

Individual Differences in Women's Rape Avoidance Behaviors

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Received: 15 April 2009 / Revised: 2 February 2010 / Accepted: 5 February 2010 / Published online: 13 May 2010
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Abstract Rape can exact severe psychological, physical, and reproductive costs on women, and likely was a recurrent adaptive problem over human evolutionary history. Therefore, women may have evolved psychological mechanisms that motivate rape avoidance behaviors. Guided heuristically by an evolutionary perspective, we tested the hypothesis that women's rape avoidance behaviors would vary with several individual difference variables. Specifically, we predicted that rape avoidance behaviors would covary positively with (1) women's attractiveness, (2) women's involvement in a committed romantic relationship, and (3) the number of family members living nearby. We also predicted that women's rape avoidance behaviors would covary negatively with age. We administered the Rape Avoidance Inventory (McKibbin et al., *Pers Individ Differ* 39:336–340, 2009) and a demographic survey to a sample of women ($n = 144$). The results of correlational and regression analyses were consistent with the predictions, with the exception that women's rape avoidance behaviors did not covary with women's age. Discussion highlighted limitations of the current research and directions for future research on women's rape avoidance psychology and behaviors.

Keywords Sexual coercion · Rape · Rape avoidance · Evolved psychological mechanisms

Introduction

Rape is defined here as the use of force or threat of force to achieve penile-vaginal penetration of a woman without her consent (Kilpatrick, Edmunds, & Seymour, 1992; Thornhill & Palmer, 2000). This definition is somewhat restrictive and does not consider several other types of rape (e.g., homosexual rape). However, the majority of rapes are of women by men (Lalumière, Harris, Quinsey, & Rice, 2005). Women likely have been under strong selection pressure to avoid being raped by men over human evolutionary history (see Thornhill & Palmer, 2000). We therefore focused the current research on women's avoidance of rape by men.

Rape inflicts tremendous costs on women. These costs may include disruption of a woman's parental care, abandonment by her partner, and physical, psychological, and emotional injury (Thornhill, 1996; Thornhill & Palmer, 2000). An additional cost inflicted on women who are raped is the circumvention of their choice of a sexual partner (Wilson & Mesnick, 1997). Because women (relative to men) bear a substantially greater obligatory investment in offspring, circumventing a woman's mate choice can severely jeopardize her reproductive success, particularly if it results in offspring of poorer genetic quality (Symons, 1979). Therefore, it is reasonable to argue that the possibility of rape has been a strong selective pressure on women throughout evolutionary history, resulting in evolved psychological mechanisms designed to motivate rape avoidance behaviors (McKibbin et al., 2009; Thornhill & Palmer, 2000).

Research on the effects of ovulatory cycle status on women's behavior also provides evidence that women have evolved psychological mechanisms that motivate rape avoidance behaviors (e.g., Bröder & Hohmann, 2003; Chavanne & Gallup, 1998). Rape avoidance behaviors might be expected to vary with the woman's risk of conception. Women in the ovulatory

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phase of their menstrual cycle are most likely to conceive following sexual intercourse (Wilcox, Dunson, Weinberg, Trussell, & Baird, 2001). Near the time of ovulation, women perform fewer behaviors associated with a greater risk of rape (e.g., walking in a dark alley), while maintaining their general activity level (e.g., distance walked in a day; Morris & Udry, 1970) and even while engaging in more consensual sexual behavior (Morris & Udry, 1982). Thus, recent evidence indicates that women may vary their rape avoidance behaviors relative to their risk of conception.

Ancestral women who responded to increased rape-related risk with more rape avoidance behaviors may have been more reproductively successful than women who did not. Guided by an evolutionary perspective, we identified several variables that may influence women's rape-related risk. We predicted that individual differences in women's attractiveness, relationship status, number of family members living nearby, and age would covary with women's rape avoidance behaviors.

Cross-culturally, men more than women report a preference for physical attractiveness in a prospective romantic partner, because attractiveness in women more than in men is an indicator of fertility and expected future reproduction (Buss, 1989; Buss & Schmitt, 1993; Symons, 1979). Research evidence suggests that would-be rapists also may prefer and target more attractive women, in order to maximize the probability of conception (Ghiglieri, 2000; Greenfield, 1997; Kilpatrick et al., 1992; McKibbin, Shackelford, Goetz, & Starratt, 2008; Thornhill & Palmer, 2000; Thornhill & Thornhill, 1983).

If women's psychology includes mechanisms that motivate rape avoidance behaviors, then more attractive women may be more motivated to perform rape avoidance behaviors, relative to less attractive women. Therefore, we predicted that women's attractiveness will correlate positively with women's reports of the frequency with which they perform rape avoidance behaviors (Prediction 1).

Mated women, as compared with unmated women, may incur additional costs associated with being raped (Thornhill, 1996; Thornhill & Palmer, 2000). Specifically, if a woman's regular partner interprets the rape as infidelity, a mated woman risks losing her partner's support and resources for herself and her offspring (Thornhill & Palmer, 2000; Thornhill & Thornhill, 1992). Thornhill and Thornhill (1990) documented that mated women report more psychological pain than did unmated women following rape. They suggested that the psychological pain experienced by mated women functions to focus women's attention on the costs or losses they have experienced such that women will find ways to avoid similar costly situations. Unmated women might be expected to experience greater costs associated with being raped, because the rape may produce an offspring that would not benefit from the support and investment of a regular partner. Based on the findings of Thornhill and Thornhill, however, we generated the following prediction. Because mated women may experience

greater losses than unmated women as a result of a rape, we predicted that women in a relationship will report higher frequencies of rape avoidance behaviors than women not in a relationship (Prediction 2).

Over evolutionary history, individuals with psychological mechanisms that motivated reciprocal exchange of resources and support with close family members are likely to have been more successful than individuals without such mechanisms (Hamilton, 1964). Close genetic relatives also may incur costs if a female relative is raped, such as decline in inclusive fitness associated with her injury, inability to contribute to the family, or care for her own offspring. This helping may occur in multiple domains, and may include behaviors that decrease the risk of a female genetic relative being raped (e.g., parents discouraging their daughter from wearing revealing clothing or men accompanying their daughters or sisters at night). Indeed, research has demonstrated that family members do act in such ways. Figueredo et al. (2001) found that the presence of adult male kin living nearby decreased the likelihood of a female relative being raped, perhaps because would-be rapists fear retaliation by the rape victim's adult male kin. Individuals also may act in ways that more directly decrease the likelihood of a female relative being raped. Perilloux, Fleischmann, and Buss (2008) found that parents exerted more control over their daughters' behavior than their sons' behavior, particularly their mating behavior. Compared to how they interacted with their sons, parents were more likely to express upset in response to a daughter's risky sexual activity, to use curfews to control a daughter's behavior, and to exert control over a daughter's clothing choices, all of which may decrease a daughter's risk of being vulnerable to rape or being targeted for rape. Other close kin, such as siblings, also may act to prevent women from being raped. For example, brothers may accompany a sister outside at night. Because a woman's relatives may guard her directly or attempt to influence her rape-relevant behaviors, we predicted that the number of women's family members living in close proximity will correlate positively with the frequency with which women perform rape avoidance behaviors (Prediction 3).

Women's fertility—risk of conception per copulation—peaks in the early 20s and declines with age (Buss, 2003; Thornhill & Thornhill, 1983). Men have evolved preferences for fertile mates and, accordingly, men generally express a preference for younger mates (Buss, 1989, 2003). Would-be rapists also may target younger women, relative to older women. Indeed, younger women are overrepresented in reported rapes and rapes unreported to authorities (Greenfield, 1997; Kilpatrick et al., 1992; Thornhill & Palmer, 2000; Thornhill & Thornhill, 1983). Because younger women are more likely to be raped, we predicted that women's age will correlate negatively with the frequency with which women perform rape avoidance behaviors (Prediction 4).

We secured self-reports on several individual difference variables and rape avoidance behaviors from a sample of

women. We used these data to test the four target predictions and to conduct additional analyses investigating individual differences in women's rape avoidance behaviors.

Method

Participants

Data for this study were derived from the sample used by McKibbin et al. (2009). Participants were 144 women recruited from psychology courses at a public university in southeast Florida. Participants were required to be at least 18 years old. The mean age of the participants was 25.9 years ($SD = 7.8$). The mean age was higher than a typical undergraduate sample because many students at the campus where the study was conducted are non-traditional students (e.g., employed full-time, parents of several children).

Participants were asked if they were in a committed, long-term relationship. Ninety-five participants reported that they were in such a relationship. Forty-nine participants reported that they were not in a committed, long-term relationship.

Procedure

Prospective participants were provided a handout with information about the study and the web address for the study. After linking to the study, participants were required to read a consent form. After providing consent, participants then began responding to the survey. Participants were instructed that they could skip any question they did not wish to answer and could stop participating at any time.

After finishing the survey, participants were debriefed. They were provided with information about the purpose of the study, contact information for the researchers, and contact information for counseling services if they were upset by any of the questions. Following debriefing, participants were provided with a printable confirmation page that they were instructed to sign and provide to their instructor if they wished to receive extra credit. Participants were awarded extra credit in their class for participation at the instructor's discretion. This study was evaluated and approved by the university Institutional Review Board.

Measures

Participants completed the Rape Avoidance Inventory (McKibbin et al., 2009). The RAI consists of 69 behaviors that women might perform specifically to avoid being raped. Participants indicated how often on a 7-point scale they performed each behavior, on average, with scale values defined as follows: 0 = Never, 1 = Almost never, 2 = Rarely, 3 = Sometimes, 4 = Frequently, 5 = Almost always, 6 = Always. Previous research has

demonstrated that the RAI is a reliable and valid measure of women's rape avoidance behaviors (McKibbin et al., 2009).

The RAI consisted of four components identified with principal components analysis, each corresponding to a specific set of rape avoidance behaviors. The *Avoid Strange Men* component included behaviors in which women avoid unfamiliar or strange men (e.g., "Avoid men who make me feel uncomfortable"). The *Avoid Appearing Sexually Receptive* component included behaviors that may diminish a woman's attractiveness to a potential rapist (e.g., "Avoid wearing sexy clothing"). The *Avoid Being Alone* component included behaviors that function to keep a woman around others (e.g., "When I go out, I stay with at least one other person that I know"). The *Awareness of Surroundings/Defensive Preparedness* component included behaviors that serve to keep a woman attentive to her surroundings that enhance a woman's ability to thwart a would-be rapist (e.g., "Carry a knife").

After completing the RAI, participants completed a demographic survey that included assessments of age (in years), the number of adult male and female family members living in close proximity to the participant, relationship status (coded as 0 = not in a committed, long-term relationship, and 1 = currently in a committed, long term relationship), and two questions assessing self-perceived attractiveness: "How physically attractive do you think you are?," "How physically attractive do others think you are?," coded on a 7-point scale ranging from 0 = not at all to 6 = extremely attractive.

A number of the items on the RAI relate to stranger rape rather than acquaintance rape, despite rapes most often being perpetrated by someone known to the victim (Greenfield, 1997). We note, however, that the items on the RAI were derived from behaviors nominated by women themselves (for details, see McKibbin et al., 2009). This suggests that while indeed less frequently occurring, stranger rape may elicit more fear in women.

Data Analysis

Alpha reliabilities ranged between .83 and .92 for the four components of the RAI. The alpha reliability for the total RAI was .94. Full descriptions of the psychometric properties of the Rape Avoidance Inventory (RAI), including detailed reliability and validity data, were provided in McKibbin et al. (2009). Here, we tested new predictions using data from the sample used in McKibbin et al. First, we calculated participants' four RAI component scores by summing responses to the constituent items. We then calculated a total score by summing scores across the components. The means and SD s for the four components and full-scale RAI were reported in McKibbin et al. We calculated an attractiveness score by averaging responses to the two attractiveness questions ($\alpha = .81$). Participants reported a mean attractiveness of 5.32 ($SD = .87$). This variable was highly skewed. However, participants often do not report possessing

below average attractiveness (e.g., Little, Burt, Penton-Voak, & Perrett, 2001). We conducted analyses with the attractiveness variable log-transformed to reduce skew, but the results did not differ substantively from those that are reported here (analyses available from the corresponding author upon request). Participants reported a mean of 2.9 female and 3.2 male adult family members living in close proximity ($SD = 3.6$ and 4.4 , respectively). One participant was removed from further analyses because her RAI total score was more than five SDs below the mean.

Results

As shown in Table 1, total RAI scores correlated significantly and positively with self-perceived attractiveness, ($r = .17$, $p < .05$) in support of Prediction 1. The number of family members living in close proximity (male, female, and total) correlated positively with women's total RAI scores, supporting Prediction 2 ($r = .25$, $p < .01$). The point-biserial correlation between total RAI scores and relationship status also was significant, ($r = .22$, $p < .01$) indicating that women in committed, long-term relationships performed more rape avoidance behaviors than women who were not in a relationship. This finding supports Prediction 3. The correlation between age and total RAI scores was not significant ($r = .13$, $p > .05$), and therefore Prediction 4 was not supported.

We next examined the correlations between the four dependent variables and scores on the four RAI components (see Table 1 for corresponding r and p values). Self-perceived attractiveness correlated with scores on the Avoid Being Alone and Awareness of Surroundings/Defensive Preparedness components. Relationship status correlated significantly with scores on the Avoid Appearing Sexually Receptive and Avoid Being Alone components. The total number of family members living nearby correlated significantly with scores on the Avoid Appearing Sexually Receptive and Awareness of Surroundings/Defensive Preparedness components. The number of female

family members living nearby correlated significantly with scores on the Awareness of Surroundings/Defensive Preparedness component. The number of male family members living nearby correlated significantly with scores on the Avoid Appearing Sexually Receptive and the Awareness of Surroundings/Defensive Preparedness components. Finally, age correlated significantly with scores on the Avoid Appearing Sexually Receptive component.

We then conducted multiple regression analyses to investigate whether any of the individual difference variables uniquely predicted performance of rape avoidance behavior. A series of five regressions were conducted, with the total RAI score and the four components respectively as dependent variables. In each analysis, the predictor variables (attractiveness, age, relationship status, number of male family members close by, and number of female family members close by) were entered in a list-wise fashion. Table 2 presents beta weights representing the unique variance of each predictor on each component of and the total score for the RAI. Overall R^2 scores represent the total amount of variance explained by the unique and shared variance of the predictors on the criterion. As displayed in Table 2, the models predicting scores on the Avoid Appearing Sexually Receptive, $F(5, 128) = 3.28$, $p < .01$, Avoid Being Alone, $F(5, 128) = 3.29$, $p < .01$, and Awareness of Surroundings/Defensive Preparedness components were significant, $F(5, 128) = 4.76$, $p < .01$. The model predicting full-scale, total rape avoidance scores was also significant, $F(5, 128) = 4.11$, $p < .01$. Investigation of the individual standardized regression coefficients indicated that relationship status uniquely predicted women's rape avoidance overall and each of the components that produced significant models.

Discussion

Guided by an evolutionary perspective, we hypothesized that women's rape avoidance behavior would vary with specific individual differences among women: their attractiveness,

Table 1 Correlations between total and component rape avoidance inventory scores, attractiveness, relationship status, family member presence, and age

	RAI (total)	Avoid strange men	Avoid appearing sexually receptive	Avoid being alone	Awareness of surroundings/defensive preparedness
Self-perceived attractiveness	.17*	.11	-.04	.21**	.25**
Relationship status	.22**	.11	.19*	.24**	.16
Total family members	.25**	.14	.18*	.11	.30**
Female	.21*	.12	.15	.07	.26**
Male	.27**	.15	.19*	.13	.31**
Age	.13	.06	.22**	-.05	.11

Note: For relationship status, 0 = not in a committed, long-term relationship, 1 = currently in a committed, long-term relationship. Self-perceived attractiveness was a composite of two items assessing self-perceived attractiveness on a 0–6 Likert scale (see text)

* $p \leq .05$; ** $p \leq .01$. Due to missing data, ns vary from 133 to 144 for correlations

Table 2 Multiple regression analyses for women's attractiveness, relationship status, family members, and age predicting rape avoidance (reported in standardized beta weights)

	Rape avoidance components				
	Avoid strange men	Avoid appearing sexually receptive	Avoid being alone	Awareness and preparedness	Total
Attractiveness (β)	.09	-.05	.14	.14	.10
Relationship status (β)	.07	.18*	.23**	.17*	.21**
Female family members (β)	-.04	.09	-.25	-.04	-.06
Male family members (β)	.15	.11	.30	.31*	.29
Age (β)	.05	.20*	-.07	.09	.11
Full model					
<i>F</i>	.94	3.28**	3.29**	4.76**	4.11**
<i>R</i> ²	.04	.11	.08	.16	.14

Note: For relationship status, 0 = not in a committed, long-term relationship, 1 = currently in a committed, long term relationship. Self-perceived attractiveness was a composite of two items assessing self-perceived attractiveness on a 0–6 Likert scale (see text)

* $p \leq .05$; ** $p \leq .01$, $n = 133$ for all analyses

their relationship status, the presence of family members living nearby, and their age. In general, the results supported the predictions such that the frequency with which women reported performing rape avoidance behaviors varied predictably with several individual differences among women.

The results of the correlational analyses provided support for the prediction that women's attractiveness would correlate positively with women's reports of the frequency with which they performed rape avoidance behaviors. We found a positive correlation between women's self-reported attractiveness and total rape avoidance behavior. Because attractive women may be preferentially targeted by rapists (McKibbin et al., 2008; Thornhill & Palmer, 2000), these women appeared to perform more rape avoidance behaviors relative to less attractive women. This relationship appears to be driven by the Avoid Being Alone and Awareness of Surroundings/Defensive Preparedness components. Attractiveness was not a significant predictor of rape avoidance in any of the multiple regression analyses, although the beta weights for the Avoid Being Alone and Awareness of Surroundings/Defensive Preparedness components approached significance ($p = .11$ and $.10$, respectively). These findings provide preliminary evidence that more attractive women, relative to less attractive women, avoided situations in which they were alone and vulnerable. They also pay special attention to their surroundings and were more likely to carry defensive weapons such as mace.

As predicted, there was a positive correlation between relationship status and the frequency of women's rape avoidance behaviors. Women who reported being in a long-term committed relationship reported greater frequencies of total rape avoidance behaviors than women who did not report being in a committed, long-term relationship. This may be because mated women must manage the additional risk of losing their partner's investment. Specifically, mated women performed more behaviors in the Avoid Appearing Sexually Receptive and Awareness

of Surroundings/Defensive Preparedness categories of rape avoidance behaviors. Mated women performed more behaviors that downplayed their attractiveness and perceived sexual receptivity. They also paid extra attention to their surroundings and were more likely to carry defensive weapons. These results were corroborated by our multiple regression analyses. In each significant model, relationship status uniquely predicted rape avoidance. In most cases, relationship status was the sole predictor of rape avoidance after controlling for the other predictor variables. Because mated women bear additional potential costs associated with being raped (Thornhill, 1996; Thornhill & Palmer, 2000; Thornhill & Thornhill, 1990; Wilson & Mesnick, 1997), they performed more rape avoidance behavior relative to non-mated women.

We predicted that the number of women's family members living in close proximity would correlate positively with the frequency with which women performed rape avoidance behaviors. We found that women's reports of rape avoidance behaviors were positively correlated with the number of male and female family members living close by. Individuals are able to manage their inclusive fitness interests by protecting genetic female relatives from being raped. This protection may often be indirect, with relatives encouraging women to behave in ways that diminish the risk of being raped. Examining the component scores for women's rape avoidance revealed two components in particular that seemed to drive this effect. Specifically, men and women encouraged behaviors in the Awareness of Surroundings/Defensive Preparedness component. Men also appeared to encourage behaviors from the Avoid Appearing Sexually Receptive component. Examining the multiple regression analyses, the number of female family members living close by did not uniquely predict women's rape avoidance but the number of male family members living close by did predict uniquely women's behaviors in the Awareness of Surroundings/Defensive Preparedness component. The relationship between male

family members living close by and women's performance of behaviors in the Avoid Being Alone component also approached significance ($p = .07$). Although men and women appeared to actively encourage rape avoidance behaviors in their female close relatives, men in particular seemed to encourage their female family members to behave in ways to avoid rape.

We did not find support for the prediction that women's age would correlate negatively with the frequency with which women performed rape avoidance behaviors. Only one component, Avoid Appearing Sexually Receptive, correlated significantly with age, and this was in the opposite direction than we predicted. A multiple regression analysis generated similar findings. In hindsight, a positive relationship between these two variables is not surprising, as this component consisted of several items that women were less likely to report as they age (e.g., "Avoid staying out too late"). Furthermore, the current results were inconsistent with the preponderance of evidence linking rape and the age of the victim (Felson & Krohn, 1990; Greenfield, 1997; Kilpatrick et al., 1992; Perkins & Klaus, 1996; Perkins, Klaus, Bastian, & Cohen, 1996; Thornhill & Thornhill, 1983); however, approximately 80% of the participants in the current study were 29 years old or younger. This restricted age range may have made it difficult to find the predicted relationship between rape avoidance behavior and age.

Limitations and Future Directions

This research used data self-reported by women. Although the women may not accurately remember how often they performed each rape avoidance behavior, such data cannot be defensibly secured from other data sources. Because we were interested in the behaviors that women perform specifically for the purpose of avoiding rape, we have no reason to believe that other parties, such as independent observers or a woman's close friends, would have the information and perspective to provide more accurate reports than the women themselves.

We found that women in long-term committed relationships scored higher on the RAI. We interpreted this finding as suggesting that mated women perform more rape avoidance behaviors to avoid the additional potential costs for mated women associated with being raped. An alternative explanation for the difference between mated and unmated women may be that mated women are less likely to go to parties or clubs or to perform mate-seeking behaviors, such as flirting. Similarly, mated women may be less likely to be alone than are unmated women, with mated women being likely to spend time in their partner's presence. In fact, items that indicate avoiding such behaviors as "avoiding parties and clubs" and "avoiding being alone" were included in the RAI. We note that regression analyses indicated that women in long-term committed relationships also reported a greater frequency of behaviors associated with awareness of the environment and preparedness. We cannot therefore

conclusively argue that mated women perform more rape avoidance behaviors. In addition, women who did not report being in a committed, long-term relationship may nevertheless be in another type of non-committed or short-term relationship. Their responses may be different than the responses provided by women who were not in any type of relationship. Subsequent studies should more carefully define relationship status and more carefully examine shifts in women's rape avoidance associated with relationship status, perhaps by examining shifts in frequency of individual behaviors rather than categories of overall rape avoidance behavior.

The current sample was also limited to relatively affluent college students attending psychology courses at a particular state university in Florida. The current sample was very similar to the affluent, Western sample for which the RAI was designed to be used. Although future studies should attempt to replicate these findings in other samples, particularly from other countries or cultures when possible, some of the items in the RAI may not apply to non-Western cultures equally well.

The variables examined in this study did not represent an exhaustive list of the variables that may influence rape avoidance behavior. An evolutionary perspective can be used to identify other important variables for future study. For example, there may be a relationship between the number of dependent children a mated woman has and her performance of rape avoidance behaviors. A mated woman who has dependent children may perform more rape avoidance behaviors than a mated woman without dependent children because she risks losing her partner's support for herself *and* her offspring. Furthermore, previous studies have identified ovulatory shifts in women's behavior associated with increased risk of rape (Bröder & Hohmann, 2003; Chavanne & Gallup, 1998). Women might exhibit similar shifts on behaviors included in the RAI, and future research can profitably investigate this possibility.

Finally, women's self-reports of their rape avoidance behaviors may differ from the actual frequency with which they perform these behaviors. Or women may perform behaviors without consciously understanding why they do so. The instructions for the RAI asked about behaviors performed specifically to avoid being raped. Future research might examine whether the observer-reported (e.g., as reported by same-sex best friend) frequencies of these behaviors differ from women's self-reports. Furthermore, no research has assessed the effectiveness of these behaviors. Future research should assess whether women who more frequently perform these behaviors (or particular components of these behaviors) are, in fact, less likely to report being raped.

Because of the severe costs associated with rape, it is likely that women have evolved psychological mechanisms that motivate rape avoidance behavior. However, because the risk of rape is not the same for every woman, these mechanisms may be sensitive to individual differences between women that influence their risk of being raped. We found evidence that women's

rape avoidance behavior covaried with specific individual difference variables. These findings provide further support for the presence of evolved mechanisms that motivate rape avoidance behavior in women and demonstrate that these evolved mechanisms are sensitive to individual differences in women and their environments.

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