Are Women of All Age Groups Equally Affected by the Shadow of Sexual Assault? Evidence from Germany.

Helmut Hirtenlehner: Johannes Kepler University Linz, Austria, helmut.hirtenlehner@jku.at

Stephen Farrall: University of Nottingham, U.K., stephen.farrall@nottingham.ac.uk

Eva Groß: University of Applied Sciences in the Academy of the Police Hamburg, Germany, eva.gross@poladium.de

Correspondence to:
Prof. Dr. Helmut Hirtenlehner
Johannes Kepler University Linz
Centre for Criminology
Altenberger Strasse 69
A – 4040 Linz
Austria
Tel. +43 732 2468 7446
helmut.hirtenlehner@jku.at

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ABSTRACT

Ample evidence suggests that women are more fearful of crime than men. The 'shadow of sexual assault hypothesis' offers a possible explanation for this gender gap: in patriarchal societies females are more afraid of sexual violence, which, in turn, drives their fear of other types of criminal victimization. Although the shadow hypothesis has received some empirical support, knowledge on the role of age in this context has remained scant. Therefore, the present study examines whether fear of sexual assault translates into fear of other offenses in all age segments of the female population, and whether the magnitude of this shadow effect varies with age. Statistical analyses are based on a large-scale random sample of women living in Germany. The findings suggest that although the proportion of women who are fearful of sexual assault declines with age, a shadow effect of this fear can be observed in all age groups. The 'radiation effect' of fear of sexual violence on fear of other crimes increases slightly with age. We interpret this interaction as result of older women's heightened vulnerability to many sorts of harm.

Key words: fear of crime – shadow of sexual assault – perceptually contemporaneous offenses – age

INTRODUCTION

Fear of crime is a widely investigated issue (Boers, 2003; Farrall et al., 2009; Hale, 1996; Warr, 2000). One of the key findings of research on crime-related fears is the predictive power of an individual's gender (Hale, 1996). Numerous studies reveal that women – despite lower rates of victimization – report higher levels of fear of crime than men (Choi et al., 2020; Dobbs et al., 2009; Ferraro, 1995; Hirtenlehner and Farrall, 2014; Mellgren and Ivert, 2019; Warr, 1984). The gendered fear differential seems to be particularly large for sexual offenses (Cook and Fox, 2012; Choi and Merlo, 2021; Ferraro, 1996; Fisher and Sloan, 2003; Lane and Fox, 2013; Lane and Meeker, 2003; May, 2001; Özascilar, 2013; Pettit et al., 2017; Riggs and Cook, 2015).

The reasons for this gender divide in fear of crime are less clear, however. Different explanations can be found in the literature. The gender gap has been traced to women's greater physical vulnerability compared to men (Killias and Clerici, 2000; Jackson, 2009) or females' greater general anxiety (Chadee et al., 2009; Vitelli and Endler, 1993). Some scholars have argued that women are more likely to be victims of intimate partner violence or other infringements perpetrated in close relationships and that these victimizations have a particular negative impact on their general feeling of safety (Broll, 2014; Madriz, 1997). Impression management and social desirability bias may also be involved: men have been found to downplay their fear of crime in interviews because being afraid of victimization is not compatible with traditional conceptualizations of masculinity (Goodey, 1997; Sutton and Farrall, 2005). It has also been proposed that women are more fearful than men because they anticipate more serious consequences of crime and thus judge potential victimizations as more serious (Warr, 1984, 1985).

One prominent approach to explaining sex differences in fear of crime focuses on the implications of fear of sexual violence. The so-called 'shadow of sexual assault hypothesis' suggests that women's elevated fear of crime is due to a fear of sexual violence which has 'radiation effects' on many other crimes (Ferraro, 1995, 1996; Warr, 1985).[1] "The shadow hypothesis posits that women may be more afraid of crime than men because they fear sexual assault as a contemporaneous offense – an offense that (…) may lead to, arise from, or be associated with other offenses" (Riggs and Cook, 2015: 2385). The underlying logic is that when criminal incidents involve face-to-face contact between victims and offenders, women worry that they might also be sexually assaulted, and this worry 'overshadows' their fear of

[1] The terms "sexual assault" and "sexual violence" are used synonymously in this work. Here they both refer to any sort of unwanted sexual violence.

other crimes (Özascilar, 2013). It follows that many offenses – especially those that entail personal contact with the perpetrator – appear more severe and dangerous for females, and this perception may result in heightened fear of crime. In brief: the mental presence of sexual assault as a perceptually contemporaneous offense accounts for women's increased anxiety about crime (Warr, 1985).

The relationship between age and fear of crime is more complex. Here the evidence is rather heterogeneous. The traditional picture is that "as people grow older they become more fearful" (Hale 1996: 100). This pattern usually emerges in population surveys that draw on global measures of fear of crime, such as feelings of unsafety in one's neighborhood (Boers, 2003; Fattah and Sacco, 1989). When offense-specific measures are employed, the age effect sometimes disappears (Ferraro and LaGrange, 1992; Greve, 1998; LaGrange and Ferraro, 1989). Other inquiries show a U-shaped relationship, with younger and older respondents reporting higher fear than middle-aged participants do (Boers, 2003; Ferraro, 1995; Hummelsheim et al., 2011; Koeber and Oberwittler, 2019). There is also evidence of an interaction of age and sex: while fear of crime increases with age among men, it exhibits a curvilinear or even inverse relationship with age among women (Boers, 2003; Brunton-Smith and Sturgis, 2011; Ferraro, 1995; Greve et al., 2018; Koeber and Oberwittler, 2019).

The present article pursues two goals: it tests the applicability of the 'shadow of sexual assault hypothesis' among women in Germany and specifically addresses the age component of the 'shadow effect'. This is the first study to examine the shadow hypothesis in Germany, a comparatively strong (conservative) welfare state with slightly lower than average levels of economic inequality and fear of crime (Hummelsheim et al., 2011). Particular attention is paid to the significance of women's age for the size of the effect of fear of sexual assault on fear of other crimes, which represents another novel contribution to the literature. Although the shadow hypothesis has received empirical support (Bailey, 2021; Choi et al., 2020; Cook and Fox, 2012; Dobbs et al., 2009; Doude and Cook, 2021; Ferraro, 1996; Fisher and Sloan, 2003; Hilinski, 2009; Hilinski et al., 2011; Hirtenlehner and Farrall, 2014; Jacobsen, 2021; Lane et al., 2009; Lane and Fox, 2013; Lane and Meeker, 2003; May, 2001; Mellgren and Ivert, 2019; Özascilar, 2013; Petitt et al., 2017; Riggs and Cook, 2015; Wilcox et al., 2006) – with most of the relevant studies based on North American convenience samples of college or university students –, little is known about the role of age in this context.[2] This shortcoming may arise from the fact that age is largely invariant in samples of undergraduates with a limited age range. Therefore, based on a large population sample of females from Germany, we investigate

[2] Of the 20 studies referred to immediately above, 13 were based on university or college students (Bailey, 2021; Cook and Fox, 2012; Dobbs et al., 2009; Doude and Cook, 2021; Fisher and Sloan, 2003; Hilinski, 2009; Hilinski et al., 2011; Jacobsen, 2021; Lane et al., 2009; Mellgren and Ivert, 2019; Özascilar, 2013; Petitt et al., 2017 and Riggs and Cook, 2015). Additionally, May's (2001) survey applied to high school students.

whether (and, if so, how) the magnitude of the 'shadow effect' of sexual violence varies across age.

THE 'SHADOW EFFECT' HYPOTHESIS

Warr (1985) first formulated the notion that there are certain offenses that may be mentally associated with other types of criminal victimization. His concept of 'perceptually contemporaneous offenses' implies that people think that some offenses may occur together during the same crime event, simply because one leads to or escalates into the other. Building on this insight, Ferraro (1995, 1996) put forward the 'shadow of sexual assault hypothesis', according to which sexual assault represents the most significant perceptually contemporaneous offense for females. "Rape may operate like a 'master offense' among women, especially younger women who have the highest rate of rape, heightening fear reactions to other forms of crime" (Ferraro, 1995: 87). This line of argument can be traced to the influential writings of feminist criminologists on rape as a ubiquitous concern or core worry among women and the role of fear of sexual assault in the maintenance of gender stereotypes and the patriarchal order of society (Brownmiller, 1975; Gordon and Riger, 1989; Stanko, 1985). In response to fear of sexual violence, females organize their lives and their behavior in a way to minimize the risk of sexual victimization – an adjustment that facilitates the reproduction of gender roles that perpetuate women's subordination to men.

Empirical evidence backs the 'shadow of sexual assault hypothesis'. Numerous studies found that females' crime-related fears are underpinned by a deep-rooted worry that these crimes will culminate in sexual violence (Bailey, 2021; Choi et al., 2020; Cook and Fox, 2012; Dobbs et al., 2009; Doude and Cook, 2021; Ferraro, 1996; Fisher and Sloan, 2003; Hilinski, 2009; Hilinski et al., 2011; Hirtenlehner and Farrall, 2014; Jacobsen, 2021; Lane et al., 2009; Lane and Fox, 2013; Lane and Meeker, 2003; May, 2001; Mellgren and Ivert, 2019; Özascilar, 2013; Petitt et al., 2017; Riggs and Cook, 2015; Wilcox et al., 2006). Mellgren and Ivert (2019) demonstrate that both worry about sexual assault and worry about sexual harassment relate to fear of other offenses among Swedish university students.

Despite a persisting theoretical dominance of the 'shadow of sexual assault hypothesis', the empirical research community has also examined other 'shadow effects'. Some scholars have suggested that the 'radiation effect' of sexual assault may mask a broader 'shadow effect' of physical harm (Hirtenlehner and Farrall, 2014). Accordingly, several inquiries show that fear of physical violence in general underlies many crime-specific fears and is partially more important than fear of sexual assault in explaining fear of other types of victimization (Cook and Fox, 2012; Doude and Cook, 2021; Hirtenlehner and Farrall, 2014; Lane and Meeker, 2003).

Another study indicates that fear of murder predicts fear of other crimes (Riggs and Cook, 2015).

As noted above, empirical inquiry has tested various perceptually contemporaneous offenses as predictors of other crime-related fears. The observed support for all these propositions does not come as a surprise, given the intercorrelated and homogeneous nature of many crime-specific fears. The empirical literature provides ample evidence of strong positive associations between various offense-specific fears, resulting in a high internal consistency of composite measures of fear of crime (Choi and Merlo, 2021; Ferraro, 1995; Hirtenlehner, 2008; Jackson, 2005). When offense-specific fears are intercorrelated, it does not matter which one is employed as the independent variable in regression models predicting fear of other crimes: the selected predictor will always show an 'influence' on the other fears attempted to explain. Regardless of which type of fear of victimization is used as predictor, it will 'affect' the level of other offense-specific fears because the employed items all measure the same construct – namely fear of crime. Hence, the decision, which type of fear to use as 'cause' and which as 'effect', must be made on theoretical grounds. We think that the most convincing rationale has been devised for sexual assault as the pivotal factor 'overshadowing' women's fear of other offenses. While among males fear of physical harm in general may be the key driver of many crime-specific fears, females' fear of non-sexual types of victimization may be best explained by their worry about sexual violence.

OTHER INFLUENCING FACTORS

Many studies examining some sort of 'shadow effect' found evidence of fear-enhancing implications of the anticipated likelihood of future victimization (Ferraro, 1996; Hilinski, 2009; Lane and Fox, 2013; May, 2001; Özascilar, 2013; Petitt et al., 2017). The perceived risk of falling victim to a particular crime increases the fear of the same type of crime, net of the impact of worry about sexual (or physical) assault.

Socio-demographic models have focused on the role of gender and age in explaining worry about crime (Hale 1996). Aside from these attributes, other socio-demographic characteristics also emerged as significant predictors of an individual's level of fear of crime (Boers, 2003; Collins, 2016; Hale, 1996). Empirical research suggests a negative relationship between socio-economic status and crime-related fear. Economically disadvantaged people report higher fear. Members of ethnic minorities have been shown to be more fearful than the rest of the population. Higher fear levels have also been observed in urban areas, compared to rural regions.

From the outset, research on the causes of fear of crime has addressed the significance of personal experiences of criminal victimization. Meanwhile there is consensus that personal victimization is solely a weak predictor of an individual's level of crime-related fear, whose effect is furthermore partly mediated by cognitive risk anticipations (Boers, 2003; Hale, 1996; Warr, 2000).

A vulnerability perspective suggests that "individuals who understand themselves to be at greater physical disadvantage when facing a threat consequently report a higher fear of crime" (Yates and Ceccato, 2020: 279). Findings indicating greater fear among females and the elderly are in line with this proposition (see above). The few inquiries that utilize direct measures of people's perceived ability to defend themselves are only partially supportive (Hirtenlehner, 2008; Jackson, 2009, Killias and Clerici, 2000).

As our previous reflections have concentrated on the role of individual characteristics in explaining fear of crime, it must be explicitly added that people's fear of crime is a function of *who* they are (properties of the individual) and *where* they are (properties of the environment). Individual and spatial characteristics interact in shaping crime-related feelings of (un-)safety (Yates and Ceccato, 2020). An abundance of studies has established that contextual features – such as the built environment, the social and moral state of the community, the level of physical and social disorder in the neighborhood or the quality of transit settings – influence the level of fear of crime, with adverse environmental conditions provoking increased fear (Brunton-Smith and Sturgis, 2011; Ceccato et al., 2021; Farrall et al., 2009; Foster et al., 2010; Scarborough et al., 2010). Perceptions of disorder turned out to be particularly consequential (Boers, 2003).

GAPS IN THE RESEARCH LANDSCAPE ON THE 'SHADOW HYPOTHESIS' AND CONTRIBUTION OF THE PRESENT STUDY

There are a number of gaps and weaknesses within the existing literature on the 'shadow of sexual assault hypothesis', which we seek to overcome in this work. The most obvious (and indeed serious) deficiency is the reliance on university or college student samples, which limits the age range of the participants and essentially means that age is not available for analysis. A further shortcoming relates to the geographical location of the data collected, which tends to come mainly from one country (the USA), in which rates of crime, gun-ownership and imprisonment are far higher than they are in other Western countries (Van Dijk, 2008). To give a flavor of this imbalance, we demonstrate that it is easier to list the studies conducted *outside* of the USA. These are limited to Bailey (2021, data from Barbados), Choi et al. (2020, South Korea), Hirtenlehner and Farrall (2014, Scotland), Mellgren and Ivert (2019, Sweden) and

Özascilar (2013, also Sweden). Of these five studies, only two (Choi et al., 2020; Hirtenlehner and Farrall, 2014) do *not* use student samples. Although empirical inquiry tends to support the shadow hypothesis regardless of the location of data collection, it remains nevertheless important to a) conduct tests in other countries unlike those listed above, b) rely on non-student samples that cover a broad range of ages and c) extend the analyses to include age as a critical variable (since age has been identified as a key factor in explaining fear levels).

The study reported in this work tries to fill the gaps identified above. It was conducted outside of the USA and relies on a sample of women with a wide age range. The underlying survey draws on a large-scale population sample of females covering a diverse range of age groups and socio-economic backgrounds. All respondents are living in Germany. This country represents an interesting test case because it differs widely from the USA in terms of fear and crime.

Empirical evidence suggests that sexual assault is not a ubiquitous concern among women in Germany. Bilsky (1996) showed that German women are rarely afraid of rape and sexual harassment. More recently, Boers (2003) reported that 13% of the females living in large cities in Germany worry a lot about rape. According to the German Victimization Survey conducted in 2017, the proportion of women who are “very” or “fairly” worried about sexual harassment amounts to 22% (Birkel et al., 2019). In addition, all these works demonstrated lower levels of fear of sexual offenses among individuals aged 60 years and over.

In comparison to many Anglo-Saxon countries, Germany exhibits relatively low levels of sexual crime (Van Dijk, 2008). The German Police Crime Statistics 2016 discloses 30.1 reported incidents of rape per 100,000 population. According to the European Crime and Safety Survey 2005, 0.4% of the female German population declare having been a victim of sexual assault within the last year (Van Dijk et al., 2007). The victimization survey analyzed in this study reveals for women living in Northern Germany a one-year (2016) victimization rate of sexual assault amounting to 0.2%.

A novel substantive contribution to the literature results from our study’s focus on the significance of age in shaping the size of the ‘radiation effect’ of fear of sexual assault. Since most previous tests of the ‘shadow effect hypothesis’ relied on student samples with a truncated age range, they neglected the role of age in the formation of the ‘shadow effect’. However, age may be important in this context because it is closely intertwined with people’s physical vulnerability, i.e., their ability to ward off a potential assailant or recover from harm suffered (Hale 1996). The “shadow of powerlessness” identified by May (2001: 167) suggests that an individual’s defense capability has profound implications for his or her susceptibility to diverse crime-related fears.

With regard to the interplay of fear of sexual assault and age, the presence of different interaction dynamics can be inferred from the literature. There are good reasons to expect greater 'radiation effects' of fear of sexual violence among *older* women. In the course of their lives, older females are likely to have experienced more (sexual) victimizations than younger ones, resulting in a greater lifetime incidence of criminal victimization among older women. A greater general anxiety may increase older women's "sensitivity to the risk of harm" (Fattah and Sacco, 1989: 220), which may render them more susceptible to 'radiation effects' of imaginable sexual violence. In a similar vein, older females' heightened sense of their physical vulnerability (in terms of reduced coping and recovery abilities) may facilitate 'shadow effects' of sexual assault (Fattah and Sacco, 1989).

Alternative reflections suggest a greater impact of fear of sexual assault on worry about other crimes among *younger* women. Younger females have the greatest risk of being sexually assaulted (Walby and Allen, 2004). In line with their factually higher rates of victimization, young women consider themselves to be at greater risk and are also more fearful of sexual assault than older females (Boers, 2003; Ferraro, 1995; Warr, 1985). If they have been sexually victimized, such assaults are more likely to be relatively recent ones (given their age).

Finally, yet importantly, it is also conceivable that fear of sexual assault drives fear of other offenses in all age groups equally. In any case, to our knowledge the present study is the first to tackle the question as to whether the implications of female fear of sexual violence depend on a woman's age.

In the remainder of this article, we explore the ways in which age relates to the 'shadow effect' of sexual assault among females from Germany. In detail, we investigate

- whether the extent of women's fear of sexual assault varies across age groups,
- whether women's fear of sexual assault is associated with their fear of non-sexual criminal victimization,
- whether the association between fear of sexual assault and fear of other offenses is stronger for crimes that require a physical co-presence of perpetrator and victim (i.e., for violent crimes compared to property crimes),
- whether the relationship between fear of sexual assault and fear of other offenses can be found in all age segments of the female population, and
- whether the magnitude of the 'shadow effect' of sexual assault differs across age groups.

METHODS

Sample

The present study seeks to examine whether women's fear of sexual assault drives their fear of other crimes as well as whether and how this shadow effect of sexual violence varies with age. For this purpose, it uses data from a large-scale criminal victimization survey conducted in two German provinces. On behalf of the respective State Criminal Police Offices, a postal survey on victimization experiences, perceptions of risk and safety and satisfaction with the police was carried out in the provinces Lower Saxony and Schleswig-Holstein in 2017. The survey relied on simple random samples drawn from the regional population registers. 40,000 inhabitants aged 16 years and over were randomly selected in Lower Saxony, and 25,000 in Schleswig-Holstein. These 65,000 individuals received a questionnaire in March 2017, which was completed and returned by 29,684 people, making a response rate of 45.7% (Lower Saxony: 18,070 participants, response rate 45.2 %; Schleswig-Holstein: 11,614 participants, response rate 46.5 %). Slightly more than half (52.2%) of the respondents were females. These 15,483 women's data is used below. 12.9% of them were younger than 30 years. 48.3% were between 30 and 59 years old. 38.8% had an age of at least 60 years. 7% of the included females were born outside of Germany. 17% assess their current economic position as "bad".

Measures

Fear of crime: Fear of crime was measured in terms of the frequency of feeling fearful of specific named offenses. Respondents were asked "How often are you afraid of being beaten and injured / being robbed / someone breaking into your flat or house / someone stealing something from you / being sexually assaulted?", with "never", "seldom", "sometimes", "often" and "always" as response options. The last item is used in this work to determine the level of fear of sexual violence.

Perceived risk of victimization: To capture the perceived risk of becoming a victim of crime, another offense-specific Likert-type question battery was included in the survey. Respondents were asked to indicate how likely it is that they will personally become a victim of the specific offenses listed above during the next twelve months. For each type of crime, the anticipated

likelihood of victimization could be assessed with the response categories “very unlikely”, “rather unlikely”, “rather likely” and “very likely”.

Perceptions of physical disorder: The employed measure of perceived disorder in the neighborhood focuses on signs of physical disorder (trash and garbage on streets and sidewalks / graffiti on house walls / damaged letterboxes, destroyed bus shelters and the like). Three statements describing the presence of these phenomena in the respondent’s neighborhood were to be assessed on a four-point answer scale ranging from “do not agree at all” to “completely agree”. To obtain a composite measure of physical disorder, an additive index was constructed ($\alpha = .68$).

Neighborhood cohesion: The items used to tap into a respondent’s integration into her neighborhood draw on ties to and trust in other residents. Four statements were presented to the participants (e.g. “My neighbors and I visit each other at home.” or “When it comes down to it, I can rely on my neighbors.”). Each of them was accompanied by a four-point response scale with the endpoints “do not agree at all” and “completely agree”. As before, the answers were summed to form a total score ($\alpha = .82$).

Personal victimization: The individual victimization background was determined by the question “Have you personally been a victim of a criminal offense in the past year?”. The resulting dichotomous variable was coded 1 if the answer was “yes” and 0 if the answer was “no”. In sensitivity analyses, an item focusing explicitly on sexual victimization (“Have you been a victim of rape or sexual abuse in the year 2016?”) replaced the general victimization measure. This change did not alter the findings, which may be because only 0.2% of the female respondents answered this question in the affirmative.

Sociodemographic characteristics: The respondent’s age was measured in years. Education level, economic position, migration background, size of place of residence and province were included as control variables. Information on the individual’s highest educational attainment was condensed into three groups representing a low, medium or high level of education. Economic position was operationalized by the question “How do you assess your current personal economic situation?”. The associated six-point self-assessment scale ranged from “very bad” to “very good”. The presence of a migration background was inferred from the question “Were you born in Germany?”. A migration background was ascribed to those respondents who answered with “no”. The size of the participant’s place of residence was captured in five categories between “below 5,000 inhabitants” and “above 100,000 inhabitants”. Province was coded so that Lower Saxony was the reference group (1 = Schleswig-Holstein).

Table 1 gives descriptive statistics for all variables included in this study.

- insert Table 1 about here -

RESULTS

Fear of crime and age

We begin the statistical analysis with a look at the distribution of females' fear of various crimes across age. Figure 1 shows the mean level of five offense-specific fears in eight different age groups.

- insert Figure 1 about here -

It is immediately apparent that fear of sexual assault declines with age. Women's fear of sexual assault reaches its peak in their 20s. From then on, it decreases steadily. Elderly females exhibit the lowest fear of sexual violence.

Women's fear of other offenses follows a similar – although less pronounced – pattern. After their 20s, females' fear of crime exhibits a consistent decrease. In the case of robbery, this decline levels off in the 70s. In the case of burglary, the fear decline starts in the early 40s. The highest fear of break-in can be found among women in their 30s.

- insert Figure 2 about here -

The analysis does not corroborate the assumption that sexual assault is an ever-present concern among German females (Figure 2). Only 1% of the surveyed women report being 'always' afraid of sexual assault (plus 3% "frequently"). This accords with the observation that fear of sexual violence does not represent the most prevalent crime-related fear among women in Germany. As discernable from Figure 1, German females' fear portfolio is dominated by worries about property offenses.

The shadow effect of sexual assault among women of all ages

Prior research suggests that women's fear of sexual assault drives their fear of other crimes, especially their fear of offenses that involve face-to-face contact with the perpetrator (Mellgren and Ivert, 2019). To assess whether this is also the case for females in Germany, we estimate a series of crime-specific linear regression models that include fear of sexual assault and other established determinants of women's fear of non-sexual crime as predictors (Cohen et al.,

2003). To adjust the analyses for the slightly skewed distribution of the dependent variables, inferential statistical tests are based on robust standard errors.[3] Table 2 presents the results.

- insert Table 2 about here -

Fear of sexual assault and the offense-specific risk perception – i.e. the anticipated likelihood of falling victim to that particular offense – turn out to be most predictive of fear of crime among women in Germany. Both worry about sexual violence and perceived risk of the respective type of victimization are positively associated with anxieties about non-sexual crimes. This applies to all the employed measures of fear of crime.

Taken together, the results indicate that fear of sexual assault increases fear of many other offenses, but is more likely to influence fear of *violent* crime than fear of *property* crime. The computed models suggest that the 'shadow effects' of fear of sexual assault are larger for offenses with a greater potential for face-to-face contact between victim and perpetrator. Fear of physical assault and robbery appear to be more responsive to worries about sexual violence than fear of burglary and theft. Conversely, women's fear of property crime depends chiefly on their offense-specific risk appraisal. While fear of burglary and theft is best forecasted by females' perceived risk of that particular crime, fear of physical assault and robbery is best predicted by their worry about sexual violence.

Although other independent variables also significantly relate to women's crime-specific fears, none of them could obtain substantial explanatory power. Their beta coefficients lie without exception below the threshold of |.10|.

The shadow effect of sexual assault in different age groups

The results described above show that fear of sexual assault is associated with fear of other offenses. Fear of sexual assault is an important predictor of German females' crime-related fears, net of perceived victimization risk, neighborhood factors, victimization background and socio-demographic characteristics. Building on this insight, we next investigate whether the observed 'radiation effects' of fear of sexual assault vary across age. For this purpose, we split the sample by age into three subgroups: young (up to 29 years), middle-aged (30 to 59 years) and old (60 years and above) women. To determine the magnitude of the 'shadow effect' in these age groups, we fit subsample-specific linear regression models (with robust standard errors). Then, in order to assess whether these group-specific effects significantly differ in size,

[3] The skewness parameters range from 0.31 to 1.07. Due to the large sample size, Kolmogorov-Smirnov tests indicate significant deviations from the normality assumption for every fear measure. The fitted models are not burdened with multi-collinearity: all variance inflation factors are below 2.

we compare the obtained conditional regression weights of fear of sexual assault across groups, using the Z-test for the equality of regression coefficients proposed by Paternoster and colleagues (1998).[4] These analyses are conducted for all the employed measures of fear of crime separately.

Table 3 reports the pivotal results of the age-group-specific regression analyses. Therein, each row displays the effect of worry about sexual assault on one offense-specific fear measure (differentiated by age). Model 1 always represents a simple regression that includes only fear of sexual assault as independent variable. Model 2 always represents a multiple regression that incorporates additional independent variables. Here the predictors resemble the ones used in Table 2, minus age, of course. The complete results of these analyses can be obtained from the first author upon request.

- insert Table 3 about here -

The findings indicate that fear of sexual assault 'overshadows' women's fear of other offenses in all age groups. A greater fear of sexual assault is associated with a significantly greater fear of other crimes among young, middle-aged and older women, regardless of the type of crime studied. These analyses make it clear that the detrimental consequences of fear of sexual violence are not restricted to particular age segments of the female population.

It is also worth mentioning that females' offense-specific risk appraisal exerts significant explanatory power in all age groups. Perceived victimization risk is associated with higher fear of crime among young, middle-aged and old women, net of the effect of worry about sexual assault.

The interaction of age and fear of sexual assault

Although the hypothesized 'shadow effects' have been observed for women of all ages, their size varies discernably between the age groups. We can identify a pattern according to which fear of sexual assault is a better predictor among older females than it is among younger females. To assess the significance of the detected effect differences, Z-tests for the equality of regression coefficients are performed (Paternoster et al., 1998). Subject of the pairwise comparisons are the unstandardized regression slopes of fear of sexual assault from the

[4] When comparing the size of conditional regression slopes (of X_1 on Y) across two groups, a Z-test can be employed to assess whether the coefficient difference is significant. This test examines whether $b_{1A} = b_{1B}$. The Z-distributed test statistic is computed by dividing the difference of the regression coefficients by the square root of the sum of the squared standard errors (Paternoster et al., 1998: 862, formula 4). Significant effect differences (i.e. when $Z > 1.96$) indicate the presence of interaction.

conditional models including all the covariates (Model 2 in Table 3). Table 4 presents the results of the numerous coefficient comparisons.

- insert Table 4 about here -

The conducted Z-tests point towards larger 'shadow effects' among older women. For all four offense-specific fear measures, the oldest age group exhibits a significantly greater regression weight of fear of sexual assault than the youngest age group. In total, 9 out of 12 pairwise Z-tests indicate a significantly greater predictive power of fear of sexual assault among women of higher age. On balance, these findings lend credence to the notion that the 'radiation effect' of sexual violence increases with age – an interaction dynamic that is also seen when the linear regression models reported in Table 2 are expanded with a multiplicative term representing the interplay of fear of sexual assault and age. The detailed results of these models, which are based on the total sample, can be found in Table 5. Here we solely report the key findings. The corresponding product term coefficients achieve significance in any case. Their sign again suggests that the 'shadow effect' of fear of sexual assault rises when age increases. However, in absolute terms the strength of the interaction must be assessed as modest. Introducing the product terms into the regression equations adds only 0.2% to 0.5% explained variance.

- insert Table 5 about here -

CONCLUSIONS

The present study expands earlier research on the 'shadow of sexual assault hypothesis' (Ferraro, 1995, 1996; Warr, 1985) by focusing on the applicability of the thesis in Germany and the moderating role of age. It examines whether 'radiation effects' of fear of sexual assault can be observed among women of all age groups or, put differently, whether the impact of fear of sexual violence on fear of other crimes depends on females' age. The results of a large-scale postal survey conducted in Germany suggest that fear of sexual assault raises women's fear of other offenses in all age segments of the population, but also that the magnitude of the 'shadow effect' of fear of sexual violence slightly increases with age.

The obtained findings generally support the notion that fear of sexual assault intensifies females' fear of non-sexual crimes. Although fear of sexual assault is demonstrably rather uncommon among women in Germany, it nevertheless seriously affects their level of fear of other crimes. So, even in a country with relatively low levels of fear and victimization related to sexual violence, there is evidence that fear of crime is associated with the threat of sexual assault. The observation that fear of sexual violence enhances German females' fear of other

types of criminal victimization squares with the results of research conducted in the USA (e.g. Dobbs et al., 2009; Ferraro, 1996; Fisher and Sloan, 2003; Hilinski, 2009; Jacobsen, 2021; Lane and Fox, 2013; May, 2001; Wilcox et al., 2006). Together with the evidence in favor of pertinent 'shadow effects' provided in other countries (Hirtenlehner and Farrall, 2014; Mellgren and Ivert, 2019; Özascilar, 2013), our findings suggest that women's fear of non-sexual offenses is influenced by the worry about sexual assault in large parts of the Western world. This insight is consistent with the feminist critique of a patriarchal society in which females' role in society is hampered by wider discourses about male violence towards women (Brownmiller, 1975). One implication of this is that in order to further reduce the female fear of sexual violence, we must address the patriarchal nature of contemporary Western societies. On the individual level, our results imply that prevention measures that tackle women's fear of sexual assault will have positive (side) effects on their fear of other offenses and therewith their general sense of safety.

Fear of sexual assault significantly predicts fear of other crimes both among young, middle-aged and older females. However, there are also indications that its impact is slightly greater among older women, compared to younger ones, although the observed interaction of fear of sexual assault and age must not be overestimated in terms of size. Here, we can only speculate about the causes underlying this interaction dynamic. We conjecture that older women's heightened sense of physical vulnerability (Fattah and Sacco, 1989) renders them more prone to 'radiation effects' of concerns about sexual violence – even though their absolute level of crime-related fears is lower than that of younger females. Due to their reduced abilities to defend themselves and recover from harm, older individuals may be somewhat more inclined to *assume* that different crimes will co-occur, and this fact may explain their greater susceptibility to 'shadow effects' of sexual assault (Warr, 1984, 1985). The fact that "fears gradually become more abstract throughout the life course" (Pleysier and Cops, 2016: 17) may also contribute to greater 'radiation effects' of the threat of sexual violence among older females.

Women's fear of sexual assault casts its shadow over many sorts of criminal victimization, but seems to relate more closely to their anxieties about (non-sexual) violent crime, compared to worries about property crime. This may be grounded in the fact that violent offenses involve physical contact between victim and perpetrator, whereas property offenses may be committed in absence of the victim. It follows that the latter are much less likely to escalate into rape, which may render the corresponding fears less receptive to 'radiation effects' of concerns about sexual assault.

The overall pattern inherent in the data is that anxieties about (non-sexual) violent crime are closely associated with fear of sexual assault, while worries about property crime are more strongly correlated with offense-specific risk appraisals. Of course, perceived risk also affects

the extent of fear of violent offenses, but here fear of sexual assault represents the salient determining factor.

The particular strengths of the present study are a) the large sample size and b) the variation in the age of the participants. Nonetheless, there are also some methodological limitations that must be mentioned.

First, our analyses are based on cross-sectional data. Since information on fear of sexual and non-sexual offenses was collected at the same point in time, it is difficult to establish the causal ordering of the various anxieties. Here we relied on a well-established theory – the 'shadow of sexual assault hypothesis' (Ferraro, 1995, 1996) – to determine the independent and dependent variables in the calculated regression models. From our perspective, strong theorizing must guide the choice of predictor and response variables when a natural temporal order of the constructs is missing.

Crime-related fears were measured in terms of the frequency of their occurrence here (Gray et al., 2008). We think that frequency measures are beneficial for studying perceptually contemporaneous offenses, as the latter concept implies that 'shadow effects' unfold because people expect different crimes to co-occur (Warr, 1984, 1985). However, the 'indirect' approach to measuring fear of sexual assault as a perceptually contemporaneous offense may be criticized. The present study draws on isolated, independent, Likert-type measures of how often a person is usually afraid of various crimes (using vague quantifiers). We can only assume that fear of sexual assault becomes significant exactly when individuals are afraid of other (non-sexual) offenses. Whether this coincidence actually takes place, cannot be inferred from the available data (Hirtenlehner and Farrall, 2014).

It must also be borne in mind that the response rate for the survey was approximately 45%, leaving open questions about those who did not respond.

Several avenues for future research ensue from the described results and limitations. A replication of our study in other countries with a direct measurement of fear of sexual assault as a perceptually contemporaneous offense is certainly necessary. In order to establish the correct temporal ordering of the concepts, such a replication study should have a longitudinal format, not least against the background that all existing research on this issue relies on a cross-sectional design. A prospective cohort study would be ideal: our inquiry shows slightly greater implications of fear of sexual assault among older women. Whether this observation is due to a cohort or a life cycle effect cannot be deduced here. Only prospective cohort studies enable the separation of these types of effects. Future research will also be well-advised to include measures of females' general fearfulness, their relationship status and dating behavior as well as their personal vulnerability: especially with the latter, a big step towards an analysis of the roots of the interactive impact of fear of sexual assault and age could be taken.

A final remark addresses the increasingly prominent concept of intersectionality (Crenshaw, 1991). We have studied the significance of age for understanding the impact of fear of sexual assault on women's fear of other offenses. Although it considers fear of crime as a function of gender and age, our inquiry neglects the notion that (felt) insecurity may be highly intersectional. Further characteristics such as "socio-economic status", "ethnicity" and "sexual orientation" may interact with gender and age in determining an individual's level of fear. Because of its focus on the complex interplay of different aspects of a person's social identity, the concept of intersectionality could provide a fruitful framework for future research investigating women's fear of crime (Yates and Ceccato, 2020).

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Figure 1: Women's fear of various crimes differentiated by age

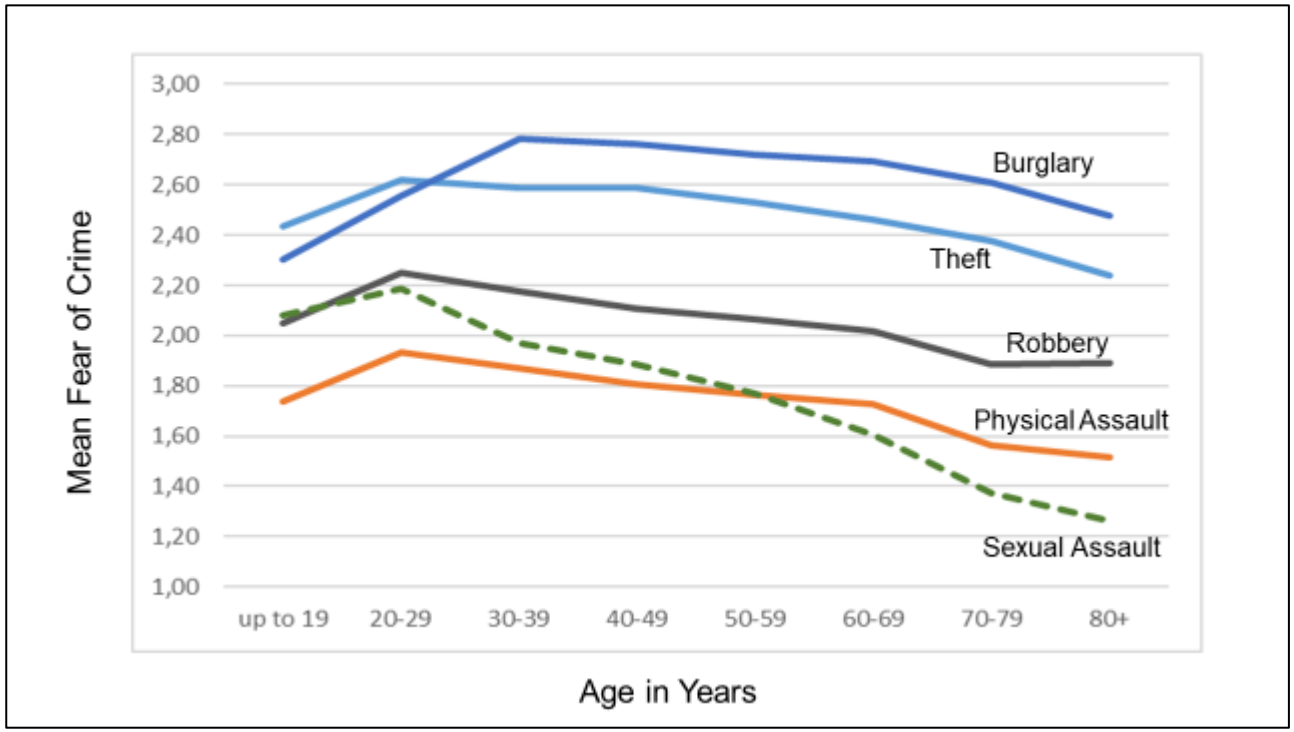

Figure 2: Women's fear of sexual assault (n = 15,004)

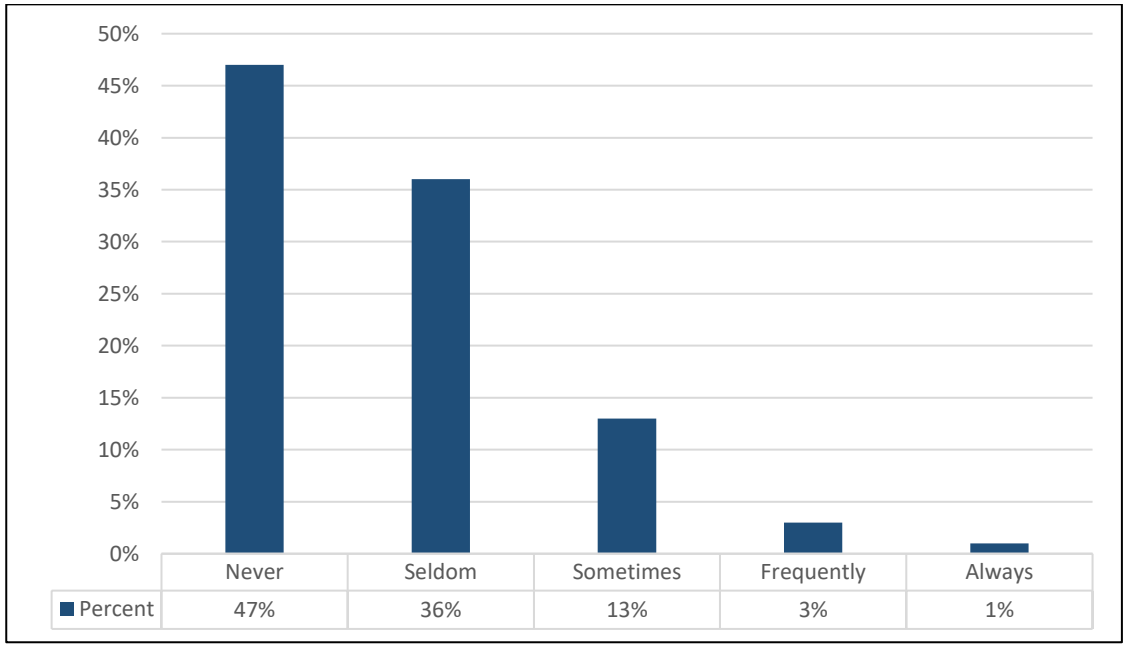

Table 1: Descriptive statistics

	n	Mean / Percent	StdDev
Fear of physical assault	15,058	1.75	0.84
Fear of robbery	15,086	2.06	0.93
Fear of burglary	15,185	2.67	1.10
Fear of theft	15,137	2.50	0.97
Fear of sexual assault	15,004	1.75	0.87
Perceived risk of physical assault	14,886	1.65	0.61
Perceived risk of robbery	14,891	1.80	0.65
Perceived risk of burglary	14,449	2.14	0.72
Perceived risk of theft	14,919	2.06	0.69
Physical disorders	14,577	4.35	1.60
Neighborhood cohesion	14,280	12.14	2.74
Age	15,348	53.10	18.19
Education level	14,722	2.07	0.79
Economic position	15,134	4.32	0.94
Size of place of residence	13,744	2.61	1.35
Province: Schleswig Holstein	15,483	39.4%	----
Personal victimization	14,652	14.4%	----
Migration background	15,375	7.2%	----

Table 2: Predictors of women's fear of non-sexual crimes in the total sample
(results of linear regression analyses with robust standard errors)

	Fear of physical assault			Fear of robbery			Fear of burglary			Fear of theft		
	B	beta	p	B	beta	p	B	beta	p	B	beta	p
Fear of sexual assault	+0.580	+.60	.000	+0.585	+.54	.000	+0.331	+.26	.000	+0.335	+.30	.000
Perceived risk	+0.304	+.22	.000	+0.423	+.30	.000	+0.847	+.55	.000	+0.577	+.41	.000
Physical disorders	+0.036	+.07	.000	+0.033	+.06	.000	+0.015	+.02	.009	+0.042	+.07	.000
Neighborhood cohesion	-0.004	-.01	.054	+0.002	+.01	.491	+0.008	+.02	.010	+0.006	+.02	.044
Personal victimization	+0.047	+.02	.007	+0.048	+.02	.015	+0.064	+.02	.005	+0.121	+.04	.000
Age	+0.003	+.07	.000	+0.003	+.06	.000	+0.003	+.05	.000	+0.003	+.06	.000
Education level	-0.010	-.01	.226	-0.002	-.00	.799	+0.054	+.04	.000	+0.037	+.03	.001
Economic position	-0.023	-.03	.001	-0.015	-.02	.041	+0.031	+.03	.001	-0.005	-.01	.543
Migration background	-0.023	-.01	.367	-0.031	-.01	.260	-0.142	-.03	.000	-0.113	-.03	.001
Size of place of residence	-0.007	-.01	.077	-0.007	-.01	.152	-0.040	-.05	.000	-0.022	-.03	.000
Province	-0.001	-.00	.921	+0.004	+.00	.735	-0.033	-.01	.044	-0.034	-.02	.023
Model Fit	R^2 = .543; p = .000			R^2 = .525; p = .000			R^2 = .446; p = .000			R^2 = .362; p = .000		

B … unstandardized regression coefficient; beta … standardized regression coefficient; p … error probability

Table 3: Effects of fear of sexual assault on women's fear of non-sexual crimes differentiated by age (results of age-group-specific linear regression analyses with robust standard errors)

Dependent variable	Age below 30 years						Age 30 to 59 years						Age 60 years and above					
	Model 1			Model 2			Model 1			Model 2			Model 1			Model 2		
Fear of	B	S.E.	p	B	S.E.	p	B	S.E.	p	B	S.E.	p	B	S.E.	p	B	S.E.	p
Physical assault	+0.579	0.018	.000	+0.443	0.024	.000	+0.708	0.010	.000	+0.578	0.013	.000	+0.784	0.014	.000	+0.675	0.017	.000
Robbery	+0.631	0.018	.000	+0.492	0.025	.000	+0.764	0.009	.000	+0.609	0.013	.000	+0.795	0.012	.000	+0.615	0.017	.000
Burglary	+0.401	0.025	.000	+0.277	0.027	.000	+0.538	0.013	.000	+0.325	0.014	.000	+0.655	0.016	.000	+0.400	0.021	.000
Theft	+0.441	0.021	.000	+0.302	0.026	.000	+0.507	0.012	.000	+0.321	0.014	.000	+0.596	0.016	.000	+0.386	0.019	.000

B … unstandardized regression coefficient; S.E. … robust standard error; p … error probability; Model 1: simple regression; Model 2: multiple regression

Table 4: Comparison of age-group-specific effects of fear of sexual assault (Z-tests)

	Fear of physical assault		Fear of robbery		Fear of burglary		Fear of theft	
	Z	p	Z	p	Z	p	Z	p
Below 30 years – 60 years and above	7.888	.000	4.068	.000	3.596	.000	2.608	.009
Below 30 years – 30 to 59 years	4.946	.000	4.152	.000	1.578	.115	0.643	.520
30 to 59 years – 60 years and above	4.533	.000	0.280	.779	2.972	.003	2.754	.006

Z … Z-statistic; p … error probability

Table 5: The interactive effect of fear of sexual assault and age on women's fear of non-sexual crimes (linear regression models with product terms for the total sample)

	Fear of physical assault			Fear of robbery			Fear of burglary			Fear of theft		
	B	S.E.	p	B	S.E.	p	B	S.E.	p	B	S.E.	p
Fear of sexual assault	+0.521	0.008	.000	+0.519	0.009	.000	+0.305	0.010	.000	+0.303	0.009	.000
Age	+0.062	0.007	.000	+0.058	0.008	.000	+0.058	0.010	.000	+0.064	0.010	.000
Fear of sexual assault x Age	+0.065	0.007	.000	+0.047	0.007	.000	+0.063	0.009	.000	+0.045	0.008	.000
Perceived risk	+0.298	0.012	.000	+0.421	0.013	.000	+0.840	0.012	.000	+0.573	0.013	.000
Physical disorders	+0.036	0.004	.000	+0.032	0.005	.000	+0.014	0.006	.010	+0.041	0.005	.000
Neighborhood cohesion	-0.005	0.002	.028	+0.001	0.003	.597	+0.008	0.003	.015	+0.006	0.003	.058
Personal victimization	+0.055	0.018	.002	+0.053	0.019	.006	+0.072	0.023	.002	+0.127	0.023	.000
Education level	-0.013	0.008	.087	-0.005	0.009	.588	+0.051	0.012	.000	+0.035	0.011	.001
Economic position	-0.023	0.007	.001	-0.015	0.007	.045	+0.032	0.009	.001	-0.005	0.009	.559
Migration background	-0.023	0.025	.354	-0.031	0.027	.249	-0.143	0.036	.000	-0.114	0.033	.001
Size of place of residence	-0.006	0.004	.160	-0.006	0.005	.229	-0.039	0.006	.000	-0.021	0.006	.000
Province	-0.001	0.011	.944	+0.004	0.012	.726	-0.032	0.016	.045	-0.034	0.015	.023
Model Fit	R^2 = .548; p = .000			R^2 = .527; p = .000			R^2 = .449; p = .000			R^2 = .364; p = .000		

B … unstandardized regression coefficient; S.E. … robust standard error; p … error probability