Original Research Article

Do Environmental Cues to Discovery Influence the Likelihood to Rape?

Rebecka K. Hahnel-Peeters[1],[*] (iD), Aaron T. Goetz[2],[*], and
Cari D. Goetz[3] (iD)

Abstract

Research on men's sexual exploitation of women has documented that men's psychology tracks cues associated with the ease of women's exploitability. In the current studies, we examined a different class of cues hypothesized to aid men's use of sexually exploitative strategies: environmental cues to the likelihood of discovery. We defined *likelihood of discovery* as the perceived probability of identification when engaging in exploitative behavior (e.g., presence of others). We test the hypothesis that men's likelihood to rape increases when their perception of the likelihood of discovery is low in three studies. In Study 1, we conducted a content analysis of individuals' responses ($N = 1,881$) when asked what one would do if they could stop time or be invisible. Besides the "other" category whereby there were no specific category for nominated behaviors, the most nominated category included sexually exploitative behavior—representing 15.3% of reported behaviors. Both Studies 2 ($N = 672$) and 3 ($N = 614$) were preregistered manipulations of likelihood of discovery surreptitiously testing men's rape likelihood to rape across varying levels of discovery. We found men, compared to women, reported a statistically higher likelihood to rape in both Studies 2 and 3: 48% compared to 39.7% and 19% compared to 6.8%, respectively. Across Studies 2 and 3, we found no statistical effect of the likelihood of discovery on participants' likelihood to rape. We discuss how the presence of one's peers may provide social protection against the costs of using an exploitative sexual strategy if a perpetrator is caught.

Survivors of sexual violence often experience severe personal costs including anxiety, depression, post-traumatic stress disorder, reputational damage, and loss of social and romantic relationships (for reviews see Buss, 2021; Lalumiere et al., 2005). Because of the severe consequences of sexual assault, it is important to better understand what factors relate to committing acts of sexual assault, such as intoxication and personality traits related to psychopathy (e.g., Abbey et al., 2012). In the current studies, we propose that men's psychology monitors the environment for informational cues that inform the costliness of implementing sexually exploitative strategies, often outside of conscious awareness. We examined the influence of one environmental feature which we hypothesized men's psychology to be sensitive: the likelihood of discovery. We define the *likelihood of discovery* as the perceived probability that individuals engaging in exploitative behavior would be identified, such as visibility and the presence of others. Specifically, we test the existing hypothesis that men's self-reported likelihood to rape increases when the perception of the likelihood of discovery is low. We experimentally test varying levels of environmental

[1]Department of Psychology, University of Texas at Austin, Austin, TX, USA
[2]Department of Psychology, California State University, Fullerton, CA, USA
[3]Department of Psychology, California State University, San Bernardino, CA, USA

[*]Indicates shared first authorship.

Corresponding Author:
Rebecka K. Hahnel-Peeters, College of Liberal Arts, Psychology, The University of Texas at Austin, 2505 University Avenue, Stop A8100, Austin, TX 78712, USA.
Email: rhahnel@utexas.edu

cues to the likelihood of discovery. For additional tests of this hypothesis see, for example, Gottschall (2004) and Malamuth (1981).

Psychology Supporting Exploitative Strategies

Buss and Duntley (2008) argued that *exploitative resource acquisition strategies* represent one fundamental class of strategies that humans enact to access reproductively relevant resources. Exploitative strategies—which need not be conscious—reflect behaviors ranging from mildly exploitative (e.g., deception and manipulation) to more harmful or extreme (e.g., coercion and force). The psychology manifesting exploitative behavioral strategies may be sensitive to multiple environmental cues that suggest the actor may successfully carry out exploitative behavior without detection (e.g., lighting and visibility, places to hide; Buss & Duntley, 2008).

The psychology motivating exploitation is expected to be sensitive to cues indicating the ease of exploitation. Some cues are displayed by the potential target of exploitation. For example, data suggest men are sensitive to cues of sexual exploitability displayed by women—including cues related to perceived victim immaturity, intoxication, current incapacitation, promiscuity, and lower intelligence (Goetz et al., 2012). Importantly, men found women displaying such cues to be sexually attractive for short-term sexual interactions. This study indicated that men's sexual attraction to cues suggesting the ease of exploitation provides motivational impetus for men pursuing women perceived as more easily exploited (Goetz et al., 2012).

Goetz et al. (2012) also examined cues related to the context the woman was in, including if she was alone, or in the vicinity of men. However, they did not find evidence that these cues were associated with perceptions of sexual exploitability or women's sexual attractiveness. Goetz et al. (2012) used photographs of women rated by two sets of raters—one rater group assessed presence of exploitability cues specific to both the target and the context, the other rated attractiveness. One possibility is that contextual cues are not as salient or easily assessable in photographs, compared to cues specifically associated with potential targets, because photographs provide limited information to a person's environment. However, situational or environmental cues may be particularly important for assessing the likelihood that an exploitative strategy will be successful (Buss & Duntley, 2008).

Within cooperative groups, exploiting others for resources comes with potential costs. The target of exploitation, including their social allies and kin, may retaliate or seek revenge (Ahrens & Campbell, 2000; Crawely & Simic, 2019; Elva & Stranger, 2017; Figueredo et al., 2001). Local norms or laws may also be tailored to punish those who are caught exploiting others (Buss & Duntley, 2008). Additionally, gaining a reputation as someone who exploits others may harm a person's ability to maintain cooperative relationships. Exploitative strategies may have been favored when the likelihood of incurring these costs was lower. In turn, the associated psychology potentially

evolved to functionally assess cues related to the current context (e.g., alone with no potential observers) as well as the broader social context (e.g., social norms and rules surrounding the punishment of exploiters).

Men's Sexual Exploitation of Women

The current paper focuses on men's sexual exploitation of women and the psychology sensitive to environmental input. Men's *sexual exploitation* of women is defined as expropriating sexual access from women through deception, coercion, and force (Buss & Duntley, 2008). Furthermore, we are interested in one set of cues to which the psychology motivating sexual exploitation may be sensitive. These cues may inform the likelihood of using exploitative strategies—for example, likelihood of identification, costs to reputation if identified, likelihood of retaliation, and one's ability to avoid these social costs.

Several lines of research support the assertion that the costs of men's sexual exploitation of women are reduced. For example, Lalumiere et al. (2005) reviewed the historical record of rape and the laws instituted to decrease rates of rape through the time periods of Ancient Greece and Rome, Medieval Europe, and the modern ages (1,500 C.E. through today). They concluded that rape was more common in societies where the cost to rapists were lower, suggesting that men track the associated costs of rape. However, it is noteworthy that rates of rape may increase—even where rape is highly punished—if the social context provides cues that likelihood of being discovered and retaliation are low.

Malamuth (1981) demonstrated that roughly 35% of male college students reported some likelihood of raping a woman if they could be assured that they would never be caught or punished for the act. More recently, Palmer et al. (2021) asked male incoming freshmen if they would forcibly rape a woman if they would never be caught. Roughly 20% of these male college students indicated some likelihood of forcibly raping a woman in this situation. Moreover, and in line with the current studies, the perception of a peer's presence and intervention was negatively associated with an individual's reported rape proclivity.

Wartime rape is another prime example where rape rates are high—potentially due to the decreased costs associated with rape perpetration. In environments ravaged by war, potential victims are highly vulnerable. Men in war experience lower costs associated with rape because the possibility of retaliation and punishment is decreased (Mckibbin et al., 2008). Male kin who typically provide security and protection are frequently absent, the ability to impose harm on perpetrators is minimized, and the anonymity of perpetrators in wartime—especially those conquering an enemy—minimizes the costs incurred by rape (Brownmiller, 1975).

Five broad contexts provide support for our hypothesis that men's likelihood to rape increases when the perceived likelihood of discovery is low: (1) wartime rape (Brownmiller, 1975; Gottschall, 2004; Henry et al., 2004), (2) when men hold positions of power (Abbott, 2015; Eastham, 1979; Isely, 1997; Moniuszko & Kelly, 2017; Poggioli, 2019; Shupe

et al., 2000), (3) sexual slavery such as sex-trafficking (Ahram, 2015; Gleason & Harris, 1976; Jennings, 1990; Walker-Rodriguez & Hill, 2011), (4) intoxication (Abbey & McDuffie, 1996; Lawyer et al., 2010; Mouilso et al., 2012), and (5) solo international travel (Kennedy & Flaherty, 2015). For deeper review of these contexts, see Hahnel-Peeters (forthcoming).

Current Studies

The current studies tested the hypothesis that men's likelihood to rape increases when environmental cues suggest one's likelihood of discovery is low (e.g., Gottschall, 2004; Malamuth, 1981). We tested this hypothesis using various methodologies across three studies. Study 1 presents a content analysis of Reddit.com, a popular online forum. Studies 2 and 3 were pre-registered, mixed-subjects, experimental designs.

Study 1

Using the website, Reddit.com, we conducted a content analysis of responses to open-ended prompts offering two levels of discovery. The prompts asked what Reddit users would do if they were invisible or could stop time. We predicted that Reddit users would spontaneously nominate sexually exploitative acts at higher frequency compared to other acts (e.g., theft, acts of altruism) when provided hypothetical opportunities

low in likelihood of discovery. Both prompts were imaginary contexts in which (1) any sexual behavior was sexual exploitation of the target because the target could not consent and (2) the likelihood of discovery was low.

Method

Search. The Supplemental Material (https://bit.ly/Likelihood_of_Discov) describes the structure of Reddit.com in more detail. We searched the subreddit—smaller forums hosted on Reddit's main server—"r/AskReddit" with phrases including: "stop time," "freeze time," "pause time," and "time stop." We chose these phrases for the search because they describe common thought experiments with low associated costs (e.g., likelihood of being discovered). The search yielded eight threads for analysis. Other community members may respond directly to the original authors of threads via top-level comments. We only analyzed the first-level comments within the eight threads. Direct responses to the first-level comments on threads, and any lower-level comments, were not included in analyses (Figure 1). These established criteria resulted in a large sample ($N = 1,881$ comments) for analysis.

Although demographic information could not be collected directly from participants, previous research indicates that Reddit users in the United States are primarily male (67%), and the distribution of ages is skewed toward a younger demographic (Barthel et al., 2016).
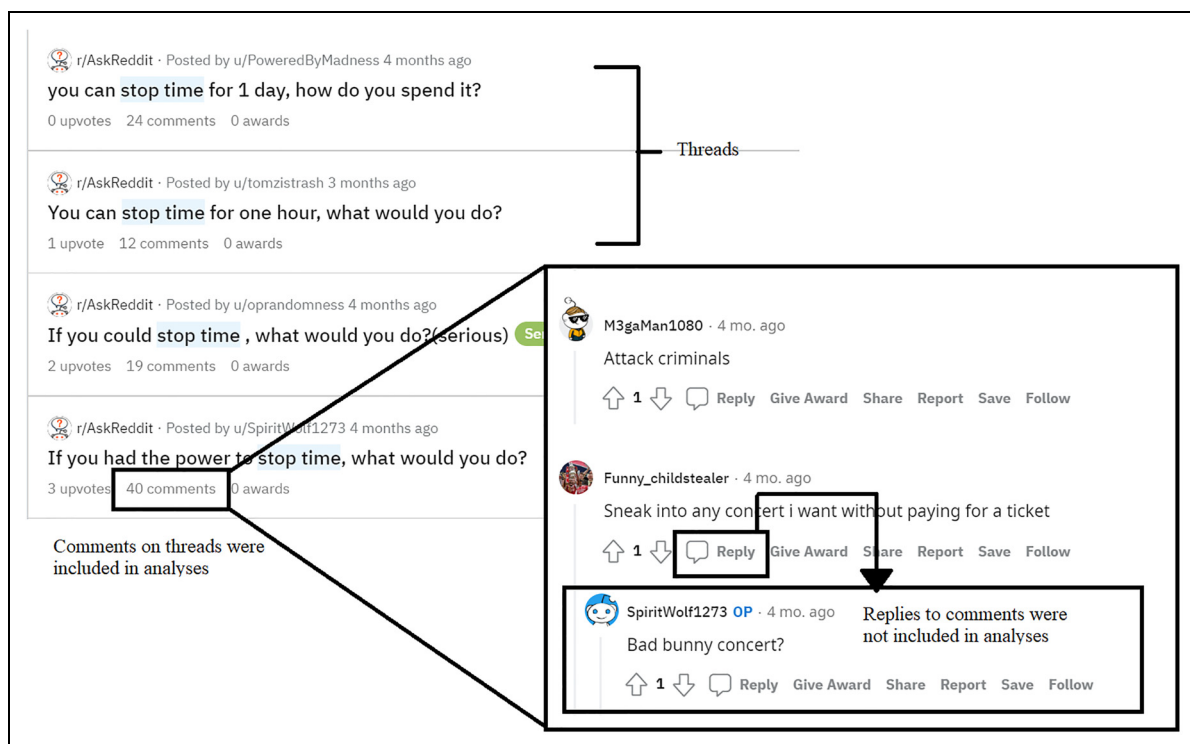
Figure 1. Illustration of reddit information included in analyses. We searched key terms in r/AskReddit which retrieved individual threads. In response to each thread, there are comments. These unique comments were included in analyses, but the responses to these comments were not.

Codebook. We used an inductive approach to the content analysis (Elo & Kyngäs, 2008). We created as many categories as necessary to fit the themes of threads gathered for analysis using an open coding paradigm. The supervising (i.e., A. Goetz) author and head research assistants read through the entirety of one thread chosen for analyses and grouped statements into categories with shared themes (i.e., 500 out of 1,881 first-level comments or roughly 25% of the total sample). Category creation was done collaboratively between the supervising author and head research assistants. After identifying categories with shared themes, the supervising author created an operational definition for each category.

Following identification of categories and creation of operational definitions for each category, a new group of research assistants blind to the study's hypothesis coded each of the first-level comments based on operational definitions (Table 1). These research assistants also independently recoded the original group of 500 comments used to create the coding system. Comparisons across raters indicated strong inter-rater reliability (Cohen's $\kappa = 0.96$).

Procedure. Eight research assistants coded unique first-level comments into the following categories: nonresponses, sexual, physical violence (non-sexual), masturbation, theft, knowledge or educational gain, property damage, prank, acts of altruism, and other. Additionally, research assistants coded responses when Reddit users nominated specific victims of crimes as women into "sex/rape," "non-sexual physical violence/emotional violence," or "both."

Results

A chi-square test revealed that observed frequencies significantly differed from expected frequencies, $\chi^2(9) = 1,187.99$, $p < .001$.

Subjects reported higher instances of nonresponses ($n = 443$; 23.6%), other ($n = 422$; 22.4%), sex/rape ($n = 287$; 15.3%), pranks ($n = 231$; 12.3%), and theft ($n = 212$; 11.2%) when compared to the expected cell frequencies ($n = 188.1$). Subjects were far less likely to endorse the following behaviors: knowledge/educational gain ($n = 97$; <1%), non-sexual bodily harm ($n = 94$; 5%), altruism ($n = 55$; 3%), masturbation ($n = 30$; 2%), and property damage ($n = 10$; <1%) than would be expected (Figure 2). These effects still hold when excluding the catch-all categories of "nonresponses" and "other," $\chi^2(7) = 310.64$, $p < .001$.

To determine if sex/rape was more frequently nominated than prank and theft, we ran three chi-square tests. A comparison of the expected versus observed frequencies of all three top-competing behaviors identified a statistical difference between observed and expected frequencies, $\chi^2(2) = 6.073$, $p = .048$. Sex/rape ($n = 287$; 39.3%) occurred more frequently than the expected frequencies ($n = 243.33$). Both theft ($n = 212$; 29.1%) and prank ($n = 231$; 31.6%) occurred less frequently than their expected frequencies. Nominations of sex/rape ($n = 287$; 57.52%) were statistically more frequent than that of theft ($n = 212$; 42.48%) compared to the expected frequency of 50% for both, $\chi^2(1) = 5.37$ $p = .021$. Finally, nominations of sex/rape ($n = 287$; 55.41%) were not statistically more frequently nominated than pulling pranks ($n = 231$; 44.59%) when compared to an expected frequency of 50% for both nominations, $\chi^2(1) = 2.82$, $p = .093$. However, this effect trended toward significance.

An additional chi-square compared instances when Reddit users mentioned women as targets of sex/rape, non-sexual physical violence, and emotional violence. The chi-square revealed that women were far more likely to be targets of sexual crimes ($n = 156$; 89%) than non-sexual physical violence

Table 1. Codebook for Redditor Responses to Forums.

Category	Definition	Example
Nonresponse	Non-answer or unintelligible answer	"you're all sick" "your mom"
Sexual	Sex, rape, any sex crime, any undefined sexual comment	"Sex with the hottest girl in my grade."
Non-sexual bodily harm	Murder, hitting, stabbing	"I would go around the world and find every case of people being truly evil and I would slit all their throats"
Masturbation	Mention of sexual self-gratification	"masturbate" "fap furiously"
Theft	Stealing money or other property	"Rob every single one of you."
Knowledge/ educational gain	Behaviors that assist the accumulation of information	"read all day" "read my partner's texts"
Property damage	Behaviors associated with the destruction of public or private property not owned by the agent.	"blow something up probably"
Prank	Light-hearted, playful tricks	"I would go to the mall and place everyone's feet slightly out of place, so when time resumes the entire mall simultaneously trips."
Altruism	Acts to benefit other individuals	"Go into Manhattan and steal ALL of the cash. Then go to the roof of one of the buildings and dump it over."
Other	Catch-all category for those that do not fall under the above categories	"sleep" "play videogames"

Note. Examples are direct quotes from the thread, "If you could freeze time for one hour, what would you do during that hour, if it was 100% certain nobody would know what you did?" by TimeFreezer99.
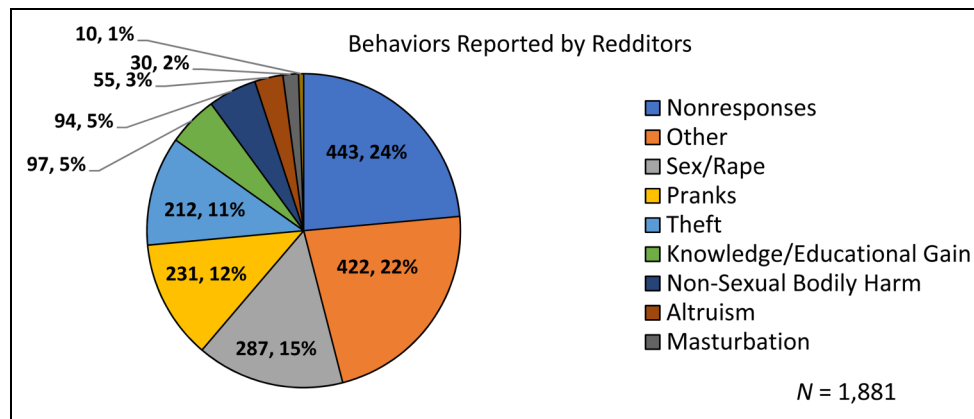
Figure 2. Pie chart displaying relative percentages of 1,881 comments on a total of eight threads on r/AskReddit asking what one would do if they could stop time.

or emotional abuse ($n = 19$; 11%) with expected frequencies at $n = 87.5$, $\chi^2(1) = 107.25$, $p < .001$.

Discussion

Results of Study 1 indicated that, besides catch-all categories, respondents reported they would sexually assault a woman when the likelihood of detection was low more frequently than other response categories—besides the more socially acceptable, less harmful behavior of pulling pranks. Our results indicated spontaneous nominations of sexually exploitative behaviors—suggesting individuals may monitor their environments for cues to opportunities in which exploitative behavior may be less costly. Behaviors associated with rape occurred more frequently than any other behavior category aside from non-response answers (e.g., "Stopping time is not logically possible"). These results are consistent with Palmer et al. (2021)'s and Malamuth's (1981) results about rates of sexual assault when the costs associated with the detection of perpetration of sexual crimes were diminished.

The content analysis of Reddit was limited in two major ways. First, we do not know demographics of the users. While estimates of Reddit users in the United States are primarily male (67%), and the distribution of ages is skewed toward a younger demographic (Barthel et al., 2016). With no concrete demographic information, we cannot generalize our results outside of Reddit users. Second, the content analysis was limited to one context: either stopping time or invisibility. The key test of the hypothesis requires a within-subjects design identifying how participants' self-reported likelihood to rape covaries with changing levels of discovery. We designed Study 2 to address these limitations.

Study 2 (Preregistered)

Study 2 addressed limitations of Study 1 in a preregistered test of the hypothesis that men's likelihood to rape increases when cues to discovery are lowered. Study 2 (1) collected demographic information of our participants to verify the findings

of Study 1 and (2) manipulated the level of likelihood of discovery.

Study 2 tested our hypothesis using thought experiments in a similar way to Study 1. Participants responded to two thought experiments differing in likelihood of discovery (i.e., *stopping time for everyone but themselves* and *becoming invisible*). After reading each thought experiment, participants self-reported their likelihood to engage in several behaviors informed by categories from Study 1. The response of interest was "have sex" because this indicated an individual's likelihood to rape. If the actor *stopped time*, there was no opportunity for the victim to consent in a sexual encounter. Furthermore, the likelihood of discovery and the associated risks would be sufficiently minimized when stopping time. In the *become invisible* thought experiment, the likelihood of discovery is slightly higher than the actor stopping time. Invisible actors would be required to overcome the victim's resistance. Therefore, Study 2 assumed that *stopping time* has a lower likelihood of discovery compared to *becoming invisible*. A post-hoc pilot test found support for this assumption. Participants were 68% more likely to choose the *invisible* thought experiment as higher in the likelihood of discovery compared to the *stop time* vignette, $p < .01$ (see Supplemental Materials).

In Study 2, we predicted that men would report a higher likelihood to rape when stopping time compared to being invisible. Second, we predicted that men, more than women, would report higher likelihood to rape.

Method

Participants. Participants responded to a study entitled *Thought Experiments, Superpowers, and Personality* described as a study about personality's influence on thought experiments. We advertised the study as a five- to ten-minute survey in which participants could enter to win an opportunity drawing of a monetary prize. We recruited participants via snowball sampling on social media (e.g., Facebook, Twitter, and Reddit) and from a participant pool from a public university in

Southern California. To ensure an adequately powered study, we aimed to collect responses from 400 participants.

A total of 672 participants responded to our study. We excluded 162 participants based on preregistered exclusion criteria. Participants who took less than 200 s to complete the study ($n = 125$), participants who indicated they paid less than 70% attention ($n = 9$), participants who responded that their answers were less than 70% honest ($n = 28$), scoring outside of two standard deviations of the mean on the Marlowe-Crowne Social Desirability Scale: Short Form C ($n = 16$; $M = 6.05$, $SD = 2.46$; Reynolds, 1982), and no participants were removed for failing our suspicion probe (i.e., correctly identifying the hypothesis being tested). Because we had specific predictions about male and female participants and only two participants identifying as "other," we omitted these two participants from final analyses. 492 participants (73.9% female; $M_{age} = 23.11$, $SD_{age} = 8.00$) were included in final analyses. Our sample was ethnically diverse including participants identifying as Hispanic or Latinx (45.3%), Asian or Pacific Islander (25.5%), White or Caucasian (22.7%), "other" (5.1%), and Black or African American (1.4%).

Materials and procedure. These data were part of a larger dataset which included individual difference measures. Below are the materials relevant to our current hypotheses. The full dataset and all measures are in the Supplemental Materials.

Thought experiments. Participants first responded to the prompt "Imagine you had the chance to gain a super-human power. From the list below, what ability would you pick?" The list of common super-powers included astral projection, bilocation, precognition, controlling time, telekinesis, regeneration, shapeshifting, invisibility, and time travel. This item was a distractor to sell our cover story.

Participants then responded to two thought experiments. One thought experiment read: "Imagine that you could stop time for everyone but yourself, and you could move around without any consequences. How likely are you to do the following things?" The other thought experiment read: "Imagine that you could make yourself invisible, causing no one to be able to see you or what you are doing. How likely are you to do the following things?" Participants self-reported their likelihood (0-*not at all*

likely to 4-*very likely*) of performing the following behaviors in response to each prompt: sleep, pull a prank, take things that do not belong to them, damage property, travel, have sex, help others, get ahead in knowledge/educational pursuits, gain knowledge about themselves or others, and spread knowledge about themselves or others. Both prompts and behaviors were randomized to minimize order effects.

Demographics. Participants responded to typical demographic items followed by an honesty and attention check.

Results

Prediction 1. To determine if men reported a higher likelihood to have sex in the *stop time* condition compared to the *invisible* condition, we ran an ordinal logistic regression[1]. There was no statistical main effect of likelihood of discovery on likelihood to have sex; $\chi^2(1) = 0.27$, $p = .60$. Further, there was no statistical effect of an interaction between participant sex and likelihood of discovery, $\chi^2(1) = 0.45$, $p = .50$ (Table 2).

Prediction 2. Men, compared to women, displayed a statistically higher likelihood to rape in both thought experiments. An ordinal logistic regression indicated a statistical main effect of participant sex on likelihood to rape when holding likelihood of discovery constant, $\chi^2(1) = 4.75$, $p = .029$. Women were 75% more likely than men to report lower levels of likelihood to rape (Table 2).

Discussion

Our first prediction that men's likelihood to rape in contexts lower in cues to discovery was not supported. It is possible that the manipulation of the likelihood of discovery was not salient enough to produce variation in antisocial behaviors, such as sexual violence. Another possibility is that our 7-point Likert-type scale was not granular enough to pick up small variation in self-reports of antisocial behaviors.

Prediction two was supported. Women were less likely to have sex across both thought experiments. Study 2's data corroborated the results of the single previous study measuring

Table 2. Study 2's Ordinal Logistic Regression.

Variable Total sample	Likelihood to rape ($N = 492$)					OR [95% CI]	*t*-value
	Not at all likely 200	Not likely 86	Undecided 78	Likely 76	Very likely 52		
Participant sex							
Male¨	45 (35.5%)	21 (16.5%)	23 (17.7%)	24 (19.3%)	14 (11%)		—
Female	155 (42.5%)	65 (17.8%)	55 (15%)	52 (14.4%)	38 (10.3%)	0.75 [0.58, 0.97]	−2.18*
Discovery condition							
Invisible¨	102 (41.3%)	44 (17.9%)	39 (15.7%)	35 (14.4%)	26 (10.8%)		—
Stopped Time	99 (40%)	42 (17.1%)	39 (15.9%)	41 (16.9%)	25 (10.2%)	1.06 [0.85, 1.33]	0.52

Note. Table displays number of participants reporting each level of likelihood to rape with the percentage of the participants in parentheses. ¨indicates comparison group. *$p < .05$.

likelihood to rape in both men and women (Young & Thiessen, 1992). When measured, some women displayed likelihood to rape. That is, 6% of women, compared to 27% of men indicated some likelihood to rape (i.e., reporting "undecided" or higher).

Study 2 documented that between 39.7 and 48% of our sample displayed some likelihood to rape – responding with the options "*undecided*" or higher when given the opportunity of sex without consent under sufficient anonymity. Our sample's estimate of likelihood to rape may be due to our paradigm. By not using the word "rape" in our study, it is possible that we captured participants' willingness to have sex when reputational damage associated with casual—yet consensual—sex is sufficiently low.

This may be especially true for our female participants. Many studies document a sexual double-standard whereby women are judged more negatively compared to men when exhibiting sexual behavior (e.g., Farvid et al., 2017; Marks et al., 2019; Muggleton et al., 2019). One way women denigrate other women is through attacking their sexual reputation (e.g., Fisher & Cox, 2011; Reynolds et al., 2018; Wyckoff et al., 2019). Some data suggest women are more likely to have casual sex when anonymity is increased. For example, a sample of female students studying abroad identified they temporarily changed their sexual behavior to be more promiscuous due to the anonymity conferred by studying abroad (Brown & Stephan, 2013). A similar experience for Israeli women on backpacking trips—they expected a temporary increase in their casual sexual behavior due to the anonymity provided from this form of tourism (Berdychevsky et al., 2010). In another study, women reported using Tinder to find casual sexual partners statistically more than men, Cohen's $d = 1.12$ (Gatter & Hodkinson, 2016). Since our study does not explicitly label the sexual behavior as coercive and women are more likely to engage in casual sex in contexts with increased anonymity, we designed Study 3 to address this limitation.

Study 3 (Preregistered)

We designed Study 3 to address Study 2's limitation that cues to discovery between the two thought experiments may not have differed enough to elicit variation in behavioral output. Study 3's design also addresses Study 2's limitation by qualifying the sexual behavior as coercive. We tested two predictions in Study 3. Prediction 1: Men, more than woman, would report a higher likelihood to coerce the vignette target into having sex. Prediction 2: Men would respond with a higher likelihood to sexually coerce in the lower discovery condition with decreasing likelihood in the medium and high discovery conditions. We first tested perceptions of discovery of Study 3's stimuli. The Supplemental Materials discuss our pilot test's design, participants, and results.

Study 3 Method

Participants. Our preregistered *a priori* power analysis indicated a total required sample size of 400 participants. Therefore, we aimed to collect at least 600 participants accounting for data cleaning and a balanced sample between men and women. A total of 914 individuals participated in our study. We removed a total of 267 participants who did not meet our preregistered inclusion criteria. That is, participants were removed for taking less than two minutes to finish the study ($n = 148$), being two standard deviations beyond the mean of socially desirable responding ($M = 4.94$, $SD = 2.32$, $n = 72$), paying less than 70% attention ($n = 51$), and answering less than 80% of questions honestly ($n = 29$).

A total of 614 participants (44.5% men, $M_{age} = 26$, $SD_{age} = 8.41$) were included in final analyses. Our participants were ethnically diverse and identified as white (61.7%), Hispanic (15.5%), Asian (11.6%), "multi-ethnic" (3.9%), Black or African American (3.6%), American Indian or Alaskan Native (0.7%), and "other" (0.7%). Our participant's sexuality included: 74%

Table 3. Within-Subjects Vignettes for Study 3.

Discoverability levels	Vignette
Low	Imagine that you're spending your last night on vacation far from home. You decide to attend a party being thrown by a couple of travelers who are also leaving in the morning. You end up as one of the last guests to leave. Everybody else is either asleep or walking out the door. When looking for a bathroom, you find a person passed out, face down, on a bed. You had noticed this woman/man earlier and thought they were attractive.
Medium	Imagine that you're walking around your hometown's downtown area, and you come across the local bar. There's a lot of laughter and music playing inside, and everybody is distracted having fun with their friends. There are a couple of people outside smoking on the patio. There's a woman/man stumbling around the corner of the bar into an alley. You had noticed this woman/man earlier and thought they were attractive.
High	Imagine that you're at your favorite bar—you typically come to this bar at least once per week. You see a group of attractive women/men, so you approach them and make conversation. Everybody is having fun, but one woman/man mentions she/he needs to go to the bathroom. Her/his friends watch you leave in the same direction. You had noticed this woman/man earlier and thought they were attractive.

Note. Table displays the final vignettes for the within-subjects design used in Study 3. Each level manipulated the likelihood of discovery by changing the location of the event to different levels of familiarity, number of witnesses around, how familiar the witnesses are with the vignette, and the level of attention paid to the vignette's actor and target. Study 3's pilot suggested the likelihood of discovery tracked our intended manipulations (see Supplemental Material).

heterosexual, 12% bisexual, 7% "other," and 7% homosexual. We advertised our study online by posting on Reddit.com, Facebook, Instagram, NextDoor, and Craigslist. Craigslist postings focused on Austin, Dallas, and Houston, Texas. Additionally, we posted advertisement posters around the University of Texas at Austin and used the university's participant pool.

Materials and procedure. These data were part of a larger dataset which included individual difference measures. Below are the materials relevant to our current hypotheses. The full dataset and all measures are in the Supplemental Materials.

Vignettes. The pilot supported a within-subjects design producing three statistically different levels of discovery. Therefore, we used the vignettes listed in Table 3. To avoid conflating our results with the indication of attractiveness included in one piloted vignette, we added the phrase, "You had noticed this woman/man earlier and thought they were attractive," to the medium and high levels of discovery vignettes.

Participants read each vignette in a randomized order. The vignette targets differed based on the participant's identification of their biological sex and sexual orientation.

Likelihood of discovery. After each vignette, participants read the question "How likely are you to do the following things?" followed by five different behavioral options in random order. The options included "try to coerce this person into having sex with you," "try to take money from their wallet," "try to help this person," "pull a prank on this person," and "take a picture of this person." Response options ranged from 1–*Very Unlikely* to 5–*Very Likely*. We measured participants' likelihood to rape by their self-reported likelihood to try and coerce the vignette's target into having sex.

Participant demographics. Participants responded to demographic questions including biological sex, sexual orientation, relationship status, age, ethnicity, and socioeconomic status. Participants responded to honesty and attention checks: "__% of my responses were honest" and "I paid attention to __% of the survey."

Procedure. Participants read and consented to participate in a study titled *Individual Differences in Violating Social Norms*. Participation took between five and 10 min. Participants completing the study entered an opportunity drawing for a gift card.

After consenting, participants identified their biological sex and sexual orientation. Participants read and responded to each vignette in random order, responded to individual differences measures, socially desirable responding, and demographic questions. Finally, participants were debriefed and thanked for their time.

Results

Prediction 1. Men, compared to women, displayed higher likelihood to rape. To identify if participants' likelihood to rape, we ran an ordinal logistic regression. There was a statistical effect of participant sex, such that women were statistically less likely to rape compared to men, $\chi^2(1) = 46.74$, $p < .001$. Women were 43% more likely to score lower on trying to coerce the target of the vignette into having sex. There was no statistical interaction between participant sex and condition on likelihood to rape, $\chi^2(2) = 1.97$, $p = .37$ (Table 4).

Prediction 2. Neither men's, nor women's, likelihood to rape statistically decreased as likelihood of discovery increased. An ordinal logistic regression indicated no statistical differences in men's, nor women's, likelihood to rape across the vignettes, $\chi^2(2) = 1.19$, $p = .55$ (Table 4).

Discussion

Study 3 found mixed support for our predictions. Prediction 1, that men would report a higher likelihood to rape than women, was supported. However, we found no support for our prediction that cues to discovery influenced participants' likelihood to rape. While Study 3 addressed two major limitations of Study 2, we did not find that experimentally manipulating cues to discovery in more realistic circumstances statistically affected participants' willingness to rape.

Table 4. Study 3's Ordinal Logistic Regression.

	Likelihood to Rape (N = 452)						
Variable Total sample	Not at All Likely (70.1%)	Not Likely (13.7%)	Undecided (7.8%)	Likely (5.1%)	Very Likely (3.3%)	OR [95% CI]	t-value
Participant sex							
Male□	142 (62.3%)	34 (14.9%)	25 (11.1%)	18 (7.9%)	9 (3.8%)	—	
Female	177 (78%)	28 (12.5%)	10 (4.4%)	5 (2.4%)	6 (2.7%)	0.43 [0.33, 0.55]	−6.72**
Discovery condition							
Low□	318 (70%)	62 (13.7%)	35 (7.7%)	22 (4.8%)	17 (3.7%)	—	
Medium	327 (72.0%)	63 (13.9%)	28 (6.2%)	25 (5.5%)	11 (2.4%)	0.94 [0.69, 1.26]	−0.43
High	310 (68.3%)	62 (13.7%)	43 (9.5%)	23 (5.1%)	16 (3.5%)	1.10 [0.82, 1.48]	0.65

Note. Table displays number of participants reporting each level of likelihood to rape with the percentage of the participants in parentheses. □ indicates comparison group. **$p < .01$.

General Discussion

Overall, we found mixed support for the hypothesis that men's likelihood to rape increases when the perception of the likelihood of discovery is low. Study 1 was the only study in which we found support for the prediction that men's reported likelihood to rape is higher in conditions low in likelihood of discovery. However, our experimental manipulations did not find support for this prediction.

We found support for our predictions that men, more than women, report a higher likelihood to rape across both Studies 2 and 3. One benefit of our studies includes that none of them used the word "rape" to identify participants' likelihood to rape. Study 2 suggests 39.7% of women and 48% of men reported some likelihood to rape – that is, the percentage of men and women responding "undecided" or higher to "have sex." In Study 3, 6.8% of women and 19% of men reported *some* likelihood to rape.

A concern introduced by our methods, however, includes the limitation that we cannot confidently claim participants in Study 2 were reporting their likelihood to rape. Study 2 is open to an alternative explanation that, when reporting their likelihood to "have sex" when time is stopped, both men and women may report a higher likelihood to have sex since the thought experiment decreases the likelihood of accruing reputational damage associated with promiscuity (e.g., Buss, 2008). Relatedly, our studies may confound cues to the likelihood of discovery with the presence of perpetrators' social allies and the protective influence against the reputational damage these allies may provide (Giardini et al., 2022; Hess & Hagen, 2019)—and may aid exploitative strategies (Wamboldt et al., 2019).

If the presence of the perpetrators' social allies provides protection against reputational damage, the presence of social allies may be one additional environmental cue tracked by the psychology motivating sexually exploitative strategies. Further, the presence of social allies who share one's attitudes and values may provide more protection than the cues we manipulated in Study 3 (i.e., number of people around, concealment of the event, and attention paid to the target). However, the level of protection the presence of a perpetrators' social allies provides is unknown. One may address these limitations by (1) controlling for the importance one places on reputational concerns, (2) use different methodology (e.g., forced choice), or (3) experimentally manipulate the discovery likelihood with an explicit focus on manipulating cues aiding perpetrators' social reputation the presence of the perpetrator's social allies.

While we did not find a main effect of the likelihood of discovery, it is possible that there are mediating factors that influence the likelihood of rape. Buss (2021) argues a subset of men high in personality traits such as Narcissism, Machiavellianism, and Psychopathy (i.e., the Dark Triad) seem to be the men following an exploitative behavioral strategy. If individuals high in the Dark Triad are those most likely to use exploitative behavioral strategies, identifying these individuals and the environmental cues

aiding the exploitation is important to mitigating future victimization.

The studies covered in this report identified that people, especially men, spontaneously nominate rape as an action in which they would engage if circumstances created a lower likelihood of discovery. These data lend support to Buss and Duntley's (2008) hypothesis that individuals enact multiple resource acquisition strategies—including exploitative strategies under certain conditions. Finally, across our experimental studies, men evidenced a greater likelihood to rape compared to women. Future work is needed to better understand how contextual factors interact to influence the likelihood of rape.

Authors' Contributions

Rebecka K. Hahnel-Peeters was responsible for Study 3 design; data collection for Studies 2 and 3; all data analyses; and manuscript authorship. Aaron T. Goetz was responsible for research question conceptualization; Studies' 1, 2, and 3 design; supervision; and manuscript revision. Cari D. Goetz was responsible for design of Studies 1, 2, and 3 and manuscript revision.

Availability of Data and Material

See https://bit.ly/Likelihood_of_Discov.

Code Availability

See https://bit.ly/Likelihood_of_Discov.

ORCID iDs

Rebecka K. Hahnel-Peeters https://orcid.org/0000-0002-5872-2861
Cari D. Goetz https://orcid.org/0000-0002-1273-6125

Supplemental Material

Supplemental material for this article is available online.

Note

1. While we preregistered running ANOVAs to identify the effect of discoverability on participants' likelihood to rape, we later realized

the correct analyses for both Studies 2 and 3 were ordinal logistic regressions. The Supplemental Materials contain the results of our preregistered ANOVAs (https://bit.ly/Likelihood_of_Discov).

References

Abbey, A., & McDuffie, D. (1996). Alcohol and dating risk factors for sexual assault among college women. *Psychology of Women Quarterly*, *20*, 147–169. https://doi.org/10.1111/j.1471-6402.1996.tb00669.x

Abbey, A., Wegner, R., Pierce, J., & Jacques-Tiura, A. J. (2012). Patterns of sexual aggression in a community sample of young men: Risk factors associated with persistence, desistance, and initiation over a 1-year interval. *Psychology of Violence*, *2*(1), 1. https://doi.org/10.1037/a0026346

Abbott, C. B. (2015). The Reverend Jim Jones and Religious, Political, and Racial Radicalism in Peoples Temple. https://dc.uwm.edu/etd/1037

Ahram, A. I. (2015). Sexual violence and the making of ISIS. *Survival*, *57*(3), 57–78. https://doi.org/10.1080/00396338.2015.1047251

Ahrens, C. E., & Campbell, R. (2000). Assisting rape victims as they recover from rape: The impact on friends. *Journal of Interpersonal Violence*, *15*(9), 959–986. https://doi.org/10.1177/088626000015009004

Barthel, M., Stocking, G., Holcomb, J., & Mitchell, A. (2016). Reddit news users more likely to be male, young and digital in their news preferences. *Pew Research Center*.

Berdychevsky, L., Proia, Y., & Uriely, N. (2010). Casual sex and the backpacking experience: The case of Israeli women. In N. Carr & Y. Proia (Eds.), *Sex and the sexual during people's leisure and tourism experiences* (pp. 105–118). Cambridge Scholars Publishing.

Brown, L., & Stephan, Y. S. (2013). Anonymous and uninhibited: Sexual encounters during the international sojourn. *Journal of Tourism and Cultural Change*, *11*(1–2), 35–47. https://doi.org/10.1080/14766825.2013.768626

Brownmiller, S. (1975). *Against our will: Men, women, and rape*. Ballantine Books.

Buss, D. M. (2008). *Evolution of desire-revised*. Basic books.

Buss, D. M. (2021). *When men behave badly: The hidden roots of sexual deception, harassment, and assault*. Little, Brown Spark.

Buss, D. M., & Duntley, J. D. (2008). Adaptations for exploitation. *Group Dynamics: Theory, Research, and Practice*, *12*(1), 53–62. https://doi.org/10.1037/1089-2699.12.1.53

Crawely, K., & Simic, O. (2019). Telling stories of rape, revenge, and redemption in the age of the TED talk. *Crime Media Culture*, *15*(2), 259–278. https://doi.org/10.1177/1741659018771117

Eastham, T. (1979). Clerics defend religions as different from cults. *San Francisco Examiner*.

Elo, S., & Kyngäs, H. (2008). The qualitative content analysis process. *Journal of Advanced Nursing*, *62*(1), 107–115. https://doi.org/10.1111/j.1365-2648.2007.04569.x

Elva, T., & Stranger, T. (2017). *South of forgiveness: A true story of rape and responsibility*. Skyhorse Publishing.

Farvid, P., Braun, V., & Rowney, C. (2017). "No girl wants to be called a slut!": Women, heterosexual casual sex and the sexual double standard. *Journal of Gender Studies*, *2017*(26), 5. https://doi.org/10.1080/09589236.2016.1150818

Figueredo, A. J., Corral-Verdugo, V., Frias-Armenta, M., Bachar, K. J., White, J., McNeill, P. L., Kirsner, B. R., & del PilarCastell-Ruiz, I. (2001). Blood, solidarity, status, and honor: The sexual balance of power and spousal abuse in Sonora, Mexico. *Evolution and Human Behavior*, *22*(5), 295–328. https://doi.org/10.1016/S1090-5138(01)00067-8

Fisher, M., & Cox, A. (2011). Four strategies used during intrasexual competition for mates. *Personal Relationships*, *18*, 20–38. https://doi.org/10.1111/j.1475-6811.2010.01307.x

Gatter, K., & Hodkinson, K. (2016). On the differences between Tinder versus online dating agencies: Questioning a myth. An exploratory study. *Cogent Psychology*, *3*(1), 1162414. https://doi.org/10.1080/23311908.2016.1162414

Giardini, F., Balliet, D., Power, E. A., Szamado, S., & Takacs, K. (2022). Four puzzles of reputation-based cooperation. *Human Nature*, *33*, 43–61. https://doi.org/10.1007/s12110-021-09419-3

Gleason, J. M., & Harris, V. A. (1976). Group discussion and defendant's socio-economic Status as determinants of judgments by simulated Jurors1. *Journal of Applied Social Psychology*, *6*(2), 186–191. https://doi.org/10.1111/j.1559-1816.1976.tb01323.x

Goetz, C. D., Easton, J. A., Lewis, D. M. G., & Buss, D. M. (2012). Sexual exploitability: Observable cues and their link to sexual attraction. *Evolution and Human Behavior*, *33*(4), 417–426. https://doi.org/10.1016/j.evolhumbehav.2011.12.004

Gottschall, J. (2004). Explaining wartime rape. *Journal of Sex Research*, *41*(2), 129–136. https://doi.org/10.1080/00224490409552221

Hahnel-Peeters, R. K. (forthcoming). Bodyguard hypothesis, rape and coercion. In T. K. Shackelford (Ed.), *Encyclopedia of sexual psychology and behavior*. Springer Nature.

Henry, N., Ward, T., & Hirshberg, M. (2004). A multifactorial model of wartime rape. *Aggression and Violent Behavior*, *9*(5), 535–562. https://doi.org/10.1016/S1359-1789(03)00048-X

Hess, N. H., & Hagen, E. H. (2019). Gossip, reputation, and friendship in within-group competition. In F. Giardini & R. Wittek (Eds.), *The Oxford handbook of gossip and reputation* (pp. 275–302). Oxford University Press.

Isely, P. J. (1997). Child sexual assault and the Catholic Church: An historical and contemporary review. *Pastoral Psychology*, *45*(4), 277–299. https://doi.org/10.1007/BF02282657

Jennings, T. (1990). "Us colored women had to go though A plenty": Sexual exploitation of African-American slave women. *Journal of Women's History*, *1*(3), 45–74. https://doi.org/10.1353/jowh.2010.0050

Kennedy, K. M., & Flaherty, G. T. (2015). The risk of sexual assault and rape during international travel: Implications for the practice of travel medicine. *Journal of Travel Medicine*, *22*(4), 282–284. https://doi.org/10.1111/jtm.12201

Lalumiere, M. L., Harris, G. T., Quinsey, V. L., & Rice, M. E. (2005). *The causes of rape: Understanding individual differences in male propensity for sexual aggression*. American Psychological Association.

Lawyer, S., Resnick, H., Bakanic, V., Burkett, T., & Kilpatrick, D. (2010). Forcible, drug-facilitated, and incapacitated rape and sexual assault among undergraduate women. *Journal of American College Health: J of ACH*, *58*(5), 453–460. https://doi.org/10.1080/07448480903540515

Malamuth, N. M. (1981). Rape proclivity among males. *Journal of Social Issues*, *37*(4), 138–155. https://doi.org/10.1111/j.1540-4560.1981.tb01075.x

Marks, M. J., Young, T. M., & Zaikman, Y. (2019). The sexual double standard in the real world: Evaluations of sexually active friends and acquaintances. *Social Psychology*, *50*(2), 67–79. https://doi.org/10.1027/1864-9335/a000362

Mckibbin, W. F., Shackelford, T. K., Goetz, A. T., & Starratt, V. G. (2008). Why do men rape? An evolutionary psychological perspective. *Review of General Psychology*, *12*(1), 86–97.

Moniuszko, S. M., & Kelly, C. (2017). Harvey Weinstein scandal: A complete list of the 87 accusers. *USA Today*. https://www.usatoday.com/story/life/people/2017/10/27/weinstein-scandal-complete-list-accusers/804663001/

Mouilso, E. R., Fischer, S., & Calhoun, K. S. (2012). A prospective study of sexual assault and alcohol use among first-year college women. *Violence and Victims*, *27*(1), 78–94. https://doi.org/10.1891/0886-6708.27.1.78

Muggleton, N. K., Tarran, S. R., & Fincher, C. L. (2019). Who punishes promiscuous women? Both women and men are prejudiced towards sexually-accessible women, but only women inflict costly punishment. *Evolution and Human Behavior*, *40*(3), 259–268. https://doi.org/10.1016/j.evolhumbehav.2018.12.003

Palmer, J. E., Mcmahon, S., & Fissel, E. (2021). Correlates of incoming male college students' proclivity to perpetrate sexual assault. *Violence Against Women*, *27*(2-3), 507–528.

Poggioli, S. (2019). After Years Of Abuse By Priests, #NunsToo Are Speaking Out. *NPR*. https://www.npr.org/2019/03/18/703067602/after-years-of-abuse-by-priests-nunstoo-are-speaking-out

Reynolds, T., Baumeister, R. F., & Maner, J. K. (2018). Competitive reputation manipulation: Women strategically transmit social information about romantic rivals. *Journal of Experimental Social Psychology*, *78*, 195–209. https://doi.org/10.1016/j.jesp.2018.03.011

Reynolds, W. M. (1982). Development of reliable and valid short forms of the Marlowe-Crowne Social Desirability Scale. *Journal of Clinical Psychology*, *38*(1), 119–125.

Shupe, A. D., Stacey, W. A., & Darnell, S. E. (2000). *Bad pastors: Clergy misconduct in modern America*. NYU Press. https://nyupress.org/9780814781463/bad-pastors

Walker-Rodriguez, A., & Hill, R. (2011). *Human sex trafficking*. FBI: Law Enforcement Bulletin. https://leb.fbi.gov/articles/featured-articles/human-sex-trafficking

Wamboldt, A., Khan, S. R., Mellins, C. A., & Hirsch, J. S. (2019). Friends, strangers, and bystanders: Informal practices of sexual assault intervention. *Global Public Health*, *14*(1), 53–64. https://doi.org/10.1080/17441692.2018.1472290

Wyckoff, J. P., Asao, K., & Buss, D. M. (2019). Gossip as an intrasexual competition strategy: Predicting information sharing from potential mate versus competitor mating strategies. *Evolution and Human Behavior*, *40*(1), 96–104. https://doi.org/10.1016/j.evolhumbehav.2018.08.006

Young, R. K., & Thiessen, D. (1992). The Texas rape scale. *Ethology and Sociobiology*, *13*(1), 19–33. https://doi.org/10.1016/0162-3095(92)90004-N