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How to explain gender differences in fear of crime: Towards an evolutionary approach

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Abstract
Employing data from a sample of 610 Dutch high school students and their parents, this article argues in favour of an evolutionary explanation for the fact that women are more fearful of crime than men while they are less often victimized. With respect to a variety of events that involved physical injury, varying from robbery to being involved in a car accident, female respondents were, compared to male respondents, more fearful of every event, judged every single event to be more harmful, and consistently rated their own probability to experience these events in the future as higher. The findings suggest that fear of crime among women does not represent a real higher risk of being victimized, is not primarily linked to the risk of being raped, and is not an isolated phenomenon. Indeed, women seem in general more fearful of all kinds of events that might imply a physical injury. The observed gender differences were not influenced by the degree of traditionality of the family of the respondents as expressed in status differences between the parents, in the division of household tasks, and in having an intact family. The gender differences could neither be explained by a perceived norm that boys must be more risk taking than girls. It is concluded that the observed gender differences may be the result of sexual selection that favoured risk-taking and status fights among males, and being cautious and protecting one's offspring among females.

Keywords: *Fear of crime, gender differences, criminal victimization, rape*

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Introduction

The literature on sex differences in victimization and fear of crime shows a remarkable paradox. It is a more than well-known fact that crimes are committed mainly by men rather than by women. Whether it concerns murder, assault, rape, robbery, or fraud, crime is predominantly a male activity (e.g., Daly & Wilson, 1988; Gottfredson & Hirschi, 1990). It is probably less well known that (with the exception of sexual violence) men are also more likely to become the victim of violent crimes than women (e.g., Daly & Wilson, 1988; Gottfredson & Hirschi, 1990; US Department of Justice, 2002; Wilson & Daly, 1985). However, while women are less likely to become a victim of a violent crime, a large number of studies have shown that women are more fearful of becoming a victim of crime than men (for a review see Hale, 1996). The fact that women are more fearful of violent crimes than men despite the fact that they are less often victimized has been called the "fear victimization paradox" (Hale, 1996).

There have been many attempts to explain this apparent paradox. In the present article we suggest that there may not be a real paradox, and we argue that both the higher chance of becoming a victim of crime among men and the higher fear of crime among women can be explained from an evolutionary perspective. While it is difficult to provide direct evidence for this perspective in the present context, we aim to demonstrate the plausibility of this perspective by showing that women are not only more fearful of crimes but also of other events that might involve physical injury, and that women estimate the likelihood that such events might happen to them as higher than men do, despite the fact that the actual likelihood is generally lower. We also intend to demonstrate that such gender differences are quite robust, and are independent of the traditionality of the gender roles in the family in which the students are living. By providing this evidence, we aim to show that the explanations that are usually offered in the literature for the fear victimization paradox are insufficient to explain the degree to which females are more afraid of crime than men. However, this is not to say that the degree of such gender differences is genetically determined and is independent from the societal conditions in which men and women live. Quite the opposite, we would argue that genetic differences between males and females and gendered socialization processes both contribute to the fact that females are more fearful of crime than men. We will come back to this issue in the discussion.

According to an evolutionary perspective, feelings of fear are functional in the sense that they signal a dangerous situation (Buss, 1999). When someone perceives a situation as dangerous, this results in an increased alertness and sensitivity towards situational cues to estimate the degree and kind of danger, which prepares the organism for behaviours like fight or flight, and let the organism try to avoid similar situations in the future (Konner, 1982). In his bestseller *The gift of fear*, Gavin De Becker (1997) demonstrated (with a large number of examples) that fear of crime very often is a valid indicator of real dangers and that a person can lower his or her probability

of victimization by taking these feelings of fear seriously. Warr (1990) showed that fear of crime in a given situation mainly depends on three situational parameters: darkness, being alone, and not being familiar with the surroundings. Warr tested the importance of these situational parameters by using vignettes that he presented to his subjects. When subjects were asked to imagine a situation (1) at night, (2) when they were alone, and (3) in an unknown area, they estimated their fear in such a situation on average with a value of 8.73 on a 10-point scale. However, when they were asked to imagine being outside (1) during the day, (2) accompanied by another person, and (3) in a well-known area, the average was just 0.25. These findings are compatible with an evolutionary explanation: it is highly functional to be afraid of being alone in the dark in an unknown area because, from an evolutionary perspective, this fear will cause an avoidance of such objectively dangerous situations. According to this interpretation, a high level of fear decreases the probability of becoming a victim of a negative event, especially if this probability is related to the cautiousness of a potential victim.

Nonetheless, as can be derived from the theories of sexual selection and parental investment (Trivers, 1972), risk avoidance and fear will have played a different role for men and women throughout their evolutionary history (Fetchenhauer & Rohde, 2002). Males had to face a relatively higher level of intra-sexual competition than females (for an overview see Buss, 1999; Daly & Wilson, 1988; Low, 2000). This is mainly due to sex differences in reproductive opportunities. While the maximum number of offspring for females is restricted, men could theoretically sire hundreds of offspring. This primary sex difference had two important consequences. On the one hand, the variance in reproductive outcomes was much larger for males than for females, giving some males the opportunity to have very many children whereas others did not have the chance to reproduce at all. On the other hand, females' parental investment was much higher than males' because they had to concentrate their resources on a smaller number of children. For the reason that females invested more in their offspring than males, access to fertile females became the limiting resource for the reproductive success of males. For that reason, males competed heavily for access to females. In order to be successful in this competition, males had to possess a high social status by acquiring a position of superiority over other local males. According to Buss and Shackelford (1997), human evolution produced males that engage in "risky strategies, including those that lead to violent combat with rivals and those that lead to increased risk taking to acquire the resources needed to attract members of the opposite sex" (p. 613). This would explain to an important extent not only the higher crime rate among males, but also the higher chance of being a victim of particularly violent crimes committed by other men. In some hunter–gatherer societies, up to 25% of males are killed in fights with other males (including wars) (Chagnon, 1988). To be successful in the competition with other males and in obtaining resources, a high level of cautiousness, fear, and risk avoidance would be more a hindrance than an

advantage. Indeed, men could not defeat their competitors or be successful hunters when they always chose to avoid risky situations and fled if a possible danger occurred. On the other hand, it seems plausible that women were more successful in securing the survival of their offspring when they had a high level of fearfulness and thus would have avoided possible dangers as much as possible. Campbell (1999) argued that it was much more important for the reproductive outcomes of women than that of men to stay alive for a long time because the survival of one's offspring depended more on the physical presence and care of the mother than on that of the father (compare with Taylor, 2002).

According to Winkel (1998), fear of crime is mainly determined by two proximate causes: the perceived probability of being victimized and the degree to which a potential victim anticipates a victimization to be harmful. If the fear of a certain event is indeed determined by the perceived probability and the perceived seriousness of this event and if the evolutionary reasoning outline above is valid, women should also perceive a higher probability of future victimizations and regard potential victimizations as more harmful. This should be independent of the fact that men are actually more often victimized than women. Furthermore, assuming that women's fearfulness and cautiousness have evolved to avoid potential physical injuries as this might hinder them taking care of their off-spring, it is expected that the same gender differences in fear can be found with regard to non-criminal victimizations that lead to injuries, such as car accidents.

The present analysis differs from the explanations that criminologists have offered for the ''fear victimization paradox''. In the following, we will review a number of previous suggestions of how to explain that paradox.

Non-evolutionary explanations

The vulnerability hypothesis

It has been argued that women are more fearful of crime because they are more vulnerable than men are, mainly because women are physically weaker than men and therefore less able to defend themselves against (typically male) perpetrators (e.g., Hale, 1996; Warr, 1984). If this ''vulnerability'' explanation were valid, one would expect that vulnerability should mediate the relationship between gender and fear of crime. In one of the few studies that addressed this issue, Killias and Clerici (2000) included different objective and subjective indicators of vulnerability (e.g., body strength, self-confidence, and the subjective ability to defend oneself against a young male aggressor). While vulnerability was indeed related to various indicators of fear of crime, gender always turned out to have a stronger effect on fear of crime than vulnerability, indicating that vulnerability did not mediate the effect of gender on fear of crime. Moreover, if the higher fear of crime among women would stem primarily from their greater vulnerability, one would expect no gender differences in fear of victimizations that

might inflict physical injury without being influenced by vulnerability, and in the perceived likelihood of being a victim of such events.

Biased measurement of victimizations

A similar argument applies to the second explanation of the ''fear victimization paradox'', that is, the higher fear of crime among women represents a real higher risk of being victimized. As Stanko (1990) has emphasized, women are much more often the victims of domestic violence than men. If this argument were correct, for events of which the victimization rates of women are objectively lower than that of men (such as car accidents) women should be less fearful than men, and women should only perceive the likelihood of being raped higher than men, and not of other events for which their risk is lower than that of men. In contrast, we argue that women will be more afraid of all events that involve physical injury, will perceive such events as more serious, and will evaluate the likelihood that such events might happen to them as higher.

Biased measurement of fear of crime

Our predictions differ also from a third interpretation of the ''fear victimization paradox'' that is based on the criticism of the so-called standard question: ''How safe do you feel being out alone in your neighbourhood after dark?'' (Hale, 1996). According to Warr (1985), asking women this type of question does not assess a general fear of crime but rather a fear of rape. Warr suggested that women may be less often victimized with regard to offences such as assaults or robberies, but will much more often become a victim of offences that are largely irrelevant for men, that is, sexual harassment and rape. If fear of rape is indeed the main reason for women's higher general fear of crime, no gender differences should be found when subjects are asked explicitly about their fear of concrete events such as assaults or robberies. It may be noted that, as Ferraro (1995) has pointed out, females might be more fearful of non-sexual crimes such as burglary, robbery, or assault because these crimes are often related to sexual offences (e.g., women are sometimes raped and assaulted during the same event). Nevertheless, still no gender differences should emerge with regard to the fear of being the victim of events that are not related to women's risk of being raped, such as car accidents.

Power control theory

The plausibility of an evolutionary approach to the crime victimization paradox would be enhanced if gender differences were independent of traditional gender roles in the family of origin. A widely accepted explanation of the ''fear victimization paradox'' is that the higher tendency to engage in criminal activities among males as well as the higher fear of crime among females, are both the result of differences in the socialization of boys and girls

(e.g., Morrongiello & Dawber, 2000; see also Lytton & Romney, 1991). One particularly influential theory, power control theory (Hagan, Simpson & Gillis, 1987; Sacco, 1990), suggests that the social status of fathers and mothers outside the family (e.g., educational level, occupational prestige) influences their relative power within their marriage. It is assumed that the partner with the higher status (which quite often is the father) dominates the partner with the lower status (which quite often is the mother) and that this dominance is the more extreme the larger the difference in status between both parents. Power control theory asserts that the dominance relationship between parents influences the socialization of their children. In traditional families (i.e., families with a dominant father), boys learn to be assertive, risk-taking, and fearless whereas girls learn to be submissive, risk avoiding, and fearful. In contrast, in balanced or non-traditional families (i.e., families where the mother's status is equal or higher than the father's status), sons and daughters learn to be equally assertive, risk taking, fearful, and submissive (e.g., Grasmick, Hagan, Blackwell & Arneklev, 1996). Therefore, gender differences in fear of crime should be higher for children who are raised in a traditional family and they should be rather small (or even non-existent) in children who are raised in balanced or matriarchal families. On the basis of this theory, it can also be predicted that gender differences should be rather small for children who live alone with their divorced mother as in this case mothers will not function as a role model of female's submissiveness and dependability (although this assumption has been relaxed by the authors of power control theory; see McCarthy, Hagan & Woodward, 1999). In contrast, from an evolutionary perspective, gender roles in the family of origin would have no or little effect on the fear of crime. Therefore, we examined the impact on fear of crime of the gender roles in the family in which the participants of our study (high school students) lived. We did this by assessing the discrepancy in the occupational and educational status of the parents, the perception of the students of the task division among their parents, and whether the students lived in an intact family or with their mother alone.

Power control theory is only one variant of a vast number of sociological theories that argue that children's and adolescents' personality is, to a large extent, a product of the socialization by their parents (Hallinan, 2000). Yet, the role of parents in shaping the personalities of their children is not as clear as often is assumed. In a provocative review, Harris (1995) concluded, ''parental behaviours have no effect on the psychological characteristics their children will have as adults'' (p. 458). Harris argued that children's and adolescents' most important socialization agents are not their parents, but their peers. Following the argument of Harris, one might argue that male adolescents are less fearful than female adolescents because young males encourage each other's tendency to take risks, while females encourage each other to be careful. To test for this hypothesis, we measured the degree to which participants held the attitude that boys ought to be less fearful than girls and investigated whether gender differences with regard to this norm might influence gender differences in fearfulness.

Method

Participants

The participants of the study were high school students from a large school centre in Groenlo in a rural area in the northern part of the Netherlands. In total, $n = 610$ students participated in the study. A total of 45.2% of all respondents were male, 54.8% were female. Respondents' average age was 15.6 years (SD = 0.96). Most students filled in their questionnaire during normal classes. Some teachers asked them to fill in the questionnaires at home and bring them back to school. Every student was given a package of three questionnaires: one for themselves, one for their father, and one for their mother. In total, 267 fathers and 293 mothers filled out a questionnaire. With regard to 255 high school students, all three questionnaires were obtained. Parents' average age was 45.7 years with a range of 31 to 65 years (SD = 4.07).

Measures

The questionnaire for the students included the following measures: in relationship to six negative events, high school students had to indicate (1) the degree to which they were fearful of these events, (2) their subjective probability of experiencing these events in the next 12 months, and (3) how harmful it would be for them to endure the events in question. All answers had to be given on 7-point scales. Four of the events were criminal victimizations (assaults, robberies, burglaries, and rape), and two of these events were non-criminal victimizations (car accidents and suffering from a physical injury by other kinds of accidents).

The students were asked a number of questions that were meant to assess whether their parents had a rather traditional or a rather non-traditional marital relationship. First, they had to indicate whether it was their father or their mother who usually had the last word on important decisions (on a 7-point scale ranging from ''always my father'' to ''always my mother''). Of all respondents, 67.9% indicated that neither their father nor their mother was more influential with regard to important decisions, but chose a value of 4 at the 7-point scale. A total of 17.6% said that their father was more influential (values from 1 to 3), whereas 14.5% perceived their mother to be more important with regard to important decisions (values from 5 to 7). Second, the respondents were asked which parent usually did housework such as ''cooking'', ''washing clothes'', or ''house cleaning'' (answers on a 7-point scale ranging from ''always my father'' to ''always my mother''). It turned out that most of housework was done by their mothers; 88.5% of all respondents indicated that house cleaning was mainly done by their mother (ranges from 5 to 7), washing clothes was mainly their mothers' task in 92.2%, and cooking in 68.0% of all cases. These three indicators of household labour division could be summarized to one single scale (Cronbach's alpha = 0.62). For further analyses, participants were on the basis of this scale trichotomized in families with a traditional, mixed, or a non-traditional labour division.

In addition, the students were asked whether their parents were divorced and, if so, whether they were living with their mother or their father and whether they were living alone with that parent or with the mother's or father's new partner. Of the participants, 8.7% ($n = 53$) had experienced a divorce of their parents. Of those students, 63.5% ($n = 33$) were living alone with their mother. Finally, to assess the extent to which respondents followed traditional sex roles with regard to fearfulness and anxiety, participants were asked to indicate their adherence to the following statement on a 7-point scale (1 = totally disagree; 7 = totally agree): "boys must be less fearful than girls".

The questionnaire for the parents mainly aimed at obtaining information about the fathers' and mothers' educational and occupational status. Both parents were asked which level of formal education they had achieved (ranging from "only elementary school" to "university degree"). Additionally, a number of indicators were used to measure the occupational status of both mothers and fathers. First, they were asked if they were working outside the home and, if so, how many hours per week they were working. Furthermore, in an open question respondents were asked to indicate their profession. The answers to this question were then classified into four different categories with low values indicating a rather low occupational status and high values indicating a rather high occupational status. Finally, parents were asked whether they had any leadership function at their workplace. Mothers and fathers did not differ in their educational status ($M = 4.2$ for men and 4.0 for women on a 8-point scale; $t = 1.6$, $p = 11$). The average working time outside the home per week for men was 42.0 hours, whereas it was only 17.0 hours per week for women ($t = 20.6$, $p < 0.01$). Of all men, 76.1% were working full-time (i.e., more than 37 hours per week), but only 7.6% of all women. Differences in occupational prestige were highly significant, but not very strong ($M = 2.1$ for men and 1.6 for women, respectively; $t = 5.5$, $p < 0.01$). In addition, men were more often indicated to have a leadership function than women (55.1% versus 22.3%).

The different indicators for fathers' and mothers' educational and occupational status were summarized into single variables by subtracting the mothers' value from the fathers' values. To create a measure for the traditionality of the gender roles in the family, these variables were classified into three different categories indicating whether the value of the father on the indicator was higher, lower, or equal in comparison with that of the mother. As it was not possible to integrate the different indicators of status into one scale (Cronbach's alpha turned out to be only 0.45), all indicators were used separately. As only very few mothers worked more hours per week outside the home than fathers (7.9%), values indicating a higher or an equal value of mothers were included in a single category: fathers were working more than mothers in 80.4% of all cases while mothers were working a higher or an equal amount of hours per week than fathers in 19.6% of all cases. Similarly, as only very few mothers had a leadership function while their partner had not (5.6%), mothers having a higher or an equal status as fathers were comprised into one category. Fathers had a higher status on

that dimension than mothers in 50.3% of all cases while status of mothers were higher or equal to that of fathers in 49.7% of all cases.

Results

Sex differences in fear, perceived harmfulness, and perceived probability

Fear of events. The first question to be answered was whether female adolescents in the present sample were actually more fearful than male adolescents and whether or not these differences would be restricted to criminal victimizations or would also be observed for non-criminal victimizations. Table I shows that females were consistently more fearful than males for all events. This was not only true for assaults, robberies, burglaries, or, as was to be expected, for rape, but also for car accidents and other kinds of physical injuries (all $p < 0.01$). All fears were highly correlated with each other and could thus be summarized into one single scale hereafter called "general fearfulness" (Cronbach's alpha = 0.84 for females and 0.81 for males, respectively). This scale included the fear of assaults, robberies, burglaries, car accidents, and other kinds of physical injuries. Fear of rape was deliberately excluded, as this fear is quite naturally much higher for females than for males, although fear of rape was highly correlated with general fearfulness for both females and males ($r = 0.74$ for females and 0.59 for males, $p < 0.01$). As can be seen from the bottom row of Table I, female respondents scored much higher on this scale than male respondents did. Cohen's d of this difference was 1.1, an effect size that is classified as *large* (Cohen, 1988).

Perceived harmfulness of events. Next, it was examined whether a similar effect could be observed with regard to the perceived harmfulness of the different negative events. As Table II shows, this was indeed the case. Each single event was judged to be more harmful by females than it was by males (all $p < 0.01$). As with regard to fearfulness, all judgements about the harmfulness

Table I. Males' and females' fear of negative events (mean values on a 7-point scale).

	Males			Females				
Event	*M*	SD	Corrected item total correlation	*M*	SD	Corrected item total correlation	*t*-values	Cohen's *d*
Assault	3.3	1.8	0.58	5.1	1.7	0.63	−13.85**	1.03
Robbery	3.1	1.7	0.62	4.4	1.7	0.75	−9.22**	0.76
Burglary	2.9	1.6	0.52	4.2	1.8	0.56	−9.53**	0.77
Car accident	2.7	1.6	0.58	4.0	1.7	0.65	−9.63**	0.79
Getting physically injured	2.5	1.6	0.43	3.6	1.6	0.53	−8.84**	0.69
Rape	2.4	2.0	0.59	5.1	1.9	0.74	−17.23**	1.39
Scale fear of negative events	2.9	1.3		4.3	1.3		−9.21**	1.08

Note: **$p < 0.01$ (two-tailed).

Table II. Males' and females' perceived harmfulness of negative events (mean values on a 7-point scale).

	Males			Females				
Event	*M*	SD	Corrected item total correlation	*M*	SD	Corrected item total correlation	*t*-values	Cohen's *d*
Assault	4.2	1.6	0.62	5.4	1.2	0.57	−10.76**	0.87
Robbery	4.0	1.5	0.65	4.7	1.3	0.68	−6.33**	0.50
Burglary	3.9	1.5	0.54	4.3	1.3	0.50	−3.89**	0.29
Car accident	4.9	1.6	0.62	5.7	1.1	0.50	−7.04**	0.60
Getting physically injured	4.1	1.7	0.51	4.9	1.4	0.48	−6.32**	0.52
Rape	5.6	1.8	0.58	6.6	0.7	0.44	−9.46**	0.89
Scale fear of negative events	4.2	1.2		5.0	0.9		−9.11**	0.77

Note: **$p < 0.01$ (two-tailed).

of the different events were highly correlated with each other and were thus integrated into one single scale (Cronbach's alpha = 0.80 for males and 0.77 for females; rape not included). Whereas the average score for females was 5.0 on this scale, the average score for males was 4.2 ($t = 9.1$, $p < 0.01$) resulting in a value of 0.78 for Cohen's *d*. Thus, as was the case with regard to fearfulness, female respondents consistently judged both criminal and non-criminal victimizing events as more harmful than male respondents.

Perceived probability of events. A very similar picture emerged concerning the perceived probability of the different negative events. As Table III illustrates, female respondents' subjective probability to experience the respective negative events in the future was consistently higher than males' respondents'. Again, this was true for criminal as well as for non-criminal victimizations (all $p < 0.01$). Similar to the fearfulness and the perceived harmfulness of the different events, all probability judgements were highly correlated with each other (Cronbach's alpha = 0.78 for males and 0.83 for females; rape not included). The average of the resulting scale was significantly lower for men than for women ($M = 2.7$ for men and 3.3 for women, respectively; $t = -7.2$, $p < 0.01$). Cohen's *d* reached a value of 0.70.

Thus, a very consistent pattern emerged. Compared to male respondents, female respondents were more fearful of every single event, judged every single event to be more harmful and consistently rated their own probability to experience these events in the future higher. Apparently, women are more concerned about the possibility that all kinds of violent events that might happen to them. The fact women perceive a higher likelihood of experiencing all criminal events than men do, while in fact most of these events happen more to men, indicates fear of crime among women does not represent a real higher risk of being victimized, as was suggested by Stanko (1990) or Chan and Rigakos (2002). Moreover, these results suggest that gender differences in fear of crime are also found for events that cannot be linked to the

Table III. Males' and females' perceived probability of experiencing negative events in the future (mean values on a 7-point scale).

	Males			Females				
Event	*M*	SD	Corrected item total correlation	*M*	SD	Corrected item total correlation	*t*-values	Cohen's *d*
Assault	2.6	1.3	0.58	3.2	1.3	0.63	−6.56**	0.46
Robbery	2.5	1.3	0.62	3.2	1.2	0.75	−6.87**	0.56
Burglary	2.4	1.4	0.52	3.1	1.3	0.56	−5.85**	0.52
Car accident	2.9	1.5	0.58	3.4	1.3	0.65	−4.32**	0.36
Getting physically injured	3.3	1.7	0.43	3.8	1.5	0.53	−4.04**	0.31
Rape	1.6	1.1	0.45	3.2	1.4	0.64	−15.93**	1.29
Scale fear of negative events	2.7	1.0		3.3	1.0		−7.15**	0.60

Note: **$p < 0.01$ (two-tailed).

risk of rape. Finally, the fear of crime does not seem an isolated phenomenon: women seem in general more fearful of all kinds of events that might imply a physical injury.

Traditionality in the family as a predictor of gender differences in fearfulness

We will now consider to what extent gender differences in fearfulness can be explained from traditionality in the family as manifest from differences in the parental status between the father and the mother. Four different ANOVAs were run using the different indicators of status as well as the gender of adolescents as independent variables and general fearfulness as the dependent variable. According to power control theory, an interaction effect between the two independent variables would be expected: gender differences in general fearfulness should be higher in traditional families (i.e., in those families where the status of the father on a given dimension is higher than that of the mother) than in non-traditional families (i.e., in those families were the status of the mother on a given dimension equals that of the father or is even higher). This appeared not to be the case with regard to any of the indicators of traditionality (the results of these analyses are summarized in Table IV). In all analyses, a strong and highly significant main effect of gender occurred, whereas none of the main effects of the indicators of traditionality was significant. More importantly, no significant interaction effect of gender with any of the indicators of traditionality occurred (all $F < 1$).

One could argue that more important than these objective indicators of mothers' and fathers' status might be the way in which the relative dominance of their parents is perceived and experienced by their children. However, as can be seen from the last two rows from Table IV, no interaction effects between these indicators and gender occurred. The degree to which high school students described their parents' behaviour as traditional, balanced or non-traditional did not influence the differences between male and female adolescents' general fearfulness.

Table IV. Analyses of variance predicting general fearfulness by gender of students and indicators of fathers' and mothers' relative status.

	F-values		
	Gender of students	Indicator of fathers' versus mothers' dominance	Interaction effect
Educational status	119.32**	2.71	0.03
Occupational prestige	109.21**	0.23	0.29
Working hours per week	203.85**	0.17	0.25
Leadership function	154.53**	1.97	0.32
Division of housework	146.64**	1.08	0.01
Domination of important decisions	106.49**	2.44	0.95

Note: $^{**}p < 0.01$.

As a last measure of a traditional versus a non-traditional socialization environment the influence of parents' divorce on the participants' fearfulness was investigated. To do this, high school students were classified into two different categories: (1) those living with both their parents and (2) those living alone with their mother. Students who either lived with their father or with their mother and her new partner were excluded from the further analysis. An ANOVA was run using the gender of students and their living situations (either with both parents or alone with their mother) as independent and general fearfulness as the dependent variable. This analysis revealed a highly significant main effect for gender: $F(1,582) = 45.74$, $p < 0.01$, while the main effect for living situation (i.e., whether students were living with both parents or alone with their mother) was not significant: $F(1,582) = 0.94$, $p = 0.33$. Neither was the interaction effect of both independent variables: $F(1,582) = 1.52$, $p = 0.22$.

To summarize, using a variety of measures, no evidence whatsoever was found that gender differences in general fearfulness were influenced by the degree to which students were living in traditional or non-traditional families. This was true for objective indicators of parents' educational or occupational status, for the degree to which parents shared the burden of doing the housework, and for the degree to which the father or the mother dominated important decisions. In addition, whether students were living together with both parents or alone with their mother did not accentuate gender differences in general fearfulness.

The influence of traditional beliefs about sex differences

Possibly, female and male adolescents are influenced in their fearfulness by their peer environment that might discourage males to be fearful but tolerate anxiety for females. To test this hypothesis, participants were asked to indicate their agreement with the following statement: "boys must be less fearful than girls". Indeed, it turned out that male adolescents adhered to such a

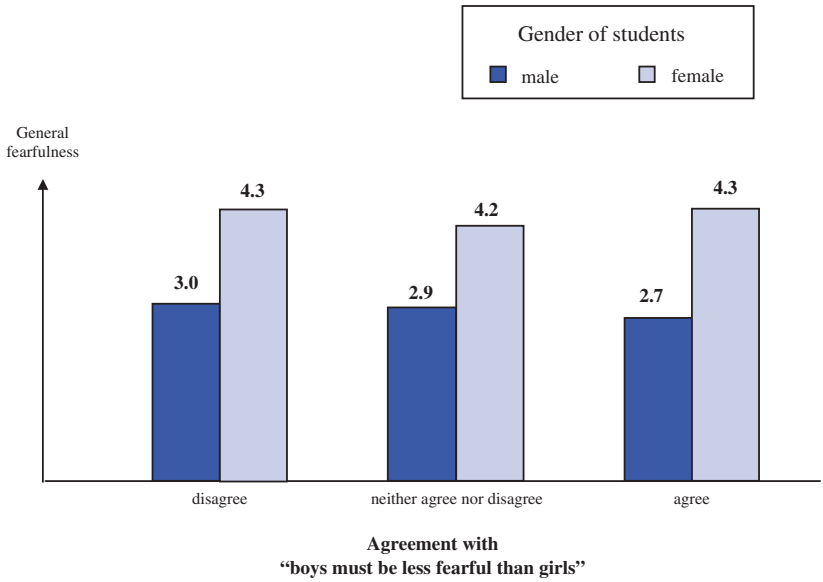


Figure 1. Influence of students' gender and adherence to traditional sex roles ("boys must be less fearful than girls") on general fearfulness.

stereotypical saying significantly more than did female adolescents ($M = 4.0$, $SD = 2.0$ for males; $M = 3.3$, $SD = 2.0$ for females; $t = 4.4$, $p < 0.01$). However, neither for males nor for females the agreement with this statement was related to their own fearfulness ($r = -0.07$ for males and $r = -0.04$ for females, respectively; $p > 0.10$). To further test whether gender differences in fearfulness are influenced by such stereotypical beliefs, this variable was first trichotomized into those who explicitly not agreed (values of 1 or 2 on the 7-point scale), those who did neither agree or disagree (values of 3 to 5), and those who explicitly agreed (values 6 to 7) that "boys must be less fearful than girls". Then this trichotomized variable and the participants' gender were used as independent variables in an ANOVA with general fearfulness as the dependent variable.

The main results from this analysis can be seen in Figure 1. The only significant determinant of general fearfulness was the participants' gender, $F(1,605) = 151.42$; $p < 0.01$. This main effect for gender was neither qualified by a main effect of adherence to stereotypes, $F(2,605) = 0.39$; $p = 0.36$, nor by an interaction effect of gender and stereotypes, $F(2,604) = 0.69$; $p = 0.74$. Thus, male participants who explicitly stated that they should be "allowed" to be as fearful as females indicated no higher level of fearfulness than did those male adolescents who adhered to stereotypical sex roles with regard to fearfulness. Correspondingly, female participants who contradicted stereotypical expectations of male and female anxiety were indeed as fearful as those female participants who indicated that they are supposed to be more fearful than boys.

Discussion

The goal of the present study was to test the plausibility of an evolutionary perspective to explain why women are more fearful of crime, despite the fact that they have a lower chance of being victimized. Furthermore, we aimed to compare the plausibility of such an explanation with a number of other explanations that have been offered for that fear–victimization paradox. Before discussing our results in a broader perspective, it might be worthwhile to discuss some methodological issues of our research.

First, although our results were extremely consistent, one could argue that we have only investigated the fear of four criminal victimizations and two non-criminal victimizations. For that reason it would definitely be worthwhile to replicate our findings by asking participants about their fearfulness according to a larger set of negative events and victimizations and to investigate whether the results would be similar to ours. However, given the consistency of our findings, we would not expect that the results with regards to other criminal and non-criminal victimizations would be substantially different.

Second, our results might appear somewhat limited in scope because we only investigated high-school students. Therefore, it would surely be reasonable to replicate our findings with a larger, representative sample of the general population.

As another point of critique, one reviewer of the present study pointed to the fact that people might not be aware of that males run a higher risk than females to be victimized by the events about which they had to indicate their fearfulness. This might very well be true and thus, one could not talk of a fear–victimization paradox if females were of equal fearfulness than males and if females and males would not differ in their estimates about their own chance of being victimized. Yet, what needs to be explained is the facts that females are victimized less often yet are more fearful than men.

The main findings of our studies showed that, with respect to a variety of events that involved physical injury, female respondents were more fearful of every event, judged every single event to be more harmful, and consistently rated their own probability to experience these events in the future as higher as male respondents. All these differences were highly significant with regard to both criminal and non-criminal events, even though victimization rates for both kinds of events are consistently higher for men than for women (Elander, West & French, 1993; US Department of Justice, 2002). For example, Kingma (1994) analysed the gender distribution of 246,277 trauma patients who had been treated at the University Hospital in Groningen, a city close to the town where the present study was conducted. Kingma found that in the age group of 10–19 year old patients, male patients outnumbered female patients in all categories. For example, 66.4% of all victims of traffic accidents and 81.0% of all victims of violence were male. Thus, the empirical results of the present study were very much in line with the evolutionary explanation of the fear–victimization paradox that was outlined in the introduction.

At the same time, the present findings question a number of explanations for that paradox that have been given in the literature. First, our research questions the vulnerability explanation, stating that women are more fearful of crime as they feel physically weaker and therefore more vulnerable. Because the gender difference in fear is also found with respect to events for which physical strength does not play a role, such as car accidents and other forms of physical injury, it seems unlikely that gender differences in fear of crime result from the fact that women feel physically less strong than men, and feel therefore more vulnerable (e.g., Hale, 1996; Warr, 1984). Particularly, the results with regard to non-criminal victimizations contradict this notion.

Second, the present findings do not at all support the interpretation that the higher fear of crime among women results from a realistic assessment that they are at higher risk to be the victim of specific crimes, and that the degree of victimization of women is generally underestimated (Stanko, 1990). Women were more afraid of all events, and perceived the likelihood of all events as higher, while at the same time their objective likelihood for all events except rape is lower. Even if women actually are more often the victim of assaults, robberies, or rape than they report to the police or indicate in victim surveys, there are no reasons to assume that prevalence rates with regards to car accidents or other physical injuries are biased in that they systematically underreport cases where the victims are female. However, our findings show that females were more fearful of these events as well, perceived them to be more harmful, and estimated their own chance of experiencing these events as higher than males (although they are objectively lower).

Little support was also found for a third explanation for gender differences in fear of crime, that is, women are more fearful of crime than men because they have to face a reason for fear that hardly plays a role for men: the fear of being raped. This would explain why women are also more fearful of criminal events like assaults, robberies, or burglaries, as these crimes are at least potentially connected with sexual violence. However, this approach cannot explain why we found the same pattern of results for non-criminal victimizations. May (2001) has recently shown that women's fear of being raped is a good predictor of their fear for other criminal events and has regarded this finding as a proof that women are more fearful of criminal victimizations because they are fearful of rape. In the present sample, this finding could be replicated. Females' fear of being raped was highly correlated with their general fearfulness ($r = 0.74$, $p < 0.01$). However, this scale comprised the fear of criminal as well as non-criminal victimizations. In fact, females' fear of rape was also closely related to the fear of non-criminal victimizations ($r = 0.59$ for car accidents and 0.40 for other physical injuries, respectively, $p < 0.01$). Furthermore, males' fear of being raped was also closely related to their general fearfulness ($r = 0.56$, $p < 0.01$). These results suggest that females' and males' fear of sexual violence is just one indicator of their overall level of fearfulness. Indeed, the results of the present study cast

some doubt on whether or not fear of crime is a reasonable construct at all, and suggests that it should be incorporated into a more general concept of fear.

The present findings also do not support the interpretation that gender differences in fear of crime result from socialization in traditional gender roles, as supposed by power control theory. This theory assumes that males are educated to be fearless and risk taking whereas females are educated to be fearful and risk avoiding, and can explain the similarity between criminal and potential non-criminal victimizations. However, the present study revealed no evidence whatsoever that gender differences in fearfulness are caused or influenced by the socialization environment of male and female adolescents. Gender differences in fearfulness were independent of whether fathers or mothers had a higher educational or occupational status, whether fathers or mothers were mainly doing the housework or who of them had the final word with regard to important decisions. Irrespective of these indicators, female adolescents were consistently more fearful than male adolescents. This was also true when adolescents' parents had been divorced and they were living together alone with their mother although these results have to be interpreted with some caution as only 33 adolescents were living in such conditions.

A very similar picture emerged with regard to males' and females' adherence to gender stereotypes about fearfulness. While males more often than females agreed that "boys must be less fearful than girls", gender differences in fearfulness were not influenced by the adherence to this statement. Of course, when interpreting this finding, one should be aware of that gender role stereotypes were measured only with a single item. Nevertheless, the present findings strongly indicate that gender differences in fear of crime are a robust phenomenon that seem to reflect a tendency of males to be less fearful than women that is rather independent of men's and women's socialization.

Often the discussion on gender differences in fear of crime implies a notion that females' fearfulness is rather irrational given that their victimization rates are so much lower than that of males. However, one could also argue the other way round: Why are, especially young, males blind to how dangerous their behavior is given the fact that they are victimized much more often than females? It is not possible to tell whether a 3 or a 5 on a 7-point scale is the adequate answer if respondents are asked to indicate their fearfulness of becoming the victim of a robbery. However, it is rather safe to assume that it is dangerous to drive above the speed limit or under the influence of alcohol, which is done much more often by men than by women (Elander et al., 1993). Thus, the finding that females are more fearful than males does not imply that they are irrational in being so. Instead, one could argue that males are the ones who are irrational by being not much more fearful than they are.

Although the present results seem in line with an evolutionary explanation, we do not want to suggest that culture and environment are not important factors for the explanation of gender differences in fear of crime. For example, gender differences in fear of crime seem to decline

over time. In one of the very few longitudinal studies on fear of crime, Schwind, Fetchenhauer, Ahlborn, and Weiß (2001) investigated large random samples of the inhabitants of Bochum (an industrial city in the western part of Germany) at three measurement points (in 1975, 1986, and 1998). Whereas the percentage of extremely fearful men was rather stable at all three measurement points (8.0%, 7.3%, and 8.8%, respectively), the percentage of extremely fearful women steadily declined from 36.8% in 1975 to 30.0% in 1986 and 24.2% in 1998 (for similar results see Hayney, 1998). One explanation for this finding might be that due to women's struggle for emancipation and equality, gender roles have changed in general and differences in the education of boys and girls have been decreasing during the last decades.

However, it does not seem very likely that gender differences in fear of crime will ever totally disappear. Note that the differences in the present study among adolescents were not only very consistent but also rather substantial: females' general fearfulness was more than one standard deviation higher than that of males. When interpreting these results, one should also consider some prevailing attributes of the Dutch society from which the present sample was drawn. According to the United Nations (United Nations, 2001), the Netherlands rank worldwide seventh on the so-called female empowerment index. For example, more than 30% of all members of the Dutch parliament are female (in contrast to less than 15% in the United States and in the United Kingdom). Thus, even in one of the world's most emancipated countries, female adolescents seem to be much more fearful than men. Consequently, evolutionary explanations for such gender differences should be incorporated into future theorizing about gender differences in fear of crime. To conclude then, we would like to argue that the present findings suggest that gender differences in fear of all kinds of events that involve physical injury may be the result of sexual selection that favoured risk-taking and status fights among males, and being cautious and protecting one's offspring among females.

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