of the vignette were used in both of the hindsight conditions, resulting in 24 different versions of the materials. These 24 different versions were randomly collated into sets of 24 without duplication, which was then stacked into multiple sets. This was done to help ensure equal numbers of participants received each of the 24 versions. These sets of questionnaires were passed out to students at the beginning of the class period, and students were given 10 minutes to complete their version. The questionnaire was anonymous and conducted with the approval of the IRB. Participants received no incentive for completing the questionnaire and were instructed to work quietly on other work if they finished early or did not want to take the questionnaire. Participants were also given the option of completing the questionnaire but declining permission to use their data.

Participants

A convenience sample of 479 undergraduate students participated in this investigation. Two participants failed to complete the measures and were dropped from the analyses. An additional four participants declined to give permission to use their data and were dropped from the analyses. This left a final sample of 473. Of those participants, 51 (10.8%) were men, and 421 (89.0%) were women, with one participant not reporting gender. In terms of ethnicity, 315 participants were White (66.6%), 131 were African American (27.7%), five were Hispanic (1.1%), six were Asian (1.3%), and 15 listed “Other” (3.2%). One participant did not report ethnicity. The average age was 20.6 years ($SD = 2.69$).

Measures

The measures used in this investigation were divided between 10 blocks (hereafter labeled A through J for ease of reference), with different blocks appearing in different versions of the questionnaire, as described below (see Figure 1 for visual depiction). All participants received block A first, which consisted of three demographic questions. Next, all participants read one of 12 sexual assault vignettes adapted for this investigation from Maurer and Robinson (2008). The vignette was divided into two sections. The first section, block B, presented the events up to the situation's outcome. The vignettes read: “Matt & Jenny meet at a party. They hang out for a while and talk to one another. They go to one of the bedrooms in the building, sit down on the bed, and start making out.”

I created the experimental alcohol conditions by inserting additional information into the presented text, mirroring the procedure used by Maurer and Robinson (2008). Information was inserted after the second sentence, except in the Abstain condition. In the Abstain condition, the second sentence was edited to end “steering clear of the alcohol at the party.” In the other three conditions, an additional sentence was inserted after the second sentence: “Both Matt and Jenny get really drunk and start stumbling around.” (Both Drunk); “Matt steers clear of the alcohol at the party, but Jenny gets really drunk and starts stumbling around.” (Drunk Female); and “Jenny steers clear of the alcohol at the party, but Matt gets really drunk and starts stumbling around.” (Drunk Male). The order in which participants received the remainder of the materials varied by hindsight condition. See Appendix A for the Foresight plus hindsight condition and Appendix B for the Hindsight-only condition.

Foresight plus Hindsight. Participants in the Foresight plus Hindsight condition then received block C, block D, and block E. Block C contained two questions, adapted from Maurer and Robinson (2008): 1. “How much does Matt seem like you?” (1=*Not at all like me* to 5=*A lot like me*); 2. “How much does Jenny seem like you?” (same response categories as question 1). Block D also contained two questions adapted from Maurer and Robinson (2008): 3. “How much do you think Matt wants to have sex?” (1=*Not at all* to 4=*A lot*); 4. “How much do you think Jenny wants to have sex?” (same response categories as question 3). In block E, participants were asked (adapted from Marchal et al., 2013), “Given your knowledge of the events that have occurred up until this point, what do you think is the likelihood that the scenario will have each of the following endings?” (1=*Not at all likely* to 5=*Extremely likely*); 5. “They kiss for a while, then each goes back to their own apartment.”; 6. “They kiss for a while, then Matt walks Jenny back to her apartment, then walks home alone to his.”; 7. “They kiss for a while, then they have sex.”; 8. “They kiss for a while, then Matt rapes Jenny.”

The next page, block F, presented the second section of the vignette and read, “This is the OUTCOME page. Please read the following OUTCOME to this scenario and answer the questions

below.” Participants received one of two outcomes: “After kissing for a while, Matt walks Jenny back to her apartment, then walks home alone to his.” (Walks Her Home) or

After kissing for a while, Matt puts his hand under Jenny’s shirt and starts squeezing her breasts. Jenny says, “No,” and pushes his hand away. Matt says, “You know you want it,” and puts his hand back under her shirt. Jenny shouts, “No!” and tries to push him away. Matt persists, takes off Jenny’s clothes, and they have sex despite Jenny’s protests, struggles, and attempts to stop. (Rape)

Participants who read the Rape outcome condition then received block G, which contained an additional two questions: 1. “What do you think is the likelihood that Jenny would tell anyone about what happened?” (1=*Not at all likely* to 5=*Extremely likely*); 2. “What do you think is the likelihood that Jenny would report this encounter to the police as a rape?” (same response categories as question 1). Next, participants who read the Rape outcome received block H on a new page, which contained the following information, “Please read the following details about what happened after the OUTCOME of the scenario, then answer the questions below:” and received one of two options: a) “Jenny tells no one about what happened and doesn’t report it to the police.” (Doesn’t Tell) or b) “Jenny tells a friend about what happened and reports to the police that she was raped.” (Tells)

All participants in the Foresight plus Hindsight condition regardless of outcome then received block I with four hindsight questions with the following instructions: “Assume that you did not know the OUTCOME of the scenario you have read. Given only your knowledge of the events that occurred before what happened on the OUTCOME page, what do you think is the likelihood that the scenario could have had each of the following endings?”. The four questions were the same outcome questions previously asked in foresight (block E). Note that participants in the Foresight plus Hindsight condition who read the Walks Her Home outcome progressed from block F directly to block I and did not receive blocks G or H.

Finally, participants in the Foresight plus Hindsight condition, regardless of outcome, received block J, which contained the following instructions: “Again, based only on your knowledge of the events that occurred before what happened on the OUTCOME page, if the outcome were that Matt had raped Jenny:” and answered the same two post outcome event questions asked in foresight of participants in the Rape outcome (block G). Note that participants who read the Walks Her Home outcome did not receive block G and thus were only asked these questions in hindsight.

Hindsight only. Participants in the Hindsight only condition, after reading block B with the first section of the vignette, proceeded immediately to the outcome page (block F) to read the second section of the vignette. Participants who received the Walks Her Home outcome read the following instructions, “Assume that you did not know the OUTCOME of the scenario you have read. Given only your knowledge of the events that occurred before what happened on this page, answer the following questions based on that point in the story:” and then received block C and block D. Those blocks presented four questions about how much each character seemed like the participants and how much each character wanted sex. Participants then received identical instructions to the Foresight plus Hindsight condition and blocks I and J, with four questions asking about the likelihood of each of four possible outcomes and two questions asking about the likelihood of two possible outcomes if the first outcome had been that Matt had raped Jenny.

Participants who received the Rape outcome proceeded from block F to block H, which contained the post-outcome information about whether or not Jenny had told anyone about the rape and reported it to the police. Then they received the same instructions and the same blocks C, D, I, and J as participants in the Walks Her Home outcome.

Participants in both Hindsight conditions also received an additional one to three questions not used in this investigation.

Results¹

Preliminary Analyses

Descriptive statistics and correlations for the dependent variables appear in Table 1. Multivariate tests were chosen to reduce the Type I error rate and control for the intercorrelations between the dependent variables. The number of participants in each condition appears in Table 2.

Existence of Hindsight Bias

To test Hypotheses 1 and 2 regarding the existence of hindsight bias using both the posttest-only method and the pretest/posttest method, four Multivariate Analyses of Variance [MANOVA] tests were conducted. The first was a 2 (Outcome Condition) x 4 (Alcohol Condition) with all four outcomes at posttest as the dependent variables, using only participants from the Hindsight only condition (N=234). This test revealed significant multivariate main effects for Outcome Condition, Wilks' Lambda = .92, $F(4, 223) = 4.85$, $p < .001$, partial $\eta^2 = .08$, Alcohol Condition, Wilks' Lambda = .87, $F(12, 590.29) = 2.67$, $p < .01$, partial $\eta^2 = .05$, and the Outcome Condition x Alcohol Condition interaction, Wilks' Lambda = .91, $F(12, 590.29) = 1.80$, $p < .05$, partial $\eta^2 = .03$. Follow-up univariate ANOVAs yielded significant models for three outcome variables: Walks Home Alone, $F(7, 233) = 3.55$, $p < .01$, partial $\eta^2 = .10$, Walks Her Home, $F(7, 233) = 3.45$, $p < .01$, partial $\eta^2 = .10$, and Have Sex, $F(7, 233) = 2.45$, $p < .05$, partial $\eta^2 = .07$, but not for Rape.

The Outcome Condition main effect was significant in the models testing Walks Home Alone and Have Sex, but not for Walks Her Home or Rape. Participants who read the Walks Her Home outcome were significantly less likely to see the Walks Home Alone outcome as probable ($M = 2.42$, $SD = .92$) than participants who read the Rape outcome ($M = 2.72$, $SD = .96$); conversely, participants who read the Rape outcome were significantly less likely to see the Have Sex outcome as probable ($M = 3.53$, $SD = 1.01$) than participants who read the Walks Her Home outcome ($M = 3.91$, $SD = .81$). These results failed to support Hypothesis 1a, which predicted that at posttest, participants would estimate a higher likelihood for the outcome they read than the outcomes they did not read.

For the Alcohol Condition, only the Walks Home Alone and Walks Her Home outcomes yielded significant differences. Post hoc comparisons using Least Significant Differences [LSD] revealed multiple differences between conditions, largely attributable to a greater perceived likelihood of the outcomes in the Abstains condition than the other three alcohol conditions. See Table 3.

Table 1*Correlations and Descriptive Statistics for Dependent Variables*

Variable	Matt seem like you	Jenny seem like you	Matt want sex	Jenny want sex	Walks home alone	Walks her home	Have sex	Rape	Tells	Reports	N	<i>M</i>	<i>SD</i>
Matt seem like you	—	.31***	-.24***	.32***	.02	.05	.09	-.18**	-.16*	-.12	233	2.30	1.37
Jenny seem like you	.40***	—	-.03	-.05	.15*	.03	-.14*	-.12	-.00	-.11	234	2.83	1.29
Matt want sex	-.11	-.02	—	-.14*	-.06	-.19**	.10	.26***	.02	-.02	233	3.19	.77
Jenny want sex	.04	-.04	.17**	—	-.02	.10	.30***	-.19**	-.17*	-.16*	234	2.05	.87
Walks home alone	.18**	.17**	-.17*	-.23***	.57***	.56***	-.25***	-.18***	.16***	.16***	473	2.50	.95
Walks her home	.19**	.07	-.23***	.02	.38***	.64***	-.16***	-.23***	.17***	.17***	473	2.31	1.02
Have sex	-.12	-.03	.18**	.30***	-.50***	-.36***	.72***	.27***	-.01	-.03	473	3.64	.96
Rape	-.11	-.12	.25***	-.04	-.37***	-.29***	.35***	.78***	-.10*	-.03	473	2.86	1.22
Tells	.07	.02	-.01	.08	.12	.13	-.07	-.00	.77***	.69***	473	2.82	1.12
Reports	.10	.13	-.07	-.00	.03	.12	-.03	-.06	.68***	.78***	473	2.43	1.09
	<i>N</i>	239	239	239	239	239	239	239	239	160	160		
	<i>M</i>	2.17	2.52	3.28	2.52	2.23	2.05	3.77	2.72	2.56	2.16		
	<i>SD</i>	1.17	1.29	.67	.80	.89	1.03	.94	1.16	.89	1.00		

Note. Numbers below the diagonal are Foresight, numbers above the diagonal are Hindsight. Numbers on the diagonal represent Foresight-Hindsight correlations. * $p < .05$, ** $p < .01$, *** $p < .001$

Table 2*Number of Participants by Condition (N = 473)*

Hindsight Condition	Post-Outcome Event Condition	Alcohol Condition			Both Drunk	Total
		Abstain	Drunk Female	Drunk Male		
Foresight plus Hindsight	Doesn't Tell or Report	20	20	19	19	78
	Tells and Reports	20	21	20	21	82
	Not in Rape Outcome	20	20	20	19	79
	Total	60	61	59	59	239
Hindsight Only	Doesn't Tell or Report	20	19	20	20	79
	Tells and Reports	19	20	19	19	77
	Not in Rape Outcome	20	18	20	20	78
	Total	59	57	59	59	234

Table 3*Hindsight Estimates of Outcome Likelihood by Outcome Condition and Alcohol Condition (N = 234)*

Outcome Condition	Possible Outcome	Alcohol Condition									
		Abstain		Drunk Female		Drunk Male		Both Drunk		Total	
		M	SE	M	SE	M	SE	M	SE	M	SE
Walks Her Home	Walks home alone	3.1	0.23	2.06	0.19	2.4	0.2	2.1	0.12	2.42	0.1
	Walks her home	3	0.26	2	0.2	2.35	0.24	2.15	0.18	2.38	0.12
	Have sex	3.9	0.19	4.22	0.19	3.7	0.16	3.85	0.18	3.91	0.09
	Rape	2.55	0.21	2.83	0.32	3.05	0.29	2.55	0.22	2.74	0.13
Rape	Walks home alone	2.67	0.17	2.9	0.17	2.77	0.13	2.54	0.15	2.72	0.08
	Walks her home	2.79	0.16	2.59	0.18	2.03	0.14	2.26	0.18	2.42	0.09
	Have sex	3.44	0.17	3.69	0.17	3.28	0.14	3.72	0.16	3.53	0.08
	Rape	2.56	0.22	3.38	0.21	3.08	0.21	3	0.21	3.01	0.11
Total	Walks home alone	2.81 _a	0.14	2.63 _b	0.14	2.64 _{ab}	0.11	2.39 _b	0.11	2.62	0.07
	Walks her home	2.86 _a	0.14	2.40 _b	0.14	2.14 _b	0.12	2.22 _b	0.13	2.41	0.07
	Have sex	3.59	0.13	3.86	0.14	3.42	0.11	3.76	0.12	3.66	0.06
	Rape	2.56	0.16	3.21	0.17	3.07	0.16	2.85	0.16	2.92	0.08

Note. In each row, means with different subscripts are significantly different at the $p < .05$ level. Response scale: 1=*Not at all likely* to 5=*Extremely likely*. Comparisons were only performed for combined Outcome Conditions for the Walks home alone and Walks her home models.

However, the results in the Walks Home Alone outcome were qualified by an Outcome Condition x Alcohol Condition interaction. Participants who read the Walks Her Home outcome were less likely to see the Walks Home Alone outcome as probable than participants who read the Rape outcome, except in the Abstain alcohol condition, where they saw the outcome as more probable. In other words, when any character alcohol use was present, participants who read the Walks Her Home outcome were less likely to see the Walks Home Alone outcome as probable than participants who read the Rape outcome.

The second MANOVA was a 3 (Post-Outcome Event Condition²) x 4 (Alcohol Condition) with both post-outcome events at posttest as the dependent variables, also using only participants from the Hindsight only condition (N=234). This test revealed significant multivariate main effects for Post-Outcome Event Condition only, Wilks' Lambda = .93, $F(4, 442) = 4.22, p < .01$, partial $\eta^2 = .04$. Neither the Alcohol Condition nor the interaction term were significant. Follow-up univariate ANOVAs yielded significant models for both post-outcome event variables: Tells, $F(11, 233) = 2.06, p < .05$, partial $\eta^2 = .09$, and Reports, $F(11, 233) = 2.29, p < .05$, partial $\eta^2 = .10$. LSD post hoc comparisons revealed significant differences between the three groups, partially supporting Hypothesis 1b, which predicted that at posttest, participants would estimate a higher likelihood for the post-outcome events that they read than the events they did not read. Specifically, participants in the Tells post-outcome event condition reported greater likelihoods for both Tells ($M = 3.32, SE = 0.13$), and Reports ($M = 2.92, SE = 0.13$), than participants in either the Doesn't Tell ($M = 2.70, SE = 0.13; M = 2.34, SE = 0.13$, respectively) or Not in the Rape Outcome Condition ($M = 2.73, SE = 0.13; M = 2.31, SE = 0.13$, respectively) conditions.

The third MANOVA was a 2 (Outcome Condition) x 4 (Alcohol Condition) x 2 (Time) repeated measures design with all four outcomes as the repeated dependent variables, using only participants from the Foresight plus Hindsight condition (N = 239). Results revealed a significant between-subjects effect for Alcohol Condition, Wilks' Lambda = .76, $F(12, 603.52) = 5.62, p < .001$, partial $\eta^2 = .09$, and a significant within-subjects effect for Time, Wilks' Lambda = .88, $F(4, 228) = 7.65, p < .001$, partial $\eta^2 = .12$, which was qualified by a Time x Outcome Condition interaction, Wilks' Lambda = .92, $F(4, 228) = 4.99, p < .01$, partial $\eta^2 = .08$. Neither the Outcome Condition nor any of the other interaction terms were significant. Univariate tests with the between-subject effect for Alcohol Condition yielded significant models for all four outcome variables, Walks Home Alone, $F(3, 231) = 8.90, p < .001$, partial $\eta^2 = .10$, Walks Her Home, $F(3, 231) = 7.61, p < .001$, partial $\eta^2 = .09$, Have Sex, $F(3, 231) = 7.54, p < .001$, partial $\eta^2 = .09$, and Rape, $F(3, 231) = 9.34, p < .001$, partial $\eta^2 = .11$. All four models were significant for the Alcohol Condition. See Table 4.

Table 4*Main Effect for Alcohol Condition on Outcome Estimates (N = 239)*

	Alcohol Condition							
	Abstain		Drunk Female		Drunk Male		Both Drunk	
	(N = 60)		(N = 61)		(N = 59)		(N = 59)	
Possible Outcome	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>
Walks home alone	2.72 _a	0.1	1.97 _b	0.1	2.38 _c	0.11	2.25 _{bc}	0.11
Walks her home	2.62 _a	0.11	2.13 _b	0.12	1.85 _b	0.12	2.09 _b	0.12
Have sex	3.37 _a	0.12	4.03 _b	0.11	3.49 _a	0.12	3.89 _b	0.12
Rape	2.08 _a	0.14	3.03 _b	0.14	2.92 _b	0.14	2.84 _b	0.14

Note. In each row, means with different subscripts are significantly different at the $p < .05$ level. Response scale: 1=*Not at all likely* to 5=*Extremely likely*. Estimates are averages of Foresight and Hindsight

Univariate tests with the within-subjects Time x Outcome interaction revealed significant effects for Walks Home Alone, $F(1, 231) = 15.19, p < .001$, partial $\eta^2 = .06$, Walks Her Home, $F(1, 231) = 9.42, p < .01$, partial $\eta^2 = .04$, and Rape, $F(1, 231) = 4.38, p < .05$, partial $\eta^2 = .02$, but not Have Sex, $F(1, 231) = 1.92, ns$. These results supported Hypothesis 2a, which predicted that from pretest to posttest, participants' estimates of the likelihood of the outcomes would change such that the outcome they read would be perceived as more likely at posttest than pretest. Participants who read the Walks Her Home outcome were more likely to see that outcome as probable in hindsight than foresight; participants who read the Rape outcome were more likely to see the rape outcome as probable. See Table 5.

Table 5*Estimates of Outcome Likelihood in Foresight and Hindsight by Outcome Condition (N = 239)*

Outcome Condition		Estimates of Outcome Likelihood															
		Walks home alone				Walks her home				Have sex				Rape			
		Foresight		Hindsight		Foresight		Hindsight		Foresight		Hindsight		Foresight		Hindsight	
<i>N</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Walks Her Home	79	2.16	.84	2.62***	.94	2.09	.98	2.49***	.99	3.78	.90	3.56**	.89	2.59	1.15	2.53	1.21
Rape	160	2.26	.92	2.27	.92	2.03	1.05	2.08	.94	3.76	.96	3.67	.98	2.79	1.16	2.95*	1.13
Total	239	2.23	.89	2.38***	.94	2.05	1.03	2.21***	.97	3.77	.94	3.63**	.95	2.72	1.16	2.81	1.17

Note. Response scale: 1=Not at all likely to 5=Extremely likely. For each possible outcome (column), only differences between foresight and hindsight within Outcome Condition (row) are flagged. * $p < .05$, ** $p < .01$, *** $p < .001$

The fourth MANOVA was a 2 (Post-Outcome Event Condition) x 4 (Alcohol Condition) x 2 (Time) repeated measures design with both post-outcome events as the repeated dependent variables. Because only participants in the Rape Outcome Condition were asked prospectively about post-outcome events, this analysis uses only that subsample within the Foresight plus Hindsight condition ($N = 160$). Results revealed only a significant within-subjects Time x Post-Outcome Event Condition interaction, Wilks' Lambda = .92, $F(2, 151) = 6.80$, $p < .01$, partial $\eta^2 = .08$. Follow-up univariate tests revealed significant effects for both Tells, $F(1, 152) = 5.62$, $p < .05$, partial $\eta^2 = .04$, and Reports, $F(1, 152) = 12.75$, $p < .001$, partial $\eta^2 = .08$. These results partially supported Hypothesis 2b, which predicted that from pretest to posttest, participants' estimates of the likelihood of the post-outcome events would change such that the events they read would be perceived as more likely at posttest than pretest. Participants who read that the victim had told someone and reported the rape were more likely to see those events as probable in hindsight than in foresight; however, participants who read that the victim did not disclose the rape did not depress their probability estimates in hindsight. See Table 6.

Table 6

Estimates of Post-Outcome Event Likelihood in Foresight and Hindsight by Post-Outcome Event Condition (N = 160)

Post-Outcome Event Condition	N	Estimates of Post-Outcome Event Likelihood							
		Tells				Reports			
		Foresight M	Foresight SD	Hindsight M	Hindsight SD	Foresight M	Foresight SD	Hindsight M	Hindsight SD
Tells and Reports	82	2.59	0.96	2.76*	1.00	2.12	1.04	2.40** *	1.05
Doesn't Tell or Report	78	2.53	0.82	2.46	0.98	2.21	0.96	2.13	0.86
Total	160	2.56	0.89	2.61	1.00	2.16	1.00	2.27	0.97

Note. Response scale: 1=Not at all likely to 5=Extremely likely. For each possible post-outcome event (column), only differences between foresight and hindsight within Post-Outcome Event Condition (row) are flagged. * $p < .05$, ** $p < .01$, *** $p < .001$

Hindsight Bias Contamination of Perceptions of Characters

To test Hypothesis 3, one MANOVA analysis was conducted: a 2 (Hindsight Condition) x 3 (Post-Outcome Event Condition) x 4 (Alcohol Condition) analysis with both questions about perceived similarity to the characters and both questions about character sexual intent as the dependent variables. Significant multivariate effects emerged for Hindsight Condition, Wilks' Lambda = .90, $F(4, 444) = 12.11$, $p < .001$, partial $\eta^2 = .10$, Post-Outcome Event Condition, Wilks' Lambda = .93, $F(8, 888) = 3.90$, $p < .001$, partial $\eta^2 = .03$, Alcohol Condition, Wilks' Lambda = .90, $F(12, 1175) = 4.02$, $p < .001$, partial $\eta^2 = .04$, and the Hindsight Condition x Post-Outcome Event Condition interaction, Wilks' Lambda = .93, $F(8, 888) = 3.86$, $p < .001$, partial $\eta^2 = .03$. None of the other interaction terms emerged as significant. Follow-up univariate ANOVAs yielded significant models only for the two sexual intent variables: Male Sexual Intent, $F(23, 470) = 2.43$, $p < .001$, partial $\eta^2 = .11$, and Female Sexual Intent, $F(23, 470) = 4.44$, $p < .001$, partial $\eta^2 = .19$, failing to support Hypothesis 3a, which predicted that

participants asked in foresight would perceive greater similarity to each of the vignette characters than participants asked in hindsight. For the Female Sexual Intent model, all four effects were significant. For the Male Sexual Intent model, only Post-Outcome Event Condition, Alcohol Condition, and the Hindsight Condition x Post-Outcome Event Condition interaction were significant.

LSD post hoc comparisons revealed significant differences between the three Post-Outcome Event Conditions. Male Sexual Intent was perceived to be higher in the Tells Condition ($M=3.34$, $SE=.06$) than in the Not in Rape Condition ($M=3.13$, $SE=.06$). Female Sexual Intent was perceived to be higher in the Not in Rape Condition ($M=2.50$, $SE=.06$) than in either the Tells Condition ($M=2.24$, $SE=.06$) or the Doesn't Tell Condition ($M=2.11$, $SE=.06$). These differences were qualified by a Hindsight Condition x Post-Outcome Event Condition interaction, contradicting Hypothesis 3b, which predicted that participants asked in foresight would perceive less sexual intent for each of the vignette characters than participants asked in hindsight. To the contrary, participants asked in hindsight perceived less sexual intent for the female character in both the Tells and Doesn't Tell Conditions compared to participants asked in foresight.

LSD post hoc comparisons also revealed significant differences between the four Alcohol Conditions. The general pattern of results was that when a character abstained from drinking, that character was perceived to have less sexual intent than when the character got drunk. See Tables 7 and 8.

Discussion

This investigation used a factorial questionnaire and a sexual assault vignette to explore hindsight bias in college students' perceptions of sexual assault. It differed from the four prior investigations in this area of research (Carli, 1999; Carli & Leonard, 1989; Janoff-Bulman et al., 1985; Marchal et al., 2013) in four key ways. First, unlike the prior research, which used variations on the posttest-only method, this investigation used both the posttest-only method and the pretest/posttest method. Second, this investigation also explored hindsight bias in perceptions of post-outcome events. Third, it explored hindsight bias contamination in perceptions of vignette characters. Finally, it explored the effect of character alcohol use on hindsight bias and hindsight bias contamination. The results obtained here suggest that considerable additional research in this area is warranted.

Hypothesis 1, that participants would demonstrate significant hindsight bias with the posttest-only method, was only partially supported. Contrary to all the prior published research on this topic using this methodology, participants who read a rape outcome were no more likely to see that outcome as likely in hindsight than participants who read a neutral outcome (H1a). However, participants who read a rape outcome and read that the victim told someone about her assault and reported it to the police were more likely to see that post-outcome event as likely in hindsight than either participant who read that she did not tell or report or participants who did not read the rape outcome (H1b).

Hypothesis 2, that participants would demonstrate significant hindsight bias with the pretest/posttest method, was partially supported. Participants' estimates of the likelihood of the outcome they read increased from foresight to hindsight (H2a). Further, for post-outcome events, participants who read that the victim told someone about her assault and reported it to the police were more likely to see that post-outcome event as likely in hindsight than in foresight (H2b).

Table 7*Hindsight Bias Contamination by Hindsight Condition and Post-Outcome Event Condition (N = 471)*

	Post-Outcome Event Condition											
	Tells and Reports				Doesn't Tell or Report				Not in Rape Outcome Condition			
	Foresight plus Hindsight (N = 82)		Hindsight Only (N = 77)		Foresight plus Hindsight (N = 78)		Hindsight Only (N = 77)		Foresight plus Hindsight (N = 79)		Hindsight Only (N = 78)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Sexual Intent												
Male Character	3.30	.56	3.36	.76	3.21	.76	3.30	.81	3.34	.68	2.91***	.67
Female Character	2.55	.86	1.94***	.80	2.46	.82	1.75***	.85	2.54	.73	2.45	.82

Note. Response scale: 1=Not at all to 4=A lot. For each Post-Outcome Event Condition (column), only differences between foresight and hindsight conditions within character sexual intent (row) are flagged. * $p < .05$, ** $p < .01$, *** $p < .001$

Table 8*Sexual Intent Perceptions by Alcohol Condition (N = 471)*

	Alcohol Condition							
	Abstain (N = 119)		Drunk Female (N = 117)		Drunk Male (N = 118)		Both Drunk (N = 117)	
	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>	<i>M</i>	<i>SE</i>
Sexual Intent								
Male Character	3.14 _a	.06	3.07 _a	.07	3.34 _b	.06	3.40 _b	.07
Female Character	2.18 _{bc}	.07	2.45 _a	.07	2.13 _c	.07	2.39 _{ab}	.07

Note. In each row, means with different subscripts are significantly different at the $p < .05$ level. Response scale: 1=Not at all to 4=A lot.

The combination of the results for Hypotheses 1 and 2 suggests that the method for measuring hindsight bias in perceptions of sexual assault matters. Posttest-only methods, which previously had been the only way hindsight bias was assessed, do not appear to consistently reveal the existence of hindsight bias, at least for outcomes. Further, given the small effect sizes noted, the reduction in error variance provided by within-subjects repeated measures designs may be critical to detecting this form of hindsight bias. This difference may have been further exacerbated by the use of subjective estimates of outcome probability (e.g., unlikely to likely Likert-type responses), which are less likely to show hindsight bias than objective estimates (e.g., estimating probabilities for different outcomes that sum to 100%, Guilbault et al., 2004). Although using subjective estimates facilitates comparisons with the four prior investigations of hindsight bias in sexual assault, all of which used subjective estimates, future research should compare hindsight bias assessed with each type of estimate.

Hypothesis 3, that participants would demonstrate significant hindsight bias contamination in their perceptions of the vignette characters in ways predicted by the existing victim-blaming literature, was not supported. No difference between participants asked in foresight and participants asked in hindsight emerged for perceptions of similarity to each of the vignette characters (H3a). This lack of hindsight contamination suggests that individuals do not locate rape victims more distally as a form of victim-blaming behavior but rather determine similarity to vignette characters based on pre-outcome information, which is not changed after learning the outcome.

However, it is important to remember that in this investigation, those items were asked only once, either in foresight or in hindsight, but not both. This prevented examining change in those perceptions from foresight to hindsight (e.g., Amacker & Littleton, 2013), which would have been a more meaningful comparison. Future research using a pretest/posttest design could evaluate this possibility more fully, which is critical, given that locating victims more distally is supported not only by empirical findings from prior research (Amacker & Littleton, 2013; Johnson, 1995; Miller et al., 2011), but also by theoretical predictions from two major perspectives concerning other aspects of victim-blaming: Just World Theory (Lerner & Miller, 1978) and the Defensive Attribution Hypothesis (Shaver, 1970). Individuals' motivations, like the need to believe the world is a just place, have been identified as predictors of derogating and distally locating victims (e.g., Lerner & Miller, 1978). Additionally, individuals' need to protect themselves from the blame of others has been connected to those individuals locating victims more distally from themselves and seeing them as "different" or "other" and thus deserving of blame (Shaver, 1970). It is possible, as was the case with the prior results from Hypotheses 1 and 2, that practically small but statistically significant shifts in perceptions of vignette characters could occur from pretest to posttest, but such differences could only be detected in a pretest/posttest design.

Hypothesis 3b predicted that participants asked in foresight would perceive less sexual intent from the vignette characters than participants asked in hindsight. One of the components of victim blaming is the belief that the victim *wanted* to be assaulted (Koss et al., 1994). Support for this belief would have required the data to show that participants asked in hindsight about the victim's sexual intent demonstrated higher levels than participants asked in foresight (i.e., those in hindsight "justified" the assault by retrospectively claiming she *wanted* sex more before the assault). However, the findings here were actually contrary to what was hypothesized: participants who read the rape outcome perceived significantly *lower* levels of sexual intent from the female victim if they were asked in hindsight as opposed to foresight.

Although this is clear evidence of hindsight bias contamination (i.e., after knowing she was raped, they retrospectively depressed their estimates of her sexual intent before the assault because they were unable to ignore the outcome information), it is far more interesting that it appears to represent an explicit rejection of other victim-blaming beliefs. These unexpected results for Hypothesis 3b suggest that victim-blaming beliefs and behaviors may be incredibly complicated and nuanced and may require substantial further research to tease apart. Individuals may infer sexual intent from the victim only under certain circumstances or in particular contexts, which were not activated in the vignette used in this investigation. Alternatively, individuals may recognize a lack of sexual intent yet blame victims in other ways beyond this investigation's scope. Mixed-methods investigations, such as Multiple Segment Factorial Vignette designs that present vignettes in multiple parts and ask participants questions about each part before advancing (Ganong & Coleman, 2006), may be especially fruitful in uncovering how individuals understand these issues. As part of this approach, explicitly investigating perceptions of consent could advance the literature, given that undergraduate men typically infer consent from ambiguous social cues rather than explicit affirmations (Bedera, 2021).

Finally, the vignette characters' alcohol use had significant influences on both the perceived likelihood of the outcomes and the perceived sexual intent of the characters. Participants perceived the Have Sex outcome to be more likely if the female character had been drinking and the Rape outcome to be more likely if either character had been drinking. Further, they perceived the female character's sexual intent to be higher if she had been drinking than if she had not, supporting Maurer and Robinson's (2008) assertion that individuals interpret women's alcohol use as a proxy for sexual intent, which increases their responsibility for the outcome (Farris et al., 2008; Lindgren et al., 2009; Pegram et al., 2018). In some respects, these findings are not surprising given that participants were a convenience sample of college students. Among college students, "hook-ups" or spontaneous sexual encounters between people with no prior romantic relationship are relatively common (Paul & Hayes, 2002), and college students view hook-ups as especially common at parties and likely to be alcohol-facilitated (Aubrey & Smith, 2013; LaBrie et al., 2014; Littleton et al., 2009). The vignettes in this investigation (unintentionally) aligned closely with hook-up scripts, which may also interpret women's alcohol use as a proxy for sexual intent. However, college students also view hook-ups as less likely to end in rape (Littleton et al., 2009), and alcohol use is frequently present in sexual assaults involving college students (Fedina et al., 2018; Gilbert et al., 2019), so it would appear that all of these factors could potentially be influencing participants' perceptions of the characters and likely outcomes, potentially simultaneously. Future research on hindsight bias should at least control for the effects of character alcohol use, as it appears to exert a significant influence.

The practical implications of the existence of hindsight bias in perceptions of sexual assault are significant. As Janoff-Bulman et al. (1985) noted, "the rape victim is blamed [for her own rape] once we know she has been raped" (p. 163) precisely because of hindsight bias. Blaming the victim in this way denies or justifies male sexual aggression (Koss et al., 1994) and prevents appropriately locating blame for the rape on the perpetrator or examining the larger sociocultural context that enables such behavior. The results of this investigation suggest that hindsight-based victim-blaming could potentially contaminate jury decision making in cases of sexual assault because jurors only ever view an assault in hindsight and thus may be more likely to blame the victim for not taking action to avoid the situation (McCaul et al., 1990). Future research exploring hindsight bias's influence on mock jury decision making could help explore these implications.

Limitations and Future Directions

This investigation was not without its limitations. Participants were a convenience sample of college students, like in all four prior studies of hindsight bias in sexual assault (Carli, 1999; Carli & Leonard, 1989; Janoff-Bulman et al., 1985; Marchal et al., 2013). In this sample, nearly 90% of the participants were women. Although men typically engage in higher levels of general victim-blaming behaviors than do women (Henry et al., 2022; van der Bruggen & Grubb, 2014), there are exceptions (Culda et al., 2018; Wentz & Archbold, 2012) and prior studies of hindsight bias in sexual assault did not report significant gender differences in the extent of hindsight bias specifically. Further, gender imbalances in a sample are not uncommon in vignette-based sexual assault research (e.g., Henry et al., 2022; Maurer, 2016; Maurer & Robinson, 2008), which facilitates comparisons with prior studies, although it limits the generalizability of the results. Future investigations with more gender-balanced, non-college samples are necessary.

In a related vein, the vignette used in this research was chosen because of its use in prior research, which facilitates comparisons between the studies. However, this vignette used characters named “Matt” and “Jenny,” which may have been interpreted by participants as racially White. Although there is only limited research on the role of victim and perpetrator race on individuals’ perceptions of sexual assaults (Gravelin et al., 2019; van der Bruggen & Grubb, 2014), there is some evidence that it could influence perceptions (Donovan, 2007; Emmers-Sommer, 2017). It is unknown if the patterns observed in this investigation would be observed with vignette characters of different races.

Additionally, the dependent variables for perceived similarity to the characters and the characters’ sexual intent were single items rather than multi-item scales. Although such global items are consistent with prior research (Marchal et al., 2013), these limits construct validity. Future research using multi-item scales for perceived similarity and sexual intent in both foresight and hindsight could provide a fuller understanding of the issues involved.

Finally, this investigation explored only a subset of victim-blaming beliefs with a specific focus on hindsight bias in perceptions of male-on-female sexual assault. Other victim-blaming beliefs and rape myths could be related to hindsight bias in perceptions of sexual assaults. Future research could explore the relationship between rape myth acceptance, hindsight bias, and perceptions of sexual assaults. Additionally, different vignette outcomes and contexts could be created. A consensual sex outcome was seen as the most likely possibility by participants in this investigation, perhaps because the first part of the vignette closely resembled the common college sexual script (Lindgren et al., 2009). Including that outcome along with a non-sex and a rape outcome could provide valuable insight into how the hindsight bias process may operate. In the vignette used in this investigation, when the victim was raped, she physically resisted. Exploring the existence of hindsight bias with a victim who is too intoxicated to resist or who has even lost consciousness due to intoxication could also advance this line of research.

Further, no work has yet been done on hindsight bias with female-on-male sexual assaults or same-gender sexual assaults. More research is needed to determine if the same patterns of results observed in this investigation would emerge in those areas, particularly with respect to perceived similarity to and sexual intent of the vignette characters.

Implications for Teaching Family Science Courses

The results of this investigation could inform teaching about sexual assault in Family Science and other courses. During the review process, it was suggested that instructors might use the vignettes

themselves to teach about issues surrounding sexual assault. Certainly, it would be possible to present students with the first section of the vignette and then query them about not only what they thought would happen next (especially in an open-ended way) but *why* and attempt to use students' responses to examine assumptions about sexual assault (e.g., rape myth acceptance, Russell & Hand, 2017) and sexual relationships (e.g., sexual scripts, Lindgren et al., 2009). Intensive curricular interventions designed to educate college students about the root causes of sexual violence have been documented to increase students' awareness of more complex structural factors (Liddell et al., 2022), but smaller-scale, less intensive teaching methods like this could also be adopted and evaluated.

Further, if instructors were interested in teaching about issues of sexual consent, asking students how the characters could seek consent after reading the first section of the vignette (or if it would even be possible) could prove fruitful. Students' responses could then be compared to the components for affirmative consent (Friedman & Valente, 2008; Planned Parenthood, 2022). Although college men generally appear to understand and endorse affirmative consent in sexual relationships, in practice, they primarily use ambiguous cues like moaning or eye contact to infer consent (Bedera, 2021). Further, adolescent males frequently report anxiety about or lack confidence in seeking affirmative consent, even after consent education programs, because of youth sexual cultural norms (Setty, 2022). Contextualizing students' responses with this research might help reveal the complexities of teaching and learning about affirmative consent and enacting it in sexual relationships.

The second section of the vignette (i.e., the outcome and post-outcome events, as applicable) could be used similarly as the first section, querying students after the rape outcome about what they thought would happen next and why and contextualizing their responses with the relevant literature. For example, very few students who are sexually assaulted report their assaults to their universities (Eisenberg et al., 2021), and rates of reporting to the police are consistently low (Morgan & Oudekerk, 2019; Sabina & Ho, 2014), yet informal disclosures, especially to friends, tend to be significantly more common (Sabina & Ho, 2014). Why might these differences occur, and how might the different conditions within the vignettes (e.g., characters' alcohol use) further contribute to differences in these rates? Additionally, university social marketing campaigns have been documented to increase students' awareness of formal university support services for survivors and promote students' confidence in responding compassionately to disclosures from survivors (Irvine-Collins et al., 2022). This information could also be incorporated into such discussions.

It is also possible that this piece could have value in teaching about *how* research is done in Family Science. As Amato (2014) has written, in Family Science, hypothesis testing is not about proving something "true" or "false"—it is about determining how common specific patterns are and under which conditions those patterns appear. This investigation revealed that hindsight bias in perceptions of sexual assault was only detectable with one of two methods and that the prior method used in all related research was no longer sufficient to reveal hindsight bias. It is critical for Family Science to keep up with innovations in measurement methods and to test the effectiveness of new and existing methods simultaneously. Additionally, because it relied on measures adapted from prior research, this investigation queried participants about vignette characters' desire to have sex. However, as Peterson and Muehlenhard (2007, p. 85) have cautioned, "Rape is about the absence of consent, not the absence of desire." Identifying these questions needing revision in future investigations to better align with definitions of affirmative consent (Friedman & Valente, 2008; Planned Parenthood, 2022) models the ongoing process of refinement and improvement that is an integral part of scholarly research.

In sum, this investigation revealed that method matters for assessing hindsight bias in perceptions of sexual assault and that complex methodologies like the kind operationalized here can help to advance understanding of—and reveal new nuances within—concepts that have been traditionally difficult to study. Additionally, both the methodology and results reported here have value in informing Family Science pedagogy about sexual assault, sexuality, and research methods.

Notes

¹ Analyses were also run after excluding men from the sample, but the results did not appreciably change, similar to Marchal et al. (2013).

² Tells, Doesn't Tell, or not in the Rape Outcome Condition.

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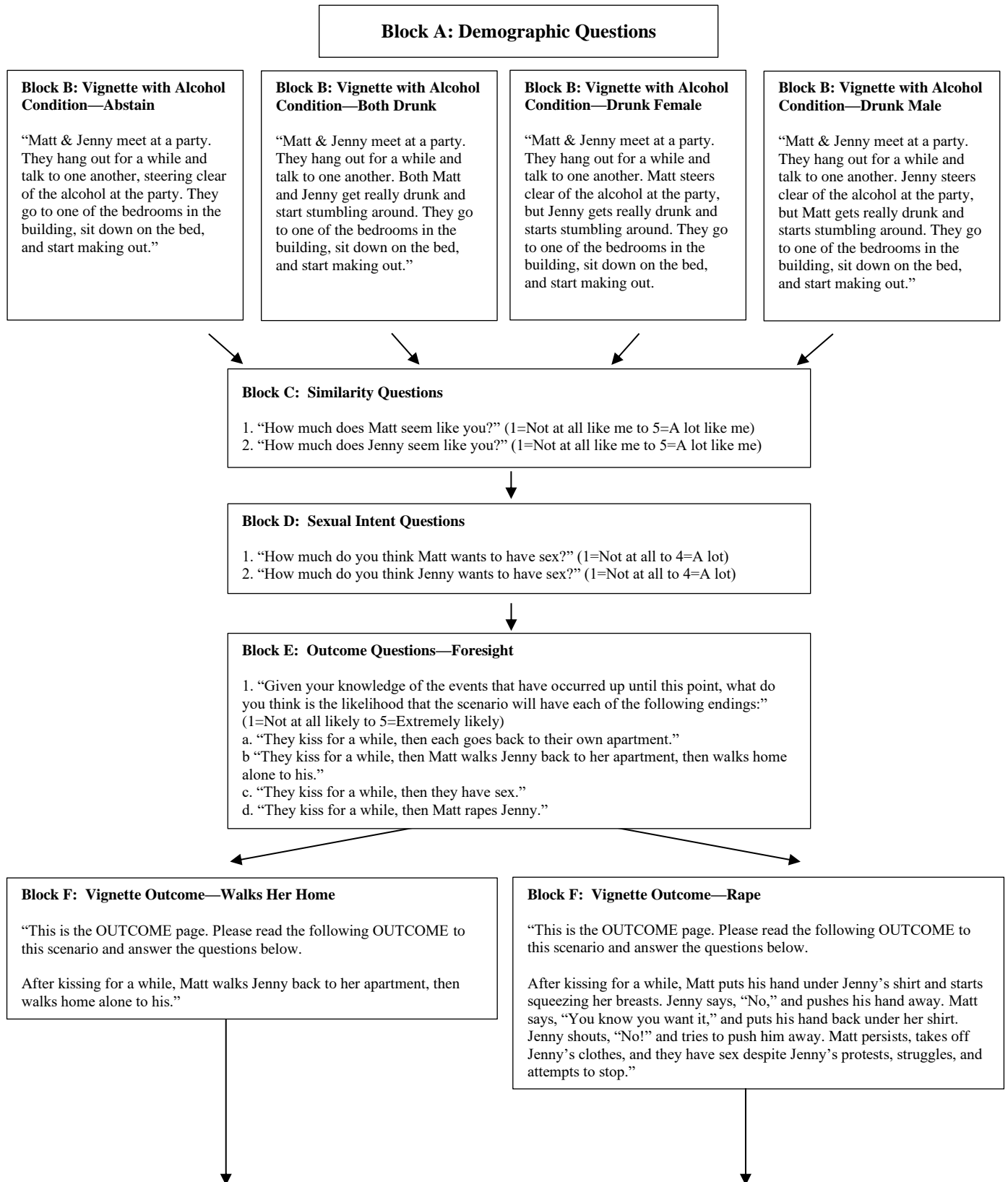
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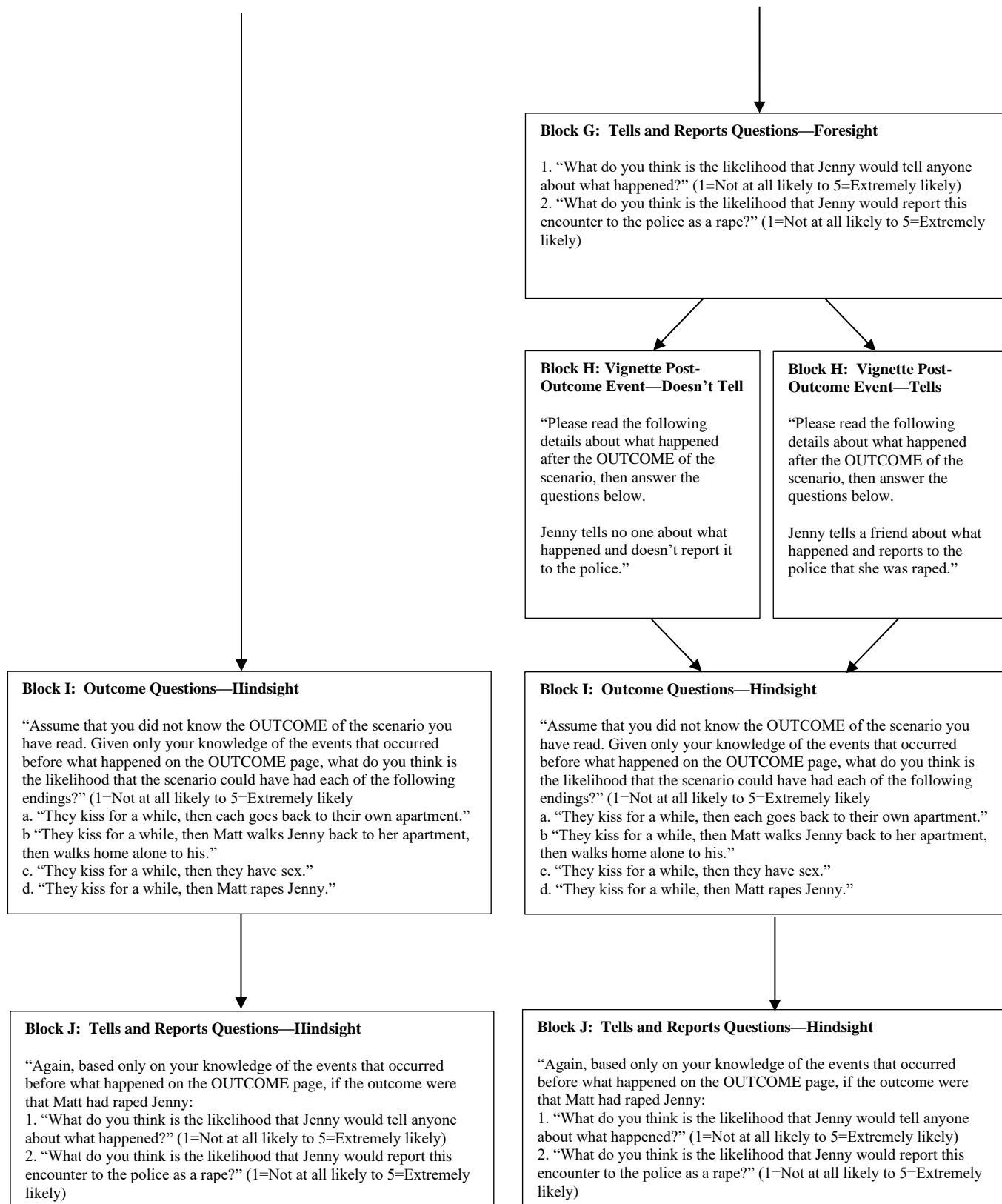
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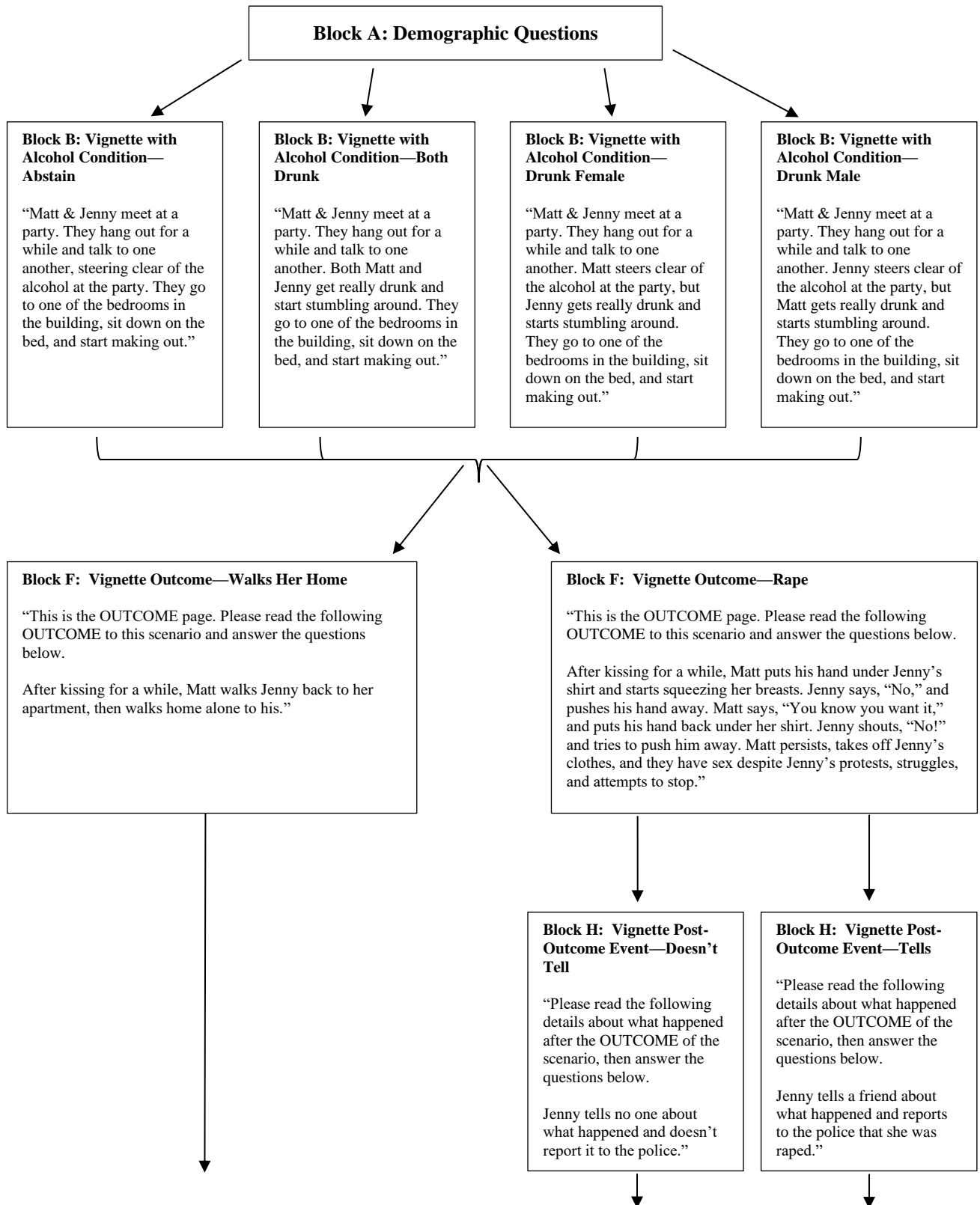
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Appendix A
Foresight plus hindsight condition: Vignettes and question blocks





Appendix B
Hindsight only condition: Vignettes and question blocks



↓

Block C: Similarity Questions

1. “How much does Matt seem like you?” (1=Not at all like me to 5=A lot like me)
2. “How much does Jenny seem like you?” (1=Not at all like me to 5=A lot like me)

↓

Block C: Similarity Questions

1. “How much does Matt seem like you?” (1=Not at all like me to 5=A lot like me)
2. “How much does Jenny seem like you?” (1=Not at all like me to 5=A lot like me)

↓

Block D: Sexual Intent Questions

1. “How much do you think Matt wants to have sex?” (1=Not at all to 4=A lot)
2. “How much do you think Jenny wants to have sex?” (1=Not at all to 4=A lot)

↓

Block D: Sexual Intent Questions

1. “How much do you think Matt wants to have sex?” (1=Not at all to 4=A lot)
2. “How much do you think Jenny wants to have sex?” (1=Not at all to 4=A lot)

↓

Block I: Outcome Questions—Hindsight

“Assume that you did not know the OUTCOME of the scenario you have read. Given only your knowledge of the events that occurred before what happened on the OUTCOME page, what do you think is the likelihood that the scenario could have had each of the following endings?” (1=Not at all likely to 5=Extremely likely)

- a. “They kiss for a while, then each goes back to their own apartment.”
- b. “They kiss for a while, then Matt walks Jenny back to her apartment, then walks home alone to his.”
- c. “They kiss for a while, then they have sex.”
- d. “They kiss for a while, then Matt rapes Jenny.”

↓

Block I: Outcome Questions—Hindsight

“Assume that you did not know the OUTCOME of the scenario you have read. Given only your knowledge of the events that occurred before what happened on the OUTCOME page, what do you think is the likelihood that the scenario could have had each of the following endings?” (1=Not at all likely to 5=Extremely likely)

- a. “They kiss for a while, then each goes back to their own apartment.”
- b. “They kiss for a while, then Matt walks Jenny back to her apartment, then walks home alone to his.”
- c. “They kiss for a while, then they have sex.”
- d. “They kiss for a while, then Matt rapes Jenny.”

↓

Block J: Tells and Reports Questions—Hindsight

“Again, based only on your knowledge of the events that occurred before what happened on the OUTCOME page, if the outcome were that Matt had raped Jenny:

1. “What do you think is the likelihood that Jenny would tell anyone about what happened?” (1=Not at all likely to 5=Extremely likely)
2. “What do you think is the likelihood that Jenny would report this encounter to the police as a rape?” (1=Not at all likely to 5=Extremely likely)

↓

Block J: Tells and Reports Questions—Hindsight

“Again, based only on your knowledge of the events that occurred before what happened on the OUTCOME page, if the outcome were that Matt had raped Jenny:

1. “What do you think is the likelihood that Jenny would tell anyone about what happened?” (1=Not at all likely to 5=Extremely likely)
2. “What do you think is the likelihood that Jenny would report this encounter to the police as a rape?” (1=Not at all likely to 5=Extremely likely)