3. Beyond the Surface of Self-Presentation: Implicit Measures of Threat

3.1. Theory

As argued in section 1 regarding the different components of emotion, subjective experience is an essential part of emotion. Accordingly, only the respondent is able to identify and report whether and to what extent he or she experiences an emotion. Respondents are asked to give an explicit judgment about the frequency and the intensity of such experiences. Component measures of fear of crime as well as the measurement of situational fear of crime as detailed in the last section rely on explicit judgments. As such they belong to the group of explicit measures in which participants are asked to rate or judge the object of interest (e.g., events, own traits or behaviors, emotions) with an explicit statement. Yet, explicit measures have been subject to critique on various grounds. For example, subjects may respond in a systematic way independent from the content of the measured construct ('response style', cf. van Vaerenbergh & Thomas, 2012, for a review). Another prominent critique focuses on social desirability as a way of deliberately or unconsciously biasing responses so as to appear in a favorable light (for a review: Paulhus, 1991; for an opposing view: Haeffel & Howard, 2010).

The findings reported in section 2 could be influenced by processes that underestimate the extent of situational fear in old adults, when being in a threatening situation. On the one hand, emotion regulatory processes could influence the way the subjects evaluate the situation. This could be due to knowing that they take precautions and therefore do not need to fear the described situations as much. It could also be the result of hedonic motivations (cf. Scheibe & Carstensen, 2010). On the other hand, Soubelet and Salthouse (2011) recently demonstrated the influence of social desirability on self-report measures of affect in an aging study. Controlling for the variance in a social desirability scale reduced the positive relationship between age and positive affect and the negative relationship between age and negative affect, and age and anxiety.

As argued in chapter 1.2.1, emotion generation involves processes of evaluation that are not consciously represented and that are potentially less susceptible to (intentional) regulation mechanisms. While we can ask someone for an explicit evaluation of whether something is threatening or not, this person may already have evaluated the stimulus unconsciously with regard to its threatening impact. In order to investigate the processes related to the evaluation of threat, while avoiding the problems linked to explicit, i.e., self-report fear-of-crime measures, I applied a priming procedure to implicitly measure age-related differences in the evaluation of crime threat and its relation to precautious behavior. These analyses refer to specific processes at the core of the model displayed in Figure 1. I will first give a brief overview of implicit measures in fear research and then introduce the evaluative priming paradigm as a specific implicit measure of inter-individual differences in evaluation processes. At last I will review studies that examined age differences using an implicit measurement approach. Subsequently, two studies are presented that examined age differences in implicit threat evaluation and its relation to explicit measures of fear of crime.

3.1.1. The Implicit Measurement of Threat

Implicit measures are thought to capture attitudes, traits, habits, processing mechanisms, or the structure of memory in an automatic manner (see also De Houwer & Moors, 2007). The core feature of implicit measures is that "the measurement outcome is causally produced by the to-be-measured attribute in the absence of certain goals, awareness, substantial cognitive resources, or substantial time" (De Houwer, Teige-Mocigemba, Spruyt, & Moors, 2009, p. 350). Implicit measures can avoid several problems linked to self-report measures: Implicit measures might be less biased by self-presentational tendencies and deliberate attempts to mislead, and they might even reflect aspects of the self of which the respondent is not aware (e.g., Dovidio & Fazio, 1992; Greenwald & Banaji, 1995).

De Houwer and Moors (2012) argue that it is important to delineate what is meant by the term *implicit*. They propose that the "meaning of the term 'implicit' is identical to the meaning of the term 'automatic'" (p. 183). Moreover, they maintain that "automaticity is not an all-or-none property of mental processes but refers to a set of features that do not necessarily co-occur within each automatic process" (p. 183). Accordingly, they call for a decompositional approach in which the specific features of automaticity are defined and researchers indicate to which features of automaticity they refer. One suggested feature is *uncontrolled*, which means either that "the state of a process changes … in the absence of a goal to achieve this change" (p. 185) or that the "goal is present but the desired effect is absent" (p. 185). Goal means here the achievement of a specific end, whereby De Houwer and Moors seem to imply that goals are consciously represented. The term *unintentional* is subsumed under the feature *uncontrolled*. Moreover, they contend that the term *unconscious* is an often used term with regard to implicit processes but difficult to define. It refers to the unawareness of "(a) the stimulus input that evokes the process, (b) the output of the process, (c) the process itself, or (d) the consequences of the process such as its influence on subsequent processing" (p. 186). This perspective allows the possibility that a process can be intentional but still unconscious, i.e., occurring without awareness of it. At last, they propose *efficiency* as a feature of implicit processes, i.e., "processes that consume few processing resources or attentional capacity" (p. 186). All the named features partially overlap or tend to occur together, respectively, but they do not necessarily co-occur.

Implicit measures in the realm of fear research have gained interest; particularly in the last two decades intensive research of inter-individual differences in attentional processes of threat detection have been intensely investigated (cf. Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van IJzendoorn, 2007). Regarding attentional processes it is argued that the environment is constantly scanned for threat-related information so as to prepare the organism to adequately respond to detected threat. Moreover, anxious individuals are assumed to show a more pronounced attentional bias. Various paradigms from general psychology have been adapted to examine general emotion-related information processing, on the one hand, and inter-individual differences in emotion-related processing on the other hand (e.g., emotional Stroop paradigm, cf. MacLeod, 1992; visual search paradigm, cf. Gilboa-Schechtman, Foa, & Amir, 1999; emotional spatial cueing, cf. Fox, Russo, Bowles, & Dutton, 2001). In a recent meta-analysis

including 172 studies, Bar-Haim and colleagues (2007) found that different populations of anxious individuals (including high-anxious nonclinical individuals) showed a threat-related bias in attention to threatening stimuli across different experimental paradigms and variations within the paradigm, while nonanxious individuals did not show such a bias.

The Emotional Priming Paradigm

Interpreting these attentional biases as threat-related, i.e., attending faster to threatening stimuli or maintaining more attention on these stimuli, implies that these stimuli have been evaluated as threatening by the subject and that this is related to differences in attention. Priming studies directly investigate the influence of automatic evaluations on subsequent evaluations and inter-individual differences in this effect. In order to investigate age-related differences in the implicit evaluation of crime threat, a modified version of the classic evaluative priming design introduced by Fazio, Sanbonmatsu, Powell, and Kardes (1986) was implemented. In the evaluative priming paradigm (also called affective priming paradigm; for reviews see, e.g., Fazio, 2001; Klauer & Musch, 2003), participants are requested to categorize a target stimulus (e.g., a valent word) as positive or negative (the so-called evaluation task). Each target is preceded by a prime stimulus (e.g., another valent word) that has to be ignored. The valence of the prime stimulus influences the speed and/or accuracy of target categorization. Typically, if the prime has the same valence as the target (i.e., prime and target valence are congruent), categorizations are facilitated as compared to trials in which target and prime differ in valence (i.e., prime and target valence are incongruent). Thus, the valence congruency of primes and targets seems to affect behavior: Although the prime is completely irrelevant for the task and participants are instructed to ignore it, the prime's valence is processed and affects target processing. The prime is processed and evaluated unintentionally (and thus in one sense of the word: *automatically*).

There is a long-standing debate on how this effect can be explained. Essentially, there are two main classes of theories. One class assumes that the prime is automatically evaluated and, in consequence, evokes a response tendency (e.g., positive vs. negative) that is either compatible or in conflict with the requested response to the target (e.g., Klauer, Roßnagel, & Musch, 1997; Wentura, 1999). Due to the pre-activation of a response tendency by the prime, the target response is somewhat accelerated (or more accurate) in congruent prime-target pairs. In contrast, priming effects might also be explained in terms of stimulus-stimulus similarities. Due to valence similarity, a prime might facilitate processing of a congruent target (and perhaps hamper processing of an incongruent one). This account is most prominently represented by the now classic theory of spreading activation and by more recent distributed network models (e.g., Masson, 1995). The prime activates its semantic representation, which includes its valence. Accordingly, the activation of "positive" or "negative" features facilitates the subsequent activation of any concept that shares the same valence because "positive" or "negative" features are already pre-activated. Therefore, a target word that follows a valence-congruent prime is assumed to be processed somewhat faster because a part of its representation (i.e., the valence) is already activated (Bower, 1991).

Priming and Inter-Individual Differences in Fear

Priming effects are used to implicitly measure inter-individual differences in the strength of evaluative associations. People differ in their evaluation of stimuli with regard to a specific feature such as valence; hence, they may be differentially affected by a preceding prime in their response to a target. This procedure has already been successfully implemented in social cognition research measuring implicit stereotypes (e.g., Banaji & Hardin, 1996; Wittenbrink, Judd, & Park, 2001). Evidence for the applicability of this paradigm to the realm of fear research stems from studies using evaluative priming and trait anxiety as a covariate (e.g., Dannlowski et al., 2006; Li, Paller, & Zinbarg, 2008; Reinecke, Becker, & Rinck, 2010). Reinecke et al. (2010) obtained a positive relationship between fear of spiders (as measured with a questionnaire) and the size of the priming effect when participants had to judge the pleasantness of positive and negative words following pictures of butterflies and spiders. Likewise, Dannlowski and colleagues (2006) found a positive relationship between trait anxiety (in comorbid patients of depression and anxiety disorder) and affective priming using positive and negative words as primes and targets.

Yet, most of these studies used an evaluation based on positive vs. negative responses but did not directly test whether implicit evaluation of threat influenced the speed or accuracy of explicit threat evaluations. Several recent studies have demonstrated that affective evaluation of stimuli does not take precedence over other categorizations routinely and that attention to specific features of a stimulus determines priming effects (e.g., Bermeitinger, Wentura, & Frings, 2011; Spruyt, De Houwer, & Hermans, 2009; Storbeck & Robinson, 2004). While evaluating a stimulus regarding its *threatening* meaning could be classified as a subcategory of an overall evaluation of a stimulus as negative, a categorization of a stimulus as *negative* does not necessarily mean that it is also evaluated as *threatening* (it could also be sad or disgusting). To focus specifically on the associated threat impact of a stimulus that drives inter-individual differences in threat priming, a modified evaluative priming task was implemented, where subjects had to evaluate whether a word is threatening or not.

3.1.2. Implicit Measures of Threat in Aging Studies

There are initial endeavors to investigate age-related differences in the implicit processing of threat-related information and fear with a variety of techniques, albeit all focus on attention measures. Mather and Knight (2006) implemented a visual search task, where an emotional face has to be detected as fast as possible among several neutral faces (in some trials no emotional face is presented). The authors could demonstrate that old adults had a similar attentional bias as young adults, which consisted of detecting angry faces faster compared to sad or happy faces (cf. also Hahn et al., 2006, exp. 1). They reported indications that this effect could even be more pronounced for old adults. Research by Ruffman, Ng, and Jenkin (2009) replicated those results. Moreover, the finding was extended by results showing that the detection bias for angry schematic faces was generalizable to photographs of real faces. Additionally, they found that this effect was

still obtained despite old adults' difficulties in labeling the emotion of the portrayed angry faces correctly. As informative as these studies are, they also have the disadvantage of drawing the attention to the threatening stimulus intentionally, i.e., subjects are asked to identify a discrepant face among neutral faces and therefore fast threat detection is advantageous in the task itself. This does not question the implicitness of the process of threat evaluation itself, but it may (partly) reflect different processes than automatic threat evaluation.

Fox and Knight (2005) employed an emotional Stroop and dot-probe task after inducing anxious mood in half of their old adults' sample. The two tasks provided contradictory results. In the dot-probe task participants have to respond to a stimulus that is displayed either on the left or right side of the screen. This dot probe is preceded by an emotional stimulus and a neutral stimulus, which are presented simultaneously on the left and right side of the screen. Response times are supposed to be faster if the dot-probe appears at the same side of the screen as the emotional stimulus, whereas it is supposed to be slower when it was presented on the other side. In the emotional Stroop paradigm neutral and emotional words are displayed in different colors. Subjects are asked to indicate the color of the word. Response times are assumed to be slower, when the color of emotional words has to be reported compared with neutral words. In Fox and Knight's study (2005), the group with induced anxiety showed an attentional bias towards threat in the dot-probe task independent from trait anxiety, while the control group (no inducement) showed no effect. However, the threat interference in the Stroop task was only visible in the low trait anxious adults in the induced anxiety group and possibly in the control group with high trait anxiety. The authors suggest that old adults high in trait anxiety may be more experienced in dealing with the interference of threat when being in a state of anxiety. Unfortunately, no age group differences have been examined in this study.

Additional results from Lee and Knight (2009) show differential effects in the dot-probe paradigm with regard to stimulus modality (faces, words, and pictures), sub- vs. supraliminal presentation of stimulus material and trait anxiety. With regard to angry faces subliminal presentation led to vigilance towards the angry faces (i.e., faster responses when the threatening stimulus was displayed on the same side as the probe in contrast to being displayed at the other side) and avoidance (i.e., slower responses when the threatening stimulus was displayed on the same side as the probe in contrast to being displayed at the other side) with supraliminal presentation in old high trait anxious adults. In contrast, when confronted with threatening words in a dot-probe paradigm old trait anxious adults showed avoidance in subliminal presentation trials and vigilance with supraliminal presentation. The authors interpret this contradictory finding as reflecting differences in processing due to the modality of the stimuli (faces versus words). They suggest that the old high trait anxious participants have pre-attentively processed the meaning of the word in the subliminal presentation and then diverted their attention resulting in slower response times. When given more time, as is the case in supraliminal presentation, old adults redirect their attention towards the threatening stimuli, which results in faster response times.

Together these studies demonstrate that old adults are sensitive to differences in threatening content of the stimuli although the specific mechanisms behind the attentional

processes in interaction with dispositional anxiety need to be investigated further. No studies have been conducted yet that focus directly on age differences in the automatic evaluation of threat.

3.2. Study 4

3.2.1. Hypotheses

The aim of the first experiment was threefold. First of all, a new method of using threatening stimuli in an evaluative priming paradigm was employed: Targets had to be evaluated as threatening vs. nonthreatening instead of negative vs. positive in order to directly relate priming effects to the threat value of the stimuli. Overall, I expected threat congruency effects, that is, faster response times to congruent than incongruent targets. Second, I wanted to test age differences in the crime-threat priming effect. If old adults perceive crime as more threatening, they should evince a more pronounced crime-threat priming effect. Third, the relationship between implicit and explicit measures of fear of crime were tested, that is, the relation between the crime-threat priming effect and the components of fear of crime as explicit fear-of-crime measures. Larger crime-threat priming effects should be positively correlated with the explicit measures of fear of crime. Moreover, if precautious behavior of old adults is an expression of increased threat evaluation and fear with age, then this should show in a larger crime-threat priming effect, hence mediating the relation between age and precautious behavior.

3.2.2. Method

3.2.2.1. Participants

The sample consisted of 40 students from different faculties of the University of Hildesheim (Md_{age} = 21.0 ranging from 19 to 30 years; 85.0% female) and 41 old adults (Md_{age} = 67.0 ranging from 59 to 80 years; 71% female). Old adults were recruited via advertisement in the local newspaper. All participants were native speakers of German and had normal or corrected-to-normal vision. To roughly assess their intellectual abilities, participants received the matrices subtest of the I-S-T 2000 R (Liepmann, 2007) and a verbal ability test (Mehrfachwahl-Wortschatz-Intelligenztest, MWT-B, Lehrl, 2005). The young age group achieved a higher mean result in the matrices test than the old age group (M_{young} = 13.1, SD = 2.6 vs. M_{old} = 7.8, SD = 4.4). In the verbal test, old participants performed better than young participants (M_{young} = 28.5, SD = 5.1 vs. M_{old} = 33.0, SD = 1.7). Compared with age specific IQ test scores, most participants achieved an average result.[20] Moreover, young participants had more years of education (M = 13.1, SD = 0.5) than did old adults (M = 10.9, SD = 1.8), $t(79) = 7.43$, $p < .001$.

[20] Two young participants and six old participants had a lower than average result in the matrices test. However, these tests were carried out at the end of the session and according to participants' comments, motivation and concentration lacked at the end. Participants with a low value were not conspicuous with regard to other variables.

Regarding measures of psychological adjustment, young adults did not differ from old adults in life satisfaction as measured with the single item used in Study 1 and Study 2. However, old adults indicated higher positive, $t(79) = -1.94$, $p = .06$, and less negative affect, $t(79) = 2.06$, $p < .05$, than young adults (positive: $M_{young} = 3.1$ vs. $M_{old} = 3.4$; negative: $M_{young} = 1.3$ vs. $M_{old} = 1.2$) as measured with the German Version of the Positive and Negative Affect Schedules (Krohne et al., 1996). Concerning subjective health as measured in Study 2 and Study 3, there were marginally significant differences between the young and old age group. Old adults reported being less flexible ($M_{young} = 4.4$ vs. $M_{old} = 4.1$) and having less visual ($M_{young} = 4.3$ vs. $M_{old} = 3.9$) and hearing abilities ($M_{young} = 4.3$ vs. $M_{old} = 3.9$) than young adults (ps < .08). There were no significant age differences in their assessment of fitness.

Five additional participants (four young and one old) were excluded based on an age-group specific analysis of outliers in reaction times (mean RT > 1050 ms) and error rates (> 10%).

3.2.2.2. Design

As can be seen in Table 12, essentially, a 4 (prime threat value: nonthreatening, crime-threatening, nature-threatening, and health-threatening) by 4 (target threat value: nonthreatening, crime-threatening, nature-threatening, and health-threatening) repeated measures design was implemented. Additionally, age group (young vs. old) was varied as quasi-experimental between-subject factor. Evaluative priming is characterized by faster evaluative responses to targets that are preceded by congruent primes than responses to targets that are preceded by incongruent primes. From the design 16 combinations of prime-by-target threat values result that are either congruent or incongruent. It can be differentiated between two kinds of congruent trials. In a broad sense, prime-target-pairs that share the same threat value can be seen as congruent, that is prime and target are both nonthreatening or both threatening no matter whether they were of the category of nature-threat, crime-threat, or health-threat (see Table 12: threat-congruent). In a narrow sense, only prime-target-pairs that belong to the same category form category-congruent trials besides sharing the same threat category (prime-target-pairs: nonthreatening–nonthreatening, crime-threatening–crime-threatening, nature-threatening–nature-threatening, health-threatening–health-threatening; see Table 1: category-congruent). Prime-target-pairs that neither share the same category nor threat value form the group of incongruent trials. There can be tested various relations between prime and target threat values; however, I am only interested in specific prime-target-pairs for my research question. In order to attribute priming effects to automatic threat evaluation of crime, crime-related words are used as primes and threat-related words of another category are used as targets. If words of the same category were used, priming effects could be interpreted as reflecting the automatic activation of the same semantic category (e.g., crime: theft-burglary; nature: tsunami-storm) that drives the effect, without necessarily reflecting automatic threat evaluations. Consequently, crime-threat priming is constituted by faster responses to threat-congruent targets (mean of prime-target-pairs: nonthreatening–nonthreatening, crime-threatening–nature-threatening, and crime-

threatening–health-threatening, see Table 12: cells in bold) than to incongruent targets (mean of prime-target-pairs: crime-threatening–nonthreatening, nonthreatening–nature-threatening, and nonthreatening-health-threatening, see Table 12: cells in bold). Accordingly, the crime-threat priming effect is computed by subtracting the mean of the relevant threat-congruent trials from the mean of the relevant incongruent trials. A positive value in this specific crime-threat priming effect signifies faster responses in congruent trials than in incongruent trials.

Table 12
Congruence-incongruence pattern per prime-target-combination (relevant cells for the crime-threat priming effect in bold)

		Target			
		Non-threatening	Crime-threatening	Nature-threatening	Health-threatening
Prime	Non-threatening	**cat-con/ threat-con**	incon	**incon**	**incon**
	Crime-threatening	**incon**	cat-con/ threat-con	**threat-con**	**threat-con**
	Nature-threatening	incon	threat-con	cat-con/ threat-con	threat-con
	Health-threatening	incon	threat-con	threat-con	cat-con/ threat-con

Note. cat-con = category-congruent, threat-con = threat-congruent, incon = incongruent

3.2.2.3. Material

Priming

In a pre-study, 187 subjects (young: 19 to 30 years, $N = 49$ and old: 59 to 95 years, $N = 138$) were asked to evaluate the threat value of 258 nouns on a 7-point scale ranging from *very secure (1)* to *very threatening (7)* with *neutral (4)* as the scale midpoint. Most words were taken from the Semantic Atlas (Schwibbe, Räder, Schwibbe, Borchardt, & Geiken-Pophanken, 1994). Half of the words had potentially threatening values tapping issues of crime, nature, health, and other topics. Crime words included various offenses to represent crime that is relevant for old adults as well. The other half of words was located on the neutral to secure side of the spectrum. Descriptively, only small differences in the evaluation of the words between young and old participants were obtained. Old participants had a slight tendency to judge the words as more threatening than young participants. Computing the absolute value of the age difference in the judgment of each word resulted in a mean absolute value of difference of $M = 0.27$ (maximum 1.19). For the priming experiment, 84 words were selected on the basis of three criteria: (1) absolute value of age difference in judgment ≤ 0.5, (2) mean rating of nonthreatening words $M \leq 2.5$ and mean rating of threatening words $M \geq 5.0$, and (3) threatening words belong to the categories crime, nature, or health and nonthreatening words do not belong to any of these categories.

The resulting word pool was comprised of 42 nonthreatening and 42 threatening German nouns with a length of 3 to 11 letters (mean word length: 7.31 letters, *SD* = 1.91 and 7.64 letters, *SD* = 1.98; mean word frequency per million according to German database of written language, COSMAS II: *M* = 7.87, *SD* = 12.30, and *M* = 14.39, *SD* = 15.52, for threatening and nonthreatening words, respectively). The threatening word list contained an equal number of words from the nature, crime, and health categories, and were matched for word length, frequency, and evaluated threat value. The threat value of the nonthreatening words was *M* = 1.96 (*SD* = 0.31), the mean value of the threatening words was *M* = 5.93 (*SD* = 0.47). Stimuli were presented in the Fixedsys font, and each letter had a size of approximately 0.5 cm in height and 0.4 cm in width.

Because each threat category should be presented as target word equally often, an unbalanced ratio of responses (threatening vs. nonthreatening) would result. To prevent a response bias due to an unbalanced ratio of responses without selectively multiplying the presentation of nonthreatening targets, 21 nonthreatening filler words and 21 threatening filler words were added (see Table 2 and below). Nonthreatening filler words were selected from the Semantic Atlas on the basis of their valence, arousal, and emotionality ratings. Ratings had to vary around the scales' midpoint (+/- 1.5 on a scale ranging from 1 to 7). Threatening filler words were chosen from the initial word pool of the pilot study and were threatening words (according to the above-mentioned criteria).

To ensure that a word is either presented as a prime or a target within participants, the assignment of words to prime and target categories was counterbalanced across subjects, while controlling for number of letters, word length, word frequency, and threat value, using paired sublists.

Self-report measures

The components of fear-of-crime scales were measured using items similar to those of prior studies (e.g., Greve, 2000) and as used in Studies 1 to 3. Internal consistency of the affective component was α = .86. Cronbach's alpha for the cognitive component was α = .84. In order to measure precautious behavior (behavioral component), the same items were used as in Study 1 and 2. Internal consistency was α = .85.

3.2.2.4. Procedure

Participants were individually tested in sound-attenuated booths. The experiment was run using E-Prime software (version 1.1) with standard PCs and 17'' CRT monitors. Viewing distance was about 60 cm. Instructions were given on the CRT screen. Participants were told that their task was to judge whether the presented target word was a threatening or nonthreatening word by pressing either the right key with their right index finger or the left key with their left index finger. Moreover, participants were told that the to-be-categorized word was preceded by a very briefly presented first word, which they should ignore. As displayed in Figure 14, the sequence of each trial was as follows: first a fixation stimulus (+) was presented for 700 ms. Then the prime word was shown for 93

ms. The prime was followed by a blank screen for 13 ms. Then, the target appeared until the evaluation of threatening vs. nonthreatening word was given. Thus, the stimulus onset asynchrony (SOA) was 106 ms. All stimuli were presented in white on a black background at the screen center. Participants were instructed to respond as quickly and as accurately as possible. In the case of an error, an error message appeared until a key press was given. The inter-trial interval was 1000 ms.

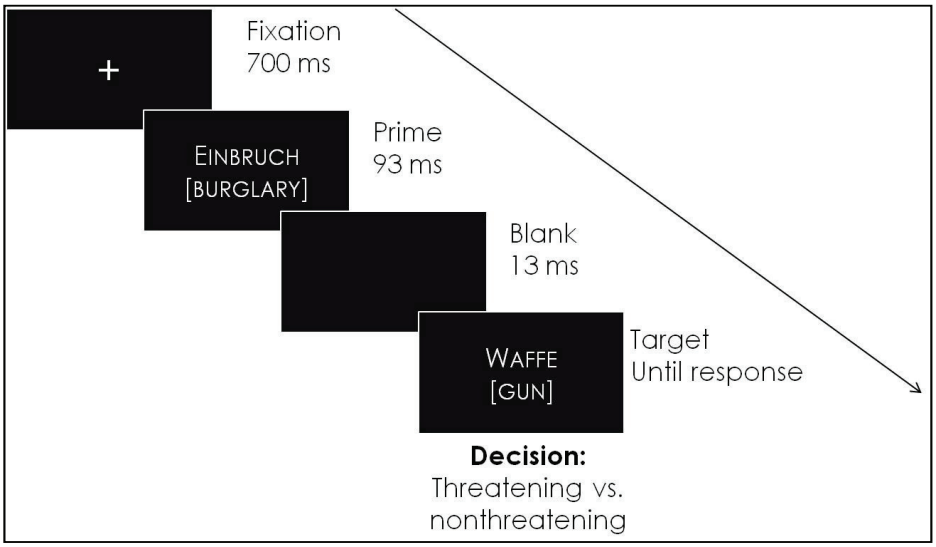

Figure 14. Priming procedure for one trial.

The experiment comprised six blocks with 56 trials each. Before the experiment, participants worked through 24 practice trials. There was a short break after each block. Over the course of the experimental trials, each word appeared equally often as a congruent target and an incongruent target, or as a congruent prime and an incongruent prime. Additionally, each relevant word appeared equally often as a target/prime in combination with each threat category. The sequence of trials was randomly selected by the computer. Altogether, 168 (affect-)congruent (42 nonthreatening-nonthreatening and 126 threatening-threatening) trials and 168 incongruent (42 nonthreatening-threatening and 126 threatening-nonthreatening) trials were presented during the experiment (see Table 13). The addition of filler trials made sure that the occurrence of a threatening vs. nonthreatening target following the prime was not predictable.

Table 13
Frequency of trials per prime-target-category

		Target				
		Non-threatening	Crime-threatening	Nature-threatening	Health-threatening	Filler: Non-threatening
Prime	Non-threatening	14	14	14	14	28
	Crime-threatening	14	14	14	14	
	Nature-threatening	14	14	14	14	
	Health-threatening	14	14	14	14	
	Filler: Threatening					84

3.2.2.5. Pilot Study and General Data Analysis Strategy

I conducted a Pilot Study to test whether the material, design, and procedure produce the intended crime-threat priming effect. The sample consisted of 19 prospective teachers studying at the University of Hildesheim (Md_{age} = 21.0 ranging from 19 to 25 years; 90% female). All participants were native speakers of German and had normal or corrected-to-normal vision. Two additional participants were excluded due to having too large error rates (13.5% and 24% of all trials).

Priming Effects

The mean error rate in threat evaluation of the target word was 2.9% (*SD* = 1.7, ranging from 0 to 6.0%) across all trials. To correct for anticipatory responses and momentary inattention, response times (RT) that were 1.5 interquartile ranges above the third quartile with respect to the individual distribution (Tukey, 1977), were above 3000 ms or below 200 ms, and RTs of incorrect responses were discarded (*M* = 15% of all trials and 10% of relevant trials).

As pointed out in the design paragraph, there are multiple relations between the prime and target threat values. For the research question concerning the crime-threat priming effect, I am only interested in the interaction between specific combinations of prime-target-pairs. In a first step, the prime-target-pairs crime-threatening–nature-threatening and crime-threatening–health-threatening were combined in one term as well as nonthreatening–nature-threatening and nonthreatening–health-threatening prime-target-pairs. Then I conducted a 2 (Prime: crime-threatening vs. nonthreatening) × 2 (Target: non-threatening vs. nature-/health-threatening) ANOVA with repeated measures on both factors. For the crime-threat priming effect this means that mean RT to threat-congruent

prime-target-pairs (nonthreatening–nonthreatening, crime-threatening–nature-/health-threatening, see Table 12) have to be significantly faster than mean RT to incongruent prime-target-pairs (nonthreatening–nature-/health-threatening, and crime-threatening–nonthreatening) resulting in a positive difference.

Crime-threat priming effect

The analysis of variance showed a significant interaction effect between Prime and Target, $F(1,18) = 11.50$, $p < .01$, $\eta^2 = .39$. As can be seen in Table 14**,** mean RT in congruent trials were faster (M = 709 ms) than mean RT in incongruent trials (M = 728 ms) in the pilot study resulting in a crime-threat priming effect of 19 ms. The same analysis with percentage of errors as dependent variable revealed no significant effects. The Pilot Study indicated that the paradigm was successful at evoking crime-threat priming effects.

Table 14

Mean RTs (in ms; errors in % in parenthesis) as a function of prime category and target category, mean values for congruent and incongruent trials and the crime-threat priming effect

		Prime		Crime-threat priming effect		
		Non-threatening	Crime-threatening	Congruent	Incongruent	Priming Effect
Target	Non-threatening	**718 (3.0)**	*734 (3.4)*	709	728	19
	Nature/Health-threatening	*722 (3.2)*	**699 (2.6)**			

Note. Priming Effect = mean RTs in incongruent trials (italics) – mean RTs in congruent trials (bold)

3.2.3. Results

The mean error rate in threat evaluation of the target word for the young age group was 2.8% (SD = 2.1, ranging from 0.30 to 8.3%); for the old age group the mean error rate was 1.4% (SD = 1.77, ranging from 0 to 7.4%). Response times (RT) that were 1.5 interquartile ranges above the third quartile with respect to the individual distribution (Tukey, 1977), were above 3000 ms or below 200 ms, and RTs of incorrect responses were discarded (M = 13% of all trials and 10% of relevant trials).

3.2.3.1. Crime-Threat Priming Effect

I conducted a 2 (Age: young vs. old) × 2 (Prime: crime-threatening vs. nonthreatening) × 2 (Target: non-threatening vs. nature-/health-threatening) ANOVA with repeated measures on the last two factors. There was a marginally significant main effect of Prime, $F(1, 79) = 3.87$, $p = .07$, $\eta^2 = .04$. As displayed in Table 15, participants were faster when responding to crime-threatening primes (M = 758 ms) than when responding to nonthreatening primes (M = 765 ms). Importantly, the interaction between Prime and

Target was significant, $F(1, 79) = 5.94$, $p < .05$, $\eta^2 = .07$. Participants showed faster response times in congruent prime-target-pairs (M = 762 ms) than in incongruent prime-target trials (M = 772 ms) resulting in a positive crime threat priming effect of 10 ms.

Table 15

Mean RTs (in ms; errors in % in parentheses) as a function of prime category and target category, mean values for congruent and incongruent trials and the crime-threat priming effect, for all participants and separately for young and old participants

		Prime		Crime priming effect		
		Non-threatening	Crime-threatening	Congruent	Incongruent	Priming Effect
All participants						
Target	Non-threatening	**768 (1.2)**	*771 (2.3)*	762	772	10
	Nature/Health-threatening	*772 (2.3)*	**755 (2.4)**			
Young participants						
Target	Non-threatening	**714 (2.0)**	*722 (3.4)*	703	725	22
	Nature/Health-threatening	*727 (2.8)*	**692 (2.9)**			
Old participants						
Target	Non-threatening	**822 (0.3)**	*820 (1.2)*	820	819	1
	Nature/Health-threatening	*818 (1.9)*	**817 (1.9)**			

Note. Priming Effect = mean RTs in incongruent trials (italics) – mean RTs in congruent trials (bold)

3.2.3.2. Age Differences

The analysis revealed a main effect of age group, $F(1, 79) = 26.30$, $p < .001$, $\eta^2 = .25$. Old adults responded slower in general than young adults (M_{young} = 714 ms vs. M_{old} = 819 ms). I wanted to test whether the crime-threat priming effect is larger for the old than for the young age group. This question corresponds to the test of the interaction between Prime, Target, and Age that was significant, $F(1, 79) = 6.19$, $p < .05$, $\eta^2 = .07$. As displayed in Table 15, young adults replicated the result of the Pilot Study with responses in congruent trials being faster (M = 703 ms) than in incongruent trials (M = 725 ms), resulting in a crime-threat priming effect of 22 ms. In contrast to hypothesis, there was no significant difference between responses in incongruent versus congruent trials in the old age group ($M_{congruent}$ = 820 ms vs. $M_{incongruent}$ = 819 ms) so that there was no priming difference. Accordingly, the crime-threat priming effect of the young age group was larger than that of the old age group.

3.2.3.3. Influence of Mean RT

As described in the previous paragraph, there was a difference between young and old adults in the crime-threat priming effect. At the same time, as could be seen in the repeated measures ANOVA, the mean RTs differed considerably between the two age groups. Moreover, mean RT was correlated with the crime-threat priming effect, $r(81)$ =

-.38, $p < .001$, i.e., the slower respondents were overall, the smaller were their priming effects. Consequently, lack of a crime-threat priming effect in the old age group could partly be a function of their high mean RT.

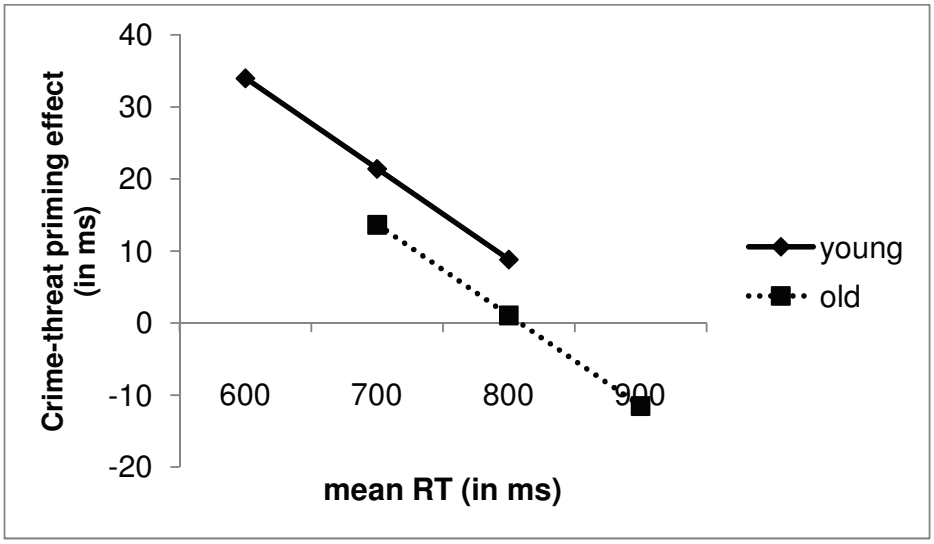

Figure 15. Crime-threat priming effect as a function of mean RT separately for young and old adults.

I performed a mediation analysis (Preacher & Hayes, 2004) with the crime-threat priming effect as criterion to test the indirect effect of age on the priming effect via mean RT. Age group (dummy coded: young = 0 and old = 1) was included as predictor and mean RT (mean centered) as mediator. If age differences in the mean RT are responsible for age differences in the size of the priming effect, the effect of age group should significantly decrease when including mean RT in the regression equation. Regarding the crime-threat priming effect, the effect of age group significantly decreased from $B = -21.52$, $\beta = -.27$, $p < .01$ to $B = -7.80$, $\beta = -.10$, $p = .42$ (Sobel's $Z = 2.23$, $p < .05$) after including mean RT ($B = -0.13$, $\beta = -.33$, $p < .01$). Thus, age differences in the size of the crime-threat priming effect are a function of the mean RT of the participants. As will be discussed, no causal conclusions can be drawn from this result. Figure 15 depicts the priming effect for different values of mean RT separately for the two age groups. As can be seen, the crime-threat priming effect becomes smaller (and tends to be reversed), the slower the mean RT is. However, given the same mean RT there remain small differences between old and young adults; yet, these differences are not significant.[21]

[21] Within the group of old adults, mean RT was not correlated with the results in the matrices and verbal ability test; hence, they cannot explain the differences in mean RT within the old age group.

3.2.3.4. Error Rates

Conducting the same 2 × 2 × 2 ANOVA with age group as between-subject factor and Prime and Target as within-subject factors and percentage of errors as dependent variable revealed a marginally significant interaction between Prime and Target, $F(1, 79) = 3.39$, $p = .07$, $\eta^2 = .04$. Participants made slightly less errors in congruent prime-target-trials ($M = 1.77$) than in incongruent pairs ($M = 2.32$). This effect was not moderated by age group; however, there was a significant main effect of age group, $F(1, 79) = 6.72$, $p < .05$, $\eta^2 = .08$. Old adults overall made less mistakes than young adults ($M_{young} = 2.75$ vs. $M_{old} = 1.35$).

3.2.3.5. Self-Report Fear of Crime

Comparing young adults with old adults concerning the different components of fear of crime revealed that young adults experienced fear of crime more often than old adults (affective component: $M_{young} = 1.90$, $SD = 0.56$ vs. $M_{old} = 1.51$, $SD = 0.45$, $t(79) = 3.27$, $p < .01$). There was no significant difference in the cognitive component ($M_{young} = 1.80$, $SD = 0.51$ vs. $M_{old} = 1.80$, $SD = 0.52$, *n.s.*). In contrast, old adults indicated more frequent precautious behavior in the behavioral component than young adults ($M_{young} = 2.00$, $SD = 0.59$ vs. $M_{old} = 2.33$, $SD = 0.68$, $t(76) = -2.30$, $p < .05$). Affective fear of crime had a positive correlation with behavioral fear of crime, $r(76) = .34$, $p < .01$, indicating that participants who experienced fear of crime more often, showed more preventive behaviors. The affective component also had a positive correlation with the cognitive component, $r(79) = .59$, $p < .001$. Behavioral fear of crime and the cognitive component were also positively correlated, $r(76) = .38$, $p < .01$.

3.2.3.6. Relations Between Priming Effects, Self-Report Fear of Crime, and Age

In order to test the relation between priming effects and self-report measures of fear of crime, I correlated the crime-threat priming effect with the affective, cognitive, and behavioral component of fear of crime. All three fear of crime measures showed nonsignificant correlation coefficients with the crime-threat priming effect, $r(79) = -.07$, $r(79) = .06$, and $r(76) = -.15$, $ps > .13$., respectively. Thus implicit and explicit measures of fear of crime do not converge at this point.

However, as I have shown in the prior analyses, the size of the crime-threat priming effect depends on age group or mean RT, respectively, which potentially obscures relevant relations between the crime-threat priming effect and self-report fear-of-crime measures. Therefore, I additionally calculated age-group specific correlations. In the young age group, the relationships between the crime-threat priming effect and the components of fear of crime were not significant, $r(38)_{affective} = .08$, $r(38)_{cognitive} = .24$, and $r(38)_{behavioral} = .15$, $ps > .39$.

Similar to the young age group, the old age group showed no significant relationship between the crime-threat priming effect and cognitive fear of crime, $r(39) = -.07$, $p = .65$, or behavioral fear of crime, $r(36) = -.24$, $p = .14$. Instead, affective fear of crime was negatively related to the crime-threat priming effect in old adults, $r(39) = -.35$, $p < .05$. This means that the higher old adults' affective fear of crime was, the smaller their priming effects were, that is, the less threat evaluations were facilitated by congruent threatening prime words and interrupted by incongruent threatening prime words. As can be seen in Figure 16, old participants with low affective fear of crime had a positive crime-threat priming effect whereas old adults with high affective fear of crime had a negative crime-threat priming effect. Reversed priming effects indicate that threat evaluations were faster when a threatening target was preceded by an incongruent nonthreatening prime compared to a congruent crime-threatening prime and threat evaluations were faster when a nonthreatening target was preceded by an incongruent crime-threatening prime compared to congruent nonthreatening prime words.

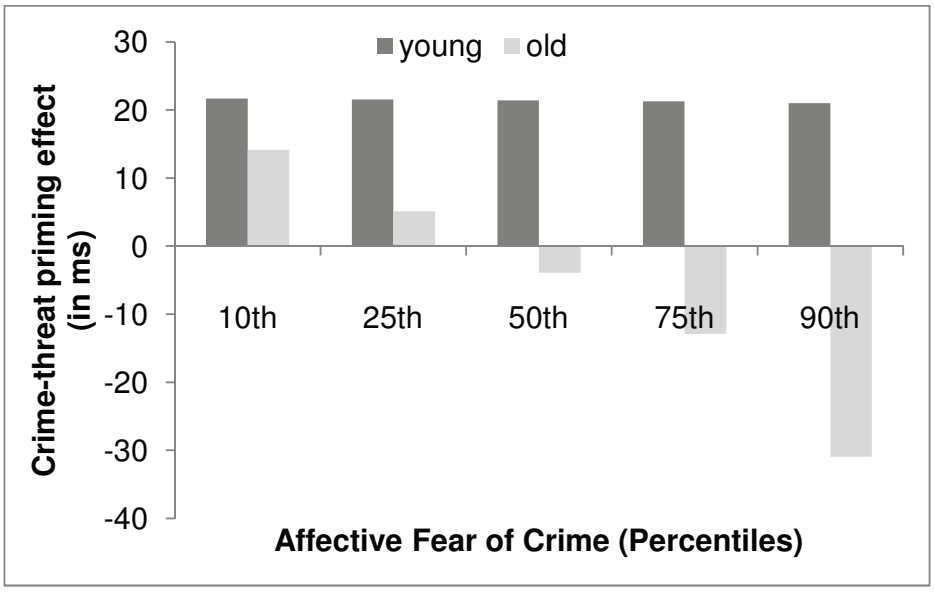

Figure 16. Crime-threat priming effect as a function of affective fear of crime separately for young and old adults at various points of the distribution.

The SPSS macro written by Hayes (2012) calculates the Johnson-Neyman point(s) of significance, which identifies the value(s) of the moderator variable continuum at which point (or points) the effect of the predictor on the criterion transitions between statistically significant and not, using the α-level of significance as the criterion (set here to $\alpha = 0.05$). Young adults' crime-threat priming effect was significantly different from old adults' priming effect when they had affective fear of crime values being 1.65 or larger. This means that, while the crime-threat priming effect in young adults was independent from the explicit measure of fear frequency, old adults show significantly less pronounced crime-threat priming effects when indicating the same level of frequency of fear of crime starting with values of 1.65.

3.2.4. Discussion

In the present study, I applied a new method of evaluative priming, in which subjects evaluated targets as threatening vs. nonthreatening instead of positive vs. negative. This paradigm was employed to test age-related differences in threat evaluations with implicit measures specifically related to fear of crime. It was predicted that if old adults evaluated crime as more threatening than young adults, this should result in a larger crime-threat priming effect. Additionally, I examined the relation between implicit and explicit measures of fear of crime in order to explain the age-related increase in precautious behavior.

Crime-threat priming and age

Crime-threat priming was found in the young age group who showed a positive priming effect with response times in congruent prime-target trials being faster than in incongruent prime-target trials. This result confirms that the new method with a threat decision task is, in general, successful to detect priming effects for crime-threat stimuli. Nevertheless, no significant priming effect was obtained when analyzing the old age group separately. As I have shown, age differences in the magnitude of the crime-threat priming effect were related to the mean RT. The faster responses were on average, the larger was the priming effect. This mediated the age group difference in the crime-threat priming effect. Old adults with response times equal to mean RT of young adults showed crime-threat priming effects comparable to that of young adults. In contrast, slower responses exhibited a tendency towards reversed effects. This result indicates that old participants can produce the same priming effects as young participants. As activation in affective priming is fast-acting and swiftly dissipates (e.g., Hermans, De Houwer, & Eelen, 2001), it may not be surprising that priming effects diminished with longer reaction times (further interpretations see below). Additionally, there were clearly no larger priming effects in old participants. Thus, it is rather unlikely that old participants in general have more pronounced associations between crime-threat concepts.

Implicit and explicit measures of fear of crime, and age

With regard to the relation between implicit and explicit measures of fear of crime I found differential effects. There was neither a relation between the crime-threat priming effect and the affective component of fear of crime nor between the priming effect and precautious behavior. Given this lack of correlation between precautious behavior and priming differences, age-related differences in the frequency of precautious behavior cannot be explained by differences in the size of the priming effect, which would have signified differences in the evaluation of threat.

Yet, I obtained age-specific relations between the affective component of fear of crime and the crime-threat priming effect, suggesting that the evaluative priming paradigm is useful in terms of its application in fear-of-crime research. In particular, I found a crime-threat priming effect in the old age group that varied as a function of the affective component of fear of crime, but in a direction opposite to expectation. With increasing fear of crime the facilitation of threatening primes in congruent trials and interference in incongruent trials decreased, almost being reversed when subjects reported high fear of

crime. However, others have reported similar findings (Berner & Maier, 2004; Glaser & Banaji, 1999; Maier, Berner, & Pekrun, 2003). Maier et al. (2003) and Berner and Maier (2004) discussed the influence of trait anxiety on the direction of affective priming in a naming task with extremely valenced primes. Low trait anxiety produced a typical positive priming effect, whereas high trait anxiety resulted in a reversed priming effect. The authors discussed this effect in terms of a model of strength-of-activation dependent inhibition. They argued that the level of activation of a superordinate evaluative representation (evoked either by prime extremity or level of participant's trait anxiety) moderates the initiation of inhibition processes and consequently the direction of priming effects. The more intense the stimulus is or the higher the level of trait anxiety, the more likely inhibitory processes set in resulting in reversed priming effects. In the present study, the crime-threat priming effect of old participants high in affective fear of crime was lower than in the old low fear-of-crime group, even showing a tendency towards a reversed priming effect. Possibly old adults high in affective fear of crime inhibited the influence of the crime-threatening prime words resulting in lower priming effects. If this interpretation was tenable, it is still an open question, why this effect was only found for old adults but not for young adults.

Dannlowski et al. (2006) found reversed priming effects when primes were presented supraliminally, i.e., when subjects could consciously perceive the primes, whereas subliminally presented primes produced the expected larger priming effect in high anxious participants. However, Reinecke et al. (2010) also utilized supraliminally presented primes and obtained a positive relation between fear and the size of the priming effect. In the present study, brief but supraliminal presentation was used, which did not result in a reversed priming effect in young adults. Moreover, there were no age group differences in the priming effect with regard to error rates. Hence, the distinction between supraliminal and subliminal presentation cannot serve as the sole explanation for the tendency for reversed priming effects in old adults. In a dot-probe paradigm, Lee and Knight (2009) had found opposing results regarding vigilance versus avoidance effects in attention depending on sub- versus supralimininal presentation of stimuli, their modality (words versus faces) and trait anxiety. They interpreted their findings as reflecting differences in processing time with faster attention to threatening stimuli, diversion of attention and redirection on the threatening stimulus. Moreover, they found these effects only in older adults but not in their young sample.

Up to now, findings have been inconclusive with respect to these different accounts. In this study, the dependence of the direction and size of the priming effect on the level of affective fear of crime and mean RT in old adults points to potential differences in the use and feasibility of counter-regulative mechanisms that may not extend to error rates. One promising explanation could be that counter-regulative mechanisms need time to unfold. Thus, the overall slower response times in the old age group could allow counter-regulative mechanisms to occur, resulting in seemingly absent priming effects. Potentially, the tendency for negative priming effects dependent on the affective component of fear of crime needs time to unfold as well. Likewise, in the young age group, a high frequency of experienced fear of crime (i.e., the affective component) was

related to slower mean RTs (r = .39, p < .05)[22], which was related to a smaller nonsignificant priming effect. However, the young age group with high affective fear of crime was possibly still too fast (compared to the old age group) to show reversed priming effects. On the other hand, old fast responders displayed the typical priming effect. In this vein, it is relevant to distinguish, whether slower response times are a function of differences in motivation to counter-regulate or allow for counter-regulation as a "side effect". Unfortunately, cell sizes were too small to cross mean RT and affective fear of crime in old age, in order to test whether the negative relationship between the affective component of fear of crime and the crime-threat priming effect is independent from mean RT. If this were the case, it would suggest that old adults differ from young adults in coping with threat. However, if they displayed the same pattern as young adults, this would speak for a response time account of counter-regulative mechanisms. This potential account is addressed in Study 5. In this vein, the lack of a relation between the crime-threat priming effect and precautious behavior may be attributable to these cognitive ways of counter-regulation.

On a different note, the overall finding of lower priming effects in old adults could indicate that old adults have lower implicit threat associations than young adults, while their explicit evaluations are comparable. Yet, old adults responded faster to threatening than to nonthreatening targets, indicating that their response to potentially threat relevant stimuli was intact. This corroborates results of studies that employed different implicit measures such as visual search or dot-probe paradigms (e.g., Mather & Knight, 2006; Ruffman, Ng, & Jenkin, 2009). These studies demonstrated that the attentional bias towards threatening information is equivalent in young and old adults. Another explanation for a lack of priming in the old age group could be that old adults did not pay attention to the prime stimuli or were not able to process them adequately. However, because the direction of the priming effect depended on the affective component of fear of crime in the old age group and priming effects were visible in their error rates, one can deduce that old adults processed the priming stimuli but with different effects.

3.3. Study 5

In this study I aimed at replicating the results of Study 4 and extending the findings with regard to the influence of mean RT on the magnitude of the crime-threat priming effect. In order to investigate the influence of mean RT, a response window technique was implemented. This technique was first introduced by Greenwald, Draine, and Abrams (1996) and consists in forcing the participant to respond within a narrow time frame after perceiving the target stimulus. This procedure is assumed to avoid that priming effects are distributed across response time and error effects because of speed-accuracy tradeoff problems. By setting a narrow response window, comparable mean RT are produced leading priming effects to be visible rather in percentage of errors than in response times. In the present study the aim consisted in producing comparable response times in old

[22] This finding conceptually replicates earlier findings of relations between the level of (trait) anxiety and mean RT in other reaction time measures, as for example dot probe tasks (e.g., Bar-Haim, Lamy, and Glickman (2005); Bradley, Mogg, White, Groom, and Bono (1999); Mogg and Bradley (1999)).

adults as in young adults without response time restriction. This was done in order to test whether potential counter-regulative mechanisms in old adults were dependent on mean RT. Study 4 had shown that old adults with fast response times had comparable crime-threat priming effects as young adults with the same mean RT. It could not be tested whether old subjects with high affective fear of crime and fast response times still showed a tendency for reversed priming effects.

3.3.1. Hypotheses

First of all, it is tested whether old adults show larger crime-threat priming effects when mean RT is restricted. Moreover, if counter-regulative mechanisms in relation to affective fear of crime in old adults are dependent on mean RT, they should be diminished when mean RT is restricted to faster responses. In contrast, if they are independent from mean RT but a function of other age-related factors, they should be still visible under response time restrictions. Furthermore, if cognitive counter-regulative mechanisms in old adults with high affective fear of crime are one mechanism to deal with threat and these mechanisms are undermined with response time restriction, potential positive relations between the crime-threat priming effect and precautious behavior may be obtained.

3.3.2. Method

3.3.2.1. Participants

Twenty-seven students from different faculties of the University of Hildesheim (Md_{age} = 21.0 ranging from 19 to 28 years; 85.0% female) and 17 old adults (Md_{age} = 67.0 ranging from 61 to 78 years; 71% female) participated in this study. Old adults were recruited via advertisement in the local newspaper, at institutions for further education, and at community meeting places. All participants were native speakers of German and had normal or corrected-to-normal vision. Moreover, young participants had more years of education (M = 12.9, SD = 0.4) than did old adults (M = 10.9, SD = 1.8), $t(41) = 4.45$, $p < .001$.

Regarding psychological variables old adults indicated less negative affect than young participants, $t(41) = 2.05$, $p < .05$, but the age groups did not differ in positive affect, $t(41) = -1.48$, *n.s.* (positive: M_{young} = 3.7 vs. M_{old} = 3.9; negative: M_{young} = 2.6 vs. M_{old} = 2.2) as measured with the Positive and Negative Affect Schedules.

Three additional old participants were excluded based on the application of the same cut-offs for outliers in mean RT and error rates as in Study 4 referring to the unrestricted response time condition. Inclusion of these participants in the analyses did not change the pattern of results.

3.3.2.2. Design, Material, and Procedure

Generally, the same design as in Study 4 was implemented. However, after two blocks a response time manipulation was used. In order to implement the response window condition, participants were instructed to respond as fast as possible without making errors. However, they were informed that the word's color would turn from white to gray when they were too slow. The color changed 800 ms after onset of the target. Respondents could still response after this deadline but were informed that they were too slow.

No changes were made concerning the measures of Study 4. Cronbach's alpha for the affective component was α = .90 and for the cognitive component it was α = .80, respectively. Internal consistency for the behavioral component was α = .82.

The technical set-up of the present study was the same as in Study 4. The experiment comprised six blocks with 84 trials each. Two consecutive blocks comprised one experimental condition. The first two blocks were assigned to the free response time condition that replicated the design of Study 4. The third and fourth blocks were conducted under conditions of restricted response time with the response window manipulation.[23] In block five and six a time perspective manipulation was implemented; however, results of this part of the Study are not reported here.

Participants worked through 24 practice trials before block one and before block three. There was a short break after each block. Over the course of two blocks, each word appeared equally often as a congruent target and as incongruent target, or as a congruent prime and as incongruent prime. The sequence of trials was randomly selected by the computer. Consequently, across two experimental blocks 84 (threat-)congruent (21 nonthreatening-nonthreatening and 63 threatening-threatening) trials and 84 incongruent (21 nonthreatening-threatening and 63 threatening-nonthreatening) trials were presented. The addition of filler trials made sure that the occurrence of a threatening vs. nonthreatening target following the prime was not predictable. Altogether, participants worked through 504 trials.

3.3.3. Results

The mean error rate in threat evaluation of the target word for the young age group was 3.7% (*SD* = 2.3, ranging from 0.6 to 9.8%) in the free response time condition and 5.0% (*SD* = 2.5, ranging from 1.0 to 11.3) in the response window condition. For the old age group the mean error rate in the free response condition was 1.3% (*SD* = 1.72, ranging from 0 to 6.2%) and under restricted response time it was 3.4% (*SD* = 3.4, ranging from 1.5 to 12.0). Response times (RT) that were 1.5 interquartile ranges above the third quartile with respect to the individual distribution (Tukey, 1977), were above 1500 ms or below 200 ms, and RTs of incorrect trials were discarded (*M* = 11% of all trials and 9% of relevant trials).

[23] Order of response time manipulation was not randomly administered as the sample size was already small. In a previous experiment, where participants immediately started with a response window instruction, the effect of shortened response time, which is reported here, was also found.

3.3.3.1. Crime-Threat Priming Effect

Mean RT

In order to test whether priming effects are dependent on response time and whether this effect is different for age groups, I conducted a 2 (Age: young vs. old) × 2 (Prime: crime-threatening vs. nonthreatening) × 2 (Target: non-threatening vs. nature-/health-threatening) × 2 (Time: free vs. response window) ANOVA with repeated measures on the last three factors and mean RT as dependent variable. The analysis revealed a significant main effect of Time, $F(1, 42) = 110.42$, $p < .001$, $\eta^2 = .72$, and Age, $F(1, 42) = 42.49$, $p < .001$, $\eta^2 = .50$. As shown in Table 16, participants responded generally faster when instructed to respond within the response window ($M = 631$ ms) than when only instructed to respond as fast as possible ($M = 761$). This effect indicates that the response window manipulation was successful. Moreover, old participants responded slower in both time conditions ($M_{free} = 842$ and $M_{window} = 671$) than young participants ($M_{free} = 680$ and $M_{window} = 591$). However, this effect was qualified by an interaction with Time, $F(1, 42) = 10.86$, $p < .01$, $\eta^2 = .21$. The decrease in mean RT was larger in the old age group (*Diff* = 171 ms) than in the young age group (*Diff* = 89 ms). Old participants under time pressure responded approximately as fast as young adults in the free response time condition.

Concerning the crime-threat priming effect, there was a significant interaction effect between Prime and Target, $F(1, 42) = 29.58$, $p < .001$, $\eta^2 = .41$. However, this effect was qualified by an interaction with Time, $F(1, 42) = 4.70$, $p < .05$, $\eta^2 = .10$, suggesting that the priming effect was influenced by the response window manipulation. Follow-up ANOVAs separately for the two time conditions revealed that the interaction between Prime and Target was only marginally significant in the condition with free response time, $F(1, 42) = 3.14$, $p = .08$, $\eta^2 = .07$. In contrast to Study 4, this effect was not influenced by age group, that is, young and old adults showed comparable crime-threat priming effects. With response time restriction, there was a large interaction effect between Prime and Target obtained, $F(1, 42) = 55.84$, $p < .001$, $\eta^2 = .57$. As can be seen in Table 16, the crime threat priming effect is much larger in the condition with response window ($M = 31$) than with free response time ($M = 12$).

Moreover, as old adults in the response window condition exemplified approximately as fast mean RT as young adults in the free response time condition, I tested the difference of the crime-threat priming effect between the age groups. The crime-threat priming effect of old adults was marginally significantly larger than that of the young age group, $t(42) = -1.95$, $p = .058$.

Table 16

Mean RTs (in ms; errors in % in parenthesis) for the two response time conditions as a function of prime category and target category, mean values for congruent and incongruent trials and the corresponding threat priming effect, for all participants and separately for young and old participants

		Free Response Time				
		Prime		Crime priming effect		
		Non-threatening	Crime-threatening	Congruent	Incongruent	Priming Effect
All participants						
Target	Non-threatening	**747 (0.9)**	768 (3.6)	755	767	12
	Nature/Health-threatening	766 (3.4)	**763 (2.6)**			
Young participants						
Target	Non-threatening	**665 (1.1)**	686 (6.3)	674	687	13
	Nature/Health-threatening	688 (4.8)	**682 (4.0)**			
Old participants						
Target	Non-threatening	**829 (0.8)**	851 (0.8)	837	848	11
	Nature/Health-threatening	845 (2.1)	**844 (1.3)**			
		Response Window				
		Prime		Crime priming effect		
		Non-threatening	Crime-threatening	Congruent	Incongruent	Priming Effect
All participants						
Target	Non-threatening	**616 (2.7)**	647 (7.9)	616	647	31
	Nature/Health-threatening	646 (7.8)	**616 (3.2)**			
Young participants						
Target	Non-threatening	**580 (2.1)**	599 (7.4)	579	603	24
	Nature/Health-threatening	606 (6.3)	**577 (3.4)**			
Old participants						
Target	Non-threatening	**651 (3.4)**	694 (8.4)	653	690	37
	Nature/Health-threatening	685 (9.2)	**654 (2.9)**			

Note. Priming Effect = mean RTs in incongruent trials (italics) – mean RTs in congruent trials (bold).

Error Rates

The same analyses as in the previous paragraph were conducted with percentage of errors as outcome variable. There was a significant effect of Time, $F(1, 42) = 11.24$, $p < .01$, $\eta^2 = .21$, that was qualified by an interaction with Age, $F(1, 42) = 5.71$, $p < .05$, $\eta^2 = .12$ (Table 16). While old adults made less mistakes in the free response time condition ($M = 1.26$) than young adults ($M = 4.03$), their increase in mistakes was greater with restricted response time ($M = 5.99$) than that of the young age group ($M = 4.83$).

Moreover, the interaction between Prime and Target [$F(1, 42) = 22.16$, $p < .001$, $\eta^2 = .35$] was qualified by Time, $F(1, 42) = 4.24$, $p < .01$, $\eta^2 = .21$. Table 16 shows the error percentages separately for the two time conditions and Prime-by-Target values. As can be seen, error percentages are lower in congruent than in incongruent prime-target-trials in both Time conditions. However, this difference is even larger in the condition with restricted response time ($Diff_{free} = 1.75$ vs. $Diff_{window} = 4.9$). Thus, the results of error percentages mirror the results in the response time analysis.

Influence of mean RT in the Free Response Time Condition

Although old adults responded generally slower than young adults comparable to Study 4, there was a marginally significant crime-threat priming effect obtained for both age groups in the condition with free response time. There was neither a significant correlation between mean RT and the crime-threat priming effect across the age groups ($r = -.14$, $p = .35$) nor within the two age groups ($r_{young} = -.13$ and $r_{old} = .22$, $p > .36$) for the free response time condition.

3.3.3.2. Self-Report Fear of Crime

As in Study 4, young adults differed significantly from old adults with regard to the affective component of fear of crime, $t(42) = 2.58$, $p < .05$. Young adults reported to be afraid of victimization more often than old adults ($M_{young} = 1.87$, $SD = 0.67$ vs. $M_{old} = 1.45$, $SD = 0.42$). There was no significant difference in the cognitive component ($M_{young} = 1.67$, $SD = 0.34$ vs. $M_{old} = 1.72$, $SD = 0.45$, *n.s.*). In contrast, old adults indicated more frequent precautious behavior in the behavioral component ($M_{young} = 2.05$, $SD = 0.54$ vs. $M_{old} = 2.38$, $SD = 0.73$); yet, this effect was only marginally significant, $t(42) = -1.74$, $p = .09$. Affective fear of crime had no significant correlation with behavioral fear of crime, $r(42) = .01$, *n.s.*, but it had a positive correlation with the cognitive component, $r(42) = .31$, $p < .01$. Behavioral fear of crime and the cognitive component were also positively correlated, $r(42) = .33$, $p < .05$.

3.3.3.3. Relations Between Priming Effects, Self-Report Fear of Crime, and Age

Results of Study 4 showed that the crime-threat priming effect was dependent on self-reported affective fear of crime in the old age group. The higher affective fear of crime was the smaller was the crime-threat priming effect. In order to test the stability of this result and to study the influence of time pressure on this effect and the influence of the other fear-of-crime measures, I conducted six regression analyses with the crime-threat priming effect in the free response time condition and the response window condition, respectively, as dependent variable. Predictors were age (effect-coded: young = -1, old = 1), the respective fear-of-crime component (centered on mean of distribution), and the interaction term between age and the fear-of-crime component.

Table 17 gives the regression coefficients for the various analyses. As expressed in small R^2-values, the studied predictors explained only a small part of the variance of the crime-threat priming effects under both time conditions. Still, there were two significant interaction effects. In contrast to Study 4, there was no significant interaction between age and affective fear of crime in the free response time condition. However, there was a marginally significant interaction in the response window condition, B = -16.52, β = -.36, p = .06. Figure 17 depicts the different trajectories of the crime-threat priming effect in dependence of affective fear of crime and age group. While the crime-threat priming effect decreased with increasing affective fear of crime in the old age group (r = -.28), it increased in the young age group (r = .23). Applying the Johnson-Neyman technique revealed that young adults' crime-threat priming effect differed significantly from old adults' when affective fear of crime was 1.44 or below. Compared with Study 4, old adults with low affective fear of crime showed markedly larger priming effects with restricted response time than with free response time.

Table 17

Predictors of crime-threat priming effect for the time conditions separately

	Free Response Time			Response Window		
Variable	*B*	β	95% CI	*B*	β	95% CI
Constant	13.29		[-2.68, 29.27]	26.44		[17.36, 35.51]
Age	-2.92	-.07	[-18.90, 13.06]	4.26	.16	[-4.82, 13.34]
Affective[a]	-10.62	-.15	[-41.05, 19.82]	-7.97	-.18	[-25.26, 9.32]
Age × Affective	6.88	.09	[-23.55, 37.32]	-16.52	-.36†	[-33.81, 0.77]
R^2	.04 [F(43) = 0.60]			.14 [F(43) = 2.24†]		
Constant	12.73		[-1.6, 27.07]	30.46		[22.19, 38.72]
Age	-0.91	-.20	[-15.25, 13.42]	7.06	.26	[-1.20, 15.32]
Cognitive[a]	-2.13	-.18	[-39.26, 35.0]	-12.30	-.18	[-33.70, 9.11]
Age × Cognitive	-15.66	-.13	[-52.79, 21.47]	-4.04	-.06	[-25.44, 17.37]
R^2	.02 [F(43) = 0.26]			.10 [F(43) = 1.42]		
Constant	16.66		[2.81, 30.51]	31.25		[22.62, 39.88]
Age	-1.20	-.03	[-15.05, 12.65]	6.87	.25	[-1.76, 15.50]
Behavioral[a]	6.65	.09	[-14.96, 28.26]	0.51	.01	[-12.95, 13.98]
Age × Behavioral	-27.17	-.37*	[-48.77, -5.56]	-5.69	-.13	[-19.15, 7.78]
R^2	.14 [F(43) = 2.24†]			.08 [F(43) = 1.14]		

Note. N = 209. CI = confidence interval. Age effect-coded (age: young = -1, old = 1). [a] mean-centered.
† p < .10 * p < .05.

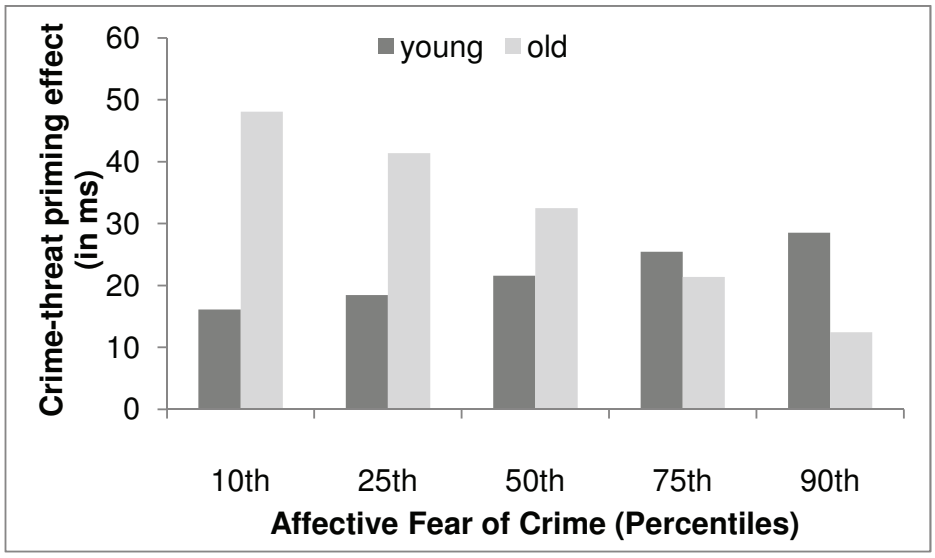

Figure 17. Crime-threat priming effect as a function of affective fear of crime in the response window condition separately for young and old adults at various points of the distribution of affective fear of crime.

Contrary to Study 4, there was a significant interaction effect between age and behavioral fear of crime in the free response time condition, B = -27.17, β = -.37, p < .05. As illustrated in Figure 18, the crime-threat priming effect increased with increasing behavioral fear of crime in the young age group (r = .41) while it decreased in the old age group (r = -.27). Old and young adults' crime-threat priming effect differed significantly when behavioral fear of crime was 2.87 or above (Johnson-Neyman significance region).

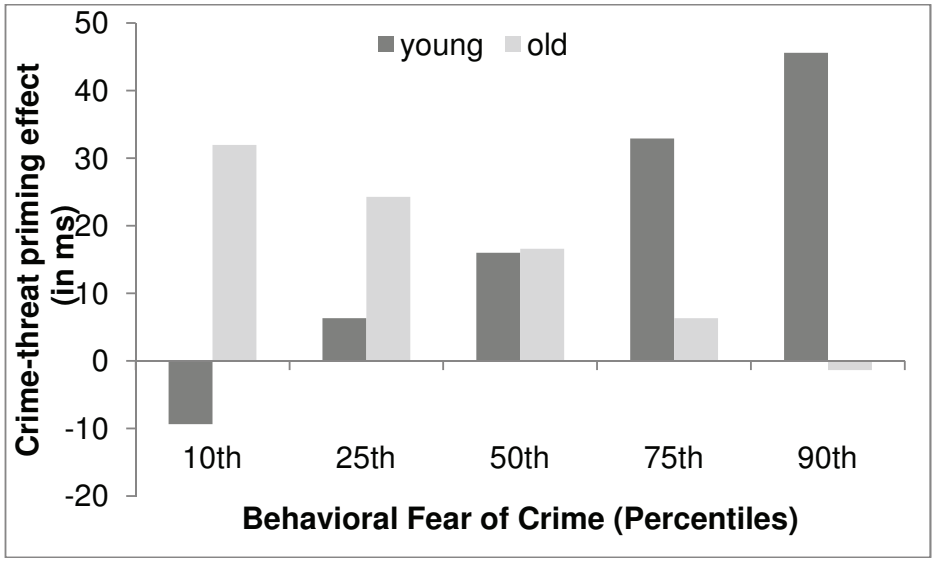

Figure 18. Crime-threat priming effect as a function of behavioral fear of crime in the free response time condition separately for young and old adults at various points of the distribution of behavioral fear of crime.

3.4. General Discussion of Studies 4 and 5

Study 5 was conducted to test the reliability of the findings of Study 4, to examine the influence of mean RT on the magnitude of the crime-threat priming effect, and to investigate the relationship between implicit and explicit measures of fear of crime.

In contrast to Study 4, old adults showed a crime-threat priming effect as large as that of the young age group in the free response time condition, albeit the magnitude of the priming effect being lower than that of the young adult group in Study 4. Mean RT had no influence on the magnitude of the priming effect. Old adults were slightly slower in Study 5 compared with Study 4, while young adults were slightly faster. This finding casts doubt on the account that smaller priming effects in the old age group in Study 4 were a function of mean RT. Age and mean RT were correlated in Study 4, but based on the findings of Study 5 it seems that mean RT was not the reason why old adults showed smaller to almost reversed priming effects.

By way of setting a response window an experimental manipulation of mean RT was induced. With restricted response times larger overall crime-threat priming effects resulted in both age groups. This finding shows that the magnitude of the crime-threat priming effect is indeed a function of mean RT. However, as suggested above, it does not seem to explain differences between the age groups in Study 4. As the effect in the younger age group was also slightly smaller in Study 5, this may suggest that the magnitude of the effect may vary. In Study 5 a smaller number of trials was utilized that may also impact on the crime-threat priming effect. Yet, a re-analysis of only the first two blocks of Study 4 consisting of 112 trials mirrors the results of the analysis across all six blocks. Hence, the number of trials seems not to be important in this case. Another difference between the procedure of Study 4 and Study 5 concerns additional experiments that were conducted within the experimental session. While participants started with the priming task in Study 4, they conducted the priming task in Study 5 directly after participating in an emotional Stroop task. This may have lead to being familiar with the computer setting, on the one hand, and differences in handling the task, on the other hand. Independent of whether one or both accounts or none of them are applicable, this indicates that the magnitude of the crime-threat priming effect is variable. Nonetheless, future studies could investigate the impact of variations in the experimental setting, as both accounts refer to important aspects in aging research. First, if (some) older adults have to familiarize with the computer setting first, this may influence the validity of the findings if the experimental setting does not take care of that. Second, if the emotional Stroop task influenced the results, this may be interesting in the sense of priming attentional processes in subsequent tasks. For example, Eder (2011) demonstrated that implementation motivations influenced subsequent task fulfillment, although this specific implementation goal was not required for the task.

This susceptibility to influences may have consequences for the interpretation of relations between explicit and implicit measures of fear of crime. The implementation of a response window in Study 5 achieved faster response times in both age groups and increased error rates. As in Study 4, there was no significant correlation between the crime-threat priming effect and component measures of fear of crime across both age

groups. In contrast to Study 4, there was no interaction between age and affective fear of crime in the free response time condition. Yet, this interaction was marginally significant in the response window condition. While affective fear of crime was negatively correlated with the crime-threat priming effect in the older age group, there was a positive relationship between affective fear of crime and the crime-threat priming effect in the young age group. Thus, the young age group mirrored results of prior studies using affective priming in fear research (e.g., Dannlowski et al., 2006; Reinecke et al., 2010). Moreover, this finding indicates that potential counter-regulative or inhibitory mechanisms in older adults are not a function of mean RT as they can also be observed under restricted response time conditions. The explanation of a strength-of-activation dependent inhibition as suggested by Berner and Meier (2004) does not seem to be appropriate here. They argue that high trait anxiety or the intensity of the stimulus may activate inhibitory mechanisms that reverse the priming effect. Yet, older adults reported lower affective fear of crime values than young adults. Potentially the same value on the affective component of fear of crime, i.e., frequency of fear experiences does not reflect the same magnitude of fear of crime for young and old adults.

Alternatively, other processing mechanisms in older adults, as mentioned above, play a role for these results. A series of studies by Degner (2009) showed that effects in the affective priming task can be influenced by spontaneous and strategic motivations to regulate the effects. Shortening the duration of prime presentation or reducing the stimulus onset asynchrony did not alter this finding. However, the implementation of a response window (600 ms) resulted in comparable priming effects in a control group and a group that was instructed to manipulate the priming effects. Degner interpreted this result as indicating that successful manipulations were implemented at the level of response control, i.e., speed of response, and not at the level of input control, which could consist in control of attentional mechanisms or evaluation of the stimulus. In Degner's study participants were instructed to manipulate the results of the priming task. This may need time and implementation may focus on response control. In contrast, in the present studies it may also be that older adults implement task processing goals dependent on or related to their affective fear of crime. As these effects were also visible under restricted response time, this may suggest that these implementation goals operate at a more automatic level and potentially also at the level of input control. Further studies are required to understand these mechanisms. For example, Williams, Bargh, Nocera, and Gray (2009) implemented unconscious re-appraisal goals in their participants that influenced physiological reactivity in a subsequent stress inducing task.

For the free response time condition I found an interaction effect between age and precautious behavior on the crime-threat priming effect in Study 5 that was not obtained in Study 4. While young adults exhibited the expected positive relationship between precautious behavior and the crime-threat priming effect, a negative relationship was found in the older adult age group. Again, this might be the result of the previous experimental task. In the emotional Stroop task, older adults with high precautious behavior showed lower Stroop effects with negative words of medium arousal than older adults with low precautious behavior. Normally, Stroop effects are interpreted as failing inhibitory mechanisms. Correspondingly, older adults with high precautious behavior

demonstrated better inhibition mechanisms than older adults with low precautious behavior. The findings in the Stroop task in the experimental setting of the present study indicated that older adults with high Stroop effects were also those who had experienced less negative affect in the last 12 months. Hence, larger Stroop effects could also reflect a mechanism of engaging with the negative information and re-appraising it (e.g., Gross & Barrett, 2011; Shiota & Levenson, 2009). In consequence, the lack of a Stroop effect in older adults with high precautious behavior could either mean that they are better able to inhibit negative stimulus information or less able or motivated to engage with the negative stimulus to re-appraise it. Yet, as mentioned above, this information processing mechanism of inhibition may have been transferred to the subsequent task influencing the size of the priming effect. Assuming that older adults with high precautious behavior were still in the mindset of inhibiting negative stimulus information could explain why this group of older adults produced lower crime-threat priming effects than those with low precautious behavior. Of course, these accounts for differential effects between Study 4 and 5 and young and old adults are very tentative at this point and need to be investigated further. Foremost, systematic variations of the evocation of specific information processing mechanisms have to be carried out, for example, absolving tasks that either promote inhibition versus engaging with negative stimuli and following this task with a priming task.

The goal of Study 5 consisted in producing mean RT in old adults that are comparable to those of young adults without response time restriction. The analysis shows that the crime-threat priming effect of old adults is larger than that of young adults, when mean RT is comparable. However, as detailed above, the crime-threat priming effect in the free response time condition may be influenced due to the prior Stroop task. More importantly, considering that affective fear of crime influenced the magnitude of the crime-threat priming effect in the response window condition, it can be seen that particularly older adults with low affective fear of crime produced larger crime-threat priming effects. Accordingly, it is questionable whether larger crime-threat priming effects in older adults indeed unconditionally reflect stronger threat associations in old age compared with young age.

Based on the findings so far, it can be concluded that the present two studies are one of the first to apply evaluative priming to the implicit measurement of age-related differences in the association of threat and its relation to experiences of fear of crime and precautious behavior. The results point to the potential of this approach. In the young age group, the expected crime-threat priming effect was obtained. Moreover, under time pressure the younger age group also exemplifies the expected relation between the explicit and implicit measures. In contrast, the results for the older adult age group do not conform to the expected relation between explicit and implicit measures. Differential findings of age group differences between Study 4 and 5 indicate that the evocation of the priming effects is dependent on numerous influences, while mean RT per se could be ruled out. There is preliminary evidence that differences in information processing related to fear of crime influence the magnitude of crime-threat priming effects. This may have consequences for the interpretation of the results of the vignette studies and emotion induction studies in general. If older adults with high precautious behavior or high

affective fear of crime have the tendency to inhibit the processing of negative threatening information, they may also have done so in the scenarios. In this way, situational fear would have been underestimated. Against this backdrop, it would be interesting to combine vignette studies with, for example, priming studies in order to disentangle different mechanisms in processing the information.

Limitations Specific to Studies 4 and 5

Some limitations have to be noted with regard to the conducted studies. A first limitation concerns the sample. The sample size of Study 5 was relatively small, although this does not seem to have affected the power to detect significant differences. Moreover, the rate of female participants was high. As has been shown in the Studies 1 to 3, female participants indicated more situational fear of crime than male participants. There is also a gender effect in the components of fear of crime. Accordingly, the effect of gender could not be considered in the priming studies. However, the percentage of females in both age groups was approximately the same so that potential gender effects should have influenced the effects to the same extent (given no interaction effects between age and gender). Middle-aged adults were not part of the priming studies but may have provided information about the linearity of effects across the life course.

A second limitation refers to the utilized stimuli. The value of the stimuli is only quasi-experimental. Although care has been taken regarding potential differences due to word frequency and word length, there may still be factors that are confounded with the specific word category (crime-threatening vs. nonthreatening). Those confounds can influence the priming effects apart from the attributed influencing factor of threat versus nonthreat. However, this would not explain age differences in the processing of the words, if not assuming interaction effects between the confounding variables and age. In order to rule out such effects, conditioning studies could be combined with threat priming studies. In a first step, participants would learn to associate neutral stimuli (e.g., geometric figures) with threat (preferably crime threat) within a classical conditioning paradigm. In a second step, participants would take part in the threat-priming paradigm. Although the ecological validity of such studies may be questioned, they could provide additional information and thereby complement findings regarding differences in processing between the age groups and strengthen the conclusions drawn above.

4. An Extended Outlook: The Value of Risk

In this chapter I want to focus on one alternative account for the increase of precautious behavior with age. This theoretical perspective encompasses a large body of research of its own, which I will not nearly be able to present here. In this sense, this section is meant to be an extended outlook at an alternative account, in which I will first only sketchily refer to relevant theoretical perspectives and then present a first correlational study that lends support for further investigations in this direction.

4.1. Theoretical Advances

Although the findings of the Studies 1 to 5 have some caveats and do not allow conclusive understanding about age-related differences in situational fear, they rather suggest that there are no general age-related differences in situational fear of crime and thus no age-related increase in dispositional fear. Moreover, they indicate that precautious behavior, while connected to situational fear, is only partly a function of age-related differences in situational fear. Hence, alternative accounts for the age-related increase in precautious behavior can be considered. An alternative account consists in viewing precautious behavior as only one way of dealing with fear. Barrett et al. (2007) contend that

> a given instrumental behavioral response need not express a specific kind of emotion. For example, although fear may be associated with freezing, fear is associated with a number of other behaviors, ranging from vigilance to attack (for a review, see Bouton, in press). The threat (or defense) system is organized so that an animal will engage in different behaviors depending on its psychological distance from a predator (Fanselow, 1994; Fanselow & Lester, 1988). Not only are different behaviors associated with the same emotion category, but one type of behavior can be associated with many categories. For example, varieties of aggressive behavior (e.g., defensive, offensive, predatory) are associated with different types of stimulus situations and are caused by different neural circuitry (Blanchard & Blanchard, 2003). (p. 185)

On the one hand, this assertion emphasizes that behaviors identified as precautious can only be recognized as such if they are attributed to fear. Otherwise the same behavior could, for example, be an expression of anger (see also chapters 1.1 and 1.2 on this aspect). The findings of Study 2 demonstrated that at least part of the variance in precautious behavior is related to differences in situational fear. However, there is a large part of unexplained variance that may be due to other factors important in the reported behaviors (when not being precautious behavior). The second important aspect raised by Barrett et al. (2007) and related to the aforementioned is that precautious behavior is but one way of dealing with fear. Instead of staying at home out of fear, people may go out but be particularly attentive to their surroundings. Accordingly, young and old adults may be equally likely to experience fear of crime when being in or anticipating a potentially threatening situation (although, based on Studies 1 to 3, it may not be the same situation).

In this perspective, unexplained variance in the relation between precautious behavior and situational fear may result from the non-deterministic relationship between fear and precautious behavior. While precautious behavior is an indicator of fear (see argumentation in chapter 1.2.3), the absence or a lower magnitude of it need not be indicative of a lack of fear. Greve (2004) argues that possibly not the costs decide whether a risky behavior is taken but that threatening situations may also be associated with possible gains, which have different weights for young and old adults. In this way risky behavior is framed within an expectancy-value perspective.

This perspective still fits with the action theoretical perspective introduced in chapter 1.1. Frijda (2010) suggests that the functions of emotion include that "they *set* the individual for action. Action itself does not necessarily follow: the right stimulus may not be around; one may have to wait for a prey to come within reach, or a mate to show interest; action may be suppressed" (p. 69). What is even more important is his assessment that "a single event is appraised as touching upon more than one concern, and activates more than one emotional aim. In everyday life, this is the rule rather than the exception" (p. 70). Goal conflicts may arise and depending on the strength of each goal in this moment goal-related behavior ensues. Frijda refers to his "Law of Apparent Reality", that is, the more real and intense the meaning of an event for a subjective goal is appraised, the more it gets behavioral precedence over other goals. In this sense, the risk associated with going out in the dark and using public transport, which is perceived as being dangerous, may be offset by associated gains like meeting friends at the club or taking part in sports courses. In contrast, the associated gains may have less weight (or apparent reality) for other individuals resulting in a different ratio of risks and gains. This does not mean that the situation is not equally evaluated as threatening but the behavioral consequences may differ in relation to expected gains. Regarding age differences, certain gains may have lost their meaning to older adults compared with young adults resulting in risk avoidant behavior. If this was the case, of course, it needed to be explained what triggers the decrease of meaning of certain goals. It may be that older adults have already achieved some of these goals (e.g., finding a partner). The goals' meaning may also have been devalued due to their unavailability in an accommodative perspective (cf. Brandtstädter, 2009; Ebner, Freund, & Baltes, 2006; e.g., meeting with friends when they have already died; being less able to walk due to physical handicaps).

Furthermore, the meaning of certain goals may not have changed but opportunities to fulfill them may differ between age groups. Tulloch (2000) argues that there are "factors which may be unrelated to crime but impact on personal risk assessment, such as relationship status, age of children, ownership of private transport, or recreation patterns" (p. 453). Retirement may influence, when older adults are able to meet friends. Moreover, they may have less time pressure so as to be able to take a longer route home that is less dangerous. Furthermore, increasing age may be related to being more able to afford living in less crime-prone areas or having built up a social network with neighbors. These aspects refer to more flexibility in seeking out dangerous situations or less necessity to be in such situations.

Seeking out versus avoiding dangerous situations could also be framed within research about risk-taking behavior. Reviews of risk-taking behavior suggest that old adults are not

generally less likely to engage in risky behavior (Mata, Josef, Samanez-Larkin, & Hertwig, 2011; Mather, 2006). Mather (2006) concludes in her review that older adults do not differ from younger adults in their risk evaluation. Yet, older adults may appear risk avoidant because they avoid making decisions, which has been shown with regard to experimental studies using choice dilemmas or in medical decisions. Moreover, cognitive decline may impact on older adults' ability in strategic decision making tasks that involve the integration of many pieces of information. Mata and colleagues (2011) refine the findings on risky choice by conducting a meta-analysis that included 29 comparisons between younger and older adults. In referring to Knight (as cited by Mata et al., 2011, p. 18), the authors distinguish between three different types of probability of risk: (1) *a priori* probabilities, (2) statistical probabilities, and (3) estimates. *A priori* probabilities mark situations, where the probability of the occurrence of an outcome is known or easily calculable, e.g., in a lottery. Statistical probabilities are empirically derived through experience with the situation. Estimates refer to situations that are relatively unique and therefore their likelihood is difficult to assess. Mata et al. included studies that focused on a priori and statistical probabilities. They found that age-related differences in risk-taking behavior were dependent on task characteristics. While there were no age-related differences in tasks that involved decisions from description, i.e., *a priori* probabilities, tasks that included learning from prior performance exhibited an age-related difference as a function of choice framing (gains vs. losses). Older adults were more risk-seeking than young adults when the task required learning that a specific behavior leads to loss. In contrast, when being confronted with tasks that led to learning that a certain behavior results in gain, older adults showed more risk-avoidant behavior than young adults. The authors interpret this finding as reflecting age-related cognitive decline resulting in impaired learning performance.

An important weakness in this field, as Mata et al. (2011) contend themselves, is that the experiments focus on relatively rapid learning that involves little information and probably a novel environment. Consequently, it is questionable to what extent conclusions can be drawn regarding real life decisions, where older adults could profit from accumulated life experience. Yet, criminal victimization may belong to the realm of estimate probabilities anyway as it is a rather unlikely event at least with regard to violent crime (e.g., about 10% lifetime prevalence of violent assault, cf. Baier et al., 2011). In this sense, it may not be possible to investigate precautious behavior within this methodological approach. In contrast, Gigerenzer and Gaissmaier (2011) suggest that especially in settings with low predictability, i.e., situations with high uncertainty, simple heuristics may be more expedient than complex calculations of all available information. Moreover, incentives in risk-decision studies were mostly monetary, which need not impact on the motivation to perform well at the task. However, it may influence the employed strategies. For example, gaining access to social activities may be more rewarding to older adults, whereas avoiding physical threats may be more motivating for risk-avoidant behavior. Of course, ethical concerns restrict the range of possibilities in employing more relevant incentives; yet, there seems to be room to rely on more (age-) relevant incentives (e.g., the utilization of different magnitudes of noise as "punishment").

4.2. The Present Study

As mentioned above, the reasons of seeking out dangerous situations may vary between age groups as a function of associated gain value and opportunity to avoid the situation. Findings of Study 3 indicated that the age groups differed with regard to the importance they put on prevention of being in a dangerous situation. The oldest age group indicated significantly more importance than the youngest age group. As the age groups did not systematically differ in situational fear, this suggests that other age-related factors influence the importance awarded to prevention of being in a potentially dangerous situation. A first correlational study was conducted in order to identify age-related differences in domains of reasons to be in a situation that is perceived as equally dangerous by young and old adults. One such domain focused on the perceived utility associated with being in a potentially dangerous situation (e.g., saving time or money). Another related but still distinct domain referred to pleasures that can only be achieved when also accepting being in a dangerous situation (e.g., meeting friends at a club, participating in sports in the evening). A further domain attended to necessities (e.g., shopping, drawing money). It is important to note that it is not the objective value attributed to these reasons regarding a certain criterion but the subjective value associated with these reasons. Older adults were assumed to award less value to these reasons for seeking out a dangerous situation than young adults. The extent of awarded value to these domain reasons was supposed to be negatively correlated with avoidance behavior towards specific situations and overall crime-related precautious behavior. Consequently, this relation was assumed to mediate the positive relation between age and precautious behavior. In order to ensure that subjects were able to distinguish between different reasons of seeking out a dangerous situation and to discriminate differences in scale use from differences in reasons, emergency as a reason was included as well. The age groups were not expected to differ with regard to value awarded to emergency as a reason to seek out a dangerous situation.

4.3. Study 6

4.3.1. Method

4.3.1.1. Participants

Thirty-eight young adults (range: 19 - 30 years; Median = 21.0; 53% female) and 32 old adults (range: 60 - 75 years; Median: 68.5; 63% female) were sampled by a student group as part of a students' project. The young sample consisted of students studying (social) pedagogy. Old subjects were recruited at community meeting places and at the senior studying program of the University of Hildesheim. Old participants were more likely to have a partner than young adults (young: 30% vs. old: 69%). However, the age groups did not differ with regard to living conditions. Only 34% of young adults and 34% of the old adults lived alone. This is probably attributable to apartment-sharing on the young adults' side or still living at home as they had a lower probability of having a partner with whom to live together.

4.3.1.2. Measures

Self-report Measures of Fear of Crime

The components of fear of crime were measured with the same scales as in the previous studies. Cronbach's α of the affective component was α = .84 and of the cognitive component it was α = .84. Internal consistency of the behavioral component was α = .88.

Scenarios

Five short descriptions of a situation were chosen that mostly situated the person at nighttime and being alone so as to put the emphasis on the specific place. All situations played at scenes that in principal could be sought out independent from age. The scenarios were:

Bank:	You withdraw money from the ATM late in the evening.
Street:	You walk alone a forlorn street at night.
Park:	You walk through a park alone at night.
Home:	You are alone at home. A stranger rings at your door and you open it.
Neighbor-hood:	You walk alone in the dark through a neighborhood that is known for its social decay.

The situations were held vague with regard to a specific crime that could happen in such a situation. This was done to ensure that there was room for interpretation as to the criminal dangerousness of the situation. Subjects were asked to answer various questions about the situations. First, they should indicate how dangerous they judge the situation with regard to crime on a 6-point scale ranging from *not dangerous at all* (1) to *very dangerous* (6). Moreover, they were asked how often they are in the described situation ranging from *never* (1) to *every day* (6) and how much they try to avoid such a situation out of fear of crime on a 6-point scale ranging from *not at all* (1) to *very much* (6).

Finally, subjects should indicate their agreement with the presence of specific reasons for them to seek out the given situation. Four reasons were provided that had to be rated on a 6-point scale ranging from *not at all* (1) to *agree completely* (6). The four reasons were: (1) being in an emergency (e.g., helping someone), (2) utility associated with being in the situation (e.g., saving time or money), (3) attending necessities (e.g., shopping, drawing money), and (4) following one's pleasures (e.g., meeting with friends, personal interests). Moreover, subjects could report other reasons in an open format.

4.3.1.3. Procedure

The questionnaire was divided into three parts. The first part consisted of questions regarding demographic information. This was followed by the five scenario descriptions. Questions about the situation had to be answered subsequent to each description. In the third part subjects responded to the components of fear-of-crime measures.

Four versions of order of the situation description were implemented and were randomly administered to the subjects stratified by age group. Subjects were handed out the questionnaire and asked to return it after they completed it.

4.3.1.4. Data Analyses

First, parallel univariate analyses of variance (ANOVAs) with age (young vs. old) and gender (female vs. male) were conducted on the components of fear of crime. Thereafter, a 5 (Scenario: Bank vs. Park vs. Neighborhood vs. Street vs. Home) × 2 (Age: young vs. old) × 2 (Gender: female vs. male) multivariate repeated measures analyses of variance (MANOVA) was calculated for each dependent variable separately, i.e., dangerousness, frequency of being in the situation, and avoidance of the situation. Age and gender were between-subject factors, scenario was varied within subjects. *F* values were computed on the basis of Wilks's lambda. If the MANOVA obtained interactions with scenario, univariate analyses of variance (ANOVA) for each scenario were conducted. The partial eta squares are reported for each significant effect.

4.3.2. Results

4.3.2.1. Non-situational Measures of fear of crime

I conducted three parallel 2 × 2 ANOVAs with age (young vs. old) and gender (female vs. male) as between-subject variables for the components of fear of crime (see Table 18 for means and standard deviations). The age groups were only significantly different in behavioral fear of crime, $F(1, 63) = 17.00$, $p < .001$, $\eta^2 = .21$. Old participants indicated that they behaved more precautious ($M = 2.96$) than young participants ($M = 2.15$). Female participants reported more behavioral fear of crime than male participants, $F(1, 63) = 4.73$, $p < .05$, $\eta^2 = .07$. There were no interaction effects between age and gender. As depicted in Figure 19, women and men displayed the same pattern of results but at a different level. Consequently, this sample was comparable to previous studies.

Table 18
Means, standard deviation, and effects of measures of fear of crime for young and old adults in parallel ANOVAS (N = 123)

		Mean		Standard deviation		Effect size		
		Young	Old	Young	Old	A	G	A × G
Affective component	Female	2.01	2.07	0.54	0.64	.00	.02	.00
	Male	1.84	1.89	0.72	0.49			
Cognitive component	Female	1.64	1.79	0.42	0.42	.02	.04	.00
	Male	1.52	1.58	0.35	0.36			
Behavioural component	Female	2.40	3.13	0.66	0.91	.21***	.07*	.00
	Male	1.89	2.78	0.84	0.66			

Note. $p < .05$. ** $p < .01$. *** $p < .001$.

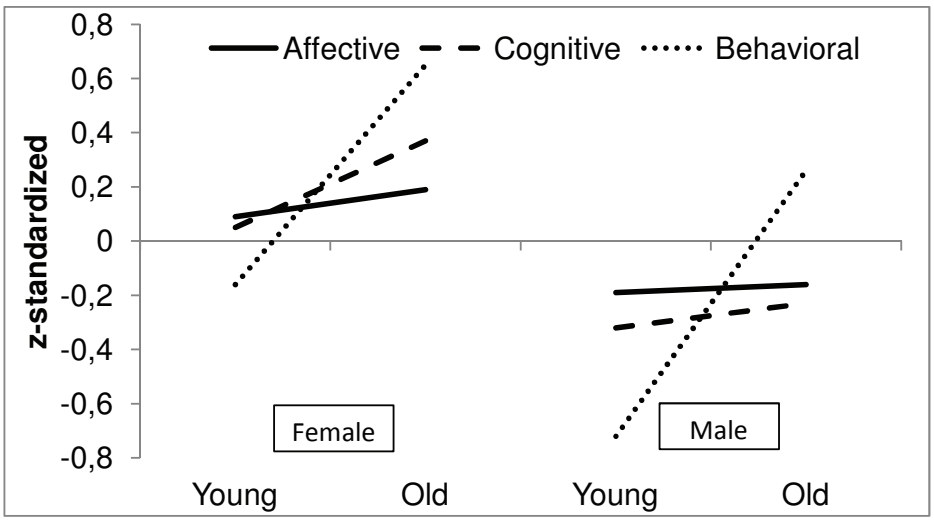

Figure 19. Z-standardized means of the components of fear of crime separately for young and old female or male participants.

4.3.2.2. Evaluation of Scenarios

Dangerousness

The MANOVAs showed a significant main effect of scenario, $F(4, 63) = 26.79$, $p < .001$, $\eta^2 = .63$, as well as interactions between scenario and age, $F(4, 63) = 6.85$, $p < .001$, $\eta^2 = .30$, and scenario and gender, $F(4,63) = 3.62$, $p < .05$, $\eta^2 = .19$. Moreover, there was a significant main effect of gender, $F(1, 66) = 8.97$, $p < .01$, $\eta^2 = .12$. Follow-up parallel ANOVAs for each scenario revealed that the age groups only reported different evaluations of dangerousness in the bank scenario, $F(1, 66) = 11.53$, $p < .001$, $\eta^2 = .15$. Old adults found this scenario more dangerous ($M = 4.18$) than young participants ($M = 2.82$). Regarding gender all but the neighborhood and bank scenario showed a significant gender effect (ps $< .05$) with female participants judging the scenarios to be more dangerous than male participants (see Table 19 for marginal means and effect sizes). Overall, dangerousness of the situations was deemed moderate, given 3.5 as the theoretical mean of the scale.

Table 19

Estimated marginal means[a], standard errors, and effect sizes for dangerousness, frequency, and avoidance for each scenario

	Scenario	Gender	*Mean*		*Standard errors*		*Effect size*[b]		
			Young	Old	Young	Old	Age	Gender	A × G
Dangerousness	Bank	Female	3.2	4.5	.17	.32	.15***	.04	.00
		Male	2.4	3.9	.34	.42			
	Park	Female	4.7	4.5	.14	.27	.01	.17**	.01
		Male	2.9	3.5	.29	.35			
	Neighborhood	Female	4.6	4.1	.16	.30	.00	.01	.06*
		Male	3.7	4.5	.32	.39			
	Street	Female	3.7	3.1	.14	.27	.03	.15**	.08*
		Male	2.4	2.8	.28	.45			
	Home	Female	3.1	3.2	.15	.29	.00	.11**	.00
		Male	2.3	2.3	.31	.38			
Frequency	Bank	Female	3.1	1.8	.11	.22	.42***	.12**	.08*
		Male	4.0	1.9	.23	.28			
	Park	Female	2.8	1.6	.10	.19	.42***	.04	.00
		Male	3.4	1.8	.20	.25			
	Neighborhood	Female	3.0	1.9	.13	.25	.28***	.16**	.06*
		Male	4.1	2.2	.26	.32			
	Street	Female	4.1	3.4	.11	.22	.22***	.01	.02
		Male	4.5	3.3	.23	.28			
	Home	Female	3.2	3.0	.13	.26	.03	.00	.03
		Male	3.4	2.7	.28	.34			
Avoidance	Bank	Female	2.8	4.5	.18	.37	.37***	.00	.03
		Male	1.9	4.9	.38	.46			
	Park	Female	4.4	4.8	.17	.35	.19***	.10**	.03
		Male	2.2	4.3	.36	.44			
	Neighborhood	Female	4.0	4.0	.20	.40	.09*	.01	.07*
		Male	2.6	4.6	.41	.50			
	Street	Female	3.2	2.6	.17	.34	.01	.01	.11**
		Male	2.1	3.4	.35	.43			
	Home	Female	2.8	3.2	.20	.40	.02	.02	.00
		Male	2.2	2.8	.41	.50			

Note. A × G =Age × Gender; [a] Estimated marginal means are given as they are less biased by differences in cell sizes [b] Effect sizes are partial eta squares (η^2).
† $p < .10$ * $p < .05$. ** $p < .01$. *** $p < .001$.

Frequency

Regarding the frequency of being in the described situation, there was a main effect of scenario, $F(4, 63) = 23.04$, $p < .001$, $\eta^2 = .59$, as well as an interaction between age and scenario, $F(4, 63) = 3.79$, $p < .01$, $\eta^2 = .19$. (The main effect of age was also significant, $F(1, 66) = 63.44$, $p < .001$, $\eta^2 = .49$.) Participants indicated being most often in the scenario with the forlorn street ($M = 3.80$) in comparison with being the least often in the park situation ($M = 2.44$). Follow-up ANOVAs revealed that old adults reported being significantly less often in the described situations than young adults in all but the home scenario (Bank: $M_{young} = 3.40$ vs. $M_{old} = 1.86$; Park: $M_{young} = 3.17$ vs. $M_{old} = 1.72$; Neighborhood: $M_{young} = 3.43$ vs. $M_{old} = 2.01$; Street: $M_{young} = 4.30$ vs. $M_{old} = 3.30$; Home: $M_{young} = 3.20$ vs. $M_{old} = 2.83$).

Moreover, there was a significant main effect of gender in the MANOVA, $F(1, 66) = 7.69$, $p < .01$, $\eta^2 = .10$, with female participants indicating to be less often in the described situations ($M = 2.72$) than male participants ($M = 3.12$). Moreover, there was a significant overall interaction between age and gender, $F(1, 66) = 6.01$, $p < .05$, $\eta^2 = .08$, indicating that differences between age groups were dependent on gender. Follow-up analyses showed that the difference in frequency between female and male participants was greater in the young than in the old age group for the bank and neighborhood scenario.

Avoidance

Participants were asked how much they tried to avoid the situation out of fear of crime. The MANOVA revealed a main effect of scenario, $F(4, 62) = 9.63$, $p < .001$, $\eta^2 = .38$, that was qualified by an interaction with age, $F(4, 62) = 11.08$, $p < .001$, $\eta^2 = .42$, as well as by an interaction with gender and age, $F(4, 62) = 2.72$, $p < .05$, $\eta^2 = .15$. In general, participants indicated that they avoided the bank, park, and neighborhood scenario more ($M = 3.47$, $M = 3.74$, and $M = 3.74$) than the street and home scenario ($M = 2.92$ and $M = 2.75$). However, avoidance behavior in the various situations was dependent on age and gender as the interactions indicated (main effect of age: $F(1, 65) = 13.24$, $p < .05$, $\eta^2 = .16$). Follow-up analyses for each scenario showed that the interaction effect between age and gender was only significant in the street and neighborhood scenario (see Table 19). In general, older adults indicated to try to avoid the described scenarios more than young adults, and female participants reported more avoidance than male participants. The only exception was in the street scenario, where older female participants indicated lower avoidance motivation than older male and young female participants.

4.3.2.3. Reasons

I conducted four 2 (Age: young vs. old) × 2 (gender: female vs. male) × 5 (Scenario) repeated measures MANOVAs. The four different reasons were the dependent variable in each MANOVA measured within subjects for each scenario.

Emergency

As hypothesized, there was no main effect of age group revealed regarding emergency as a reason to be in the described situation (Table 20). However, there was a significant 2-way interaction between age and scenario that was further qualified by a 3-way interaction between scenario, age, and gender, $F(4, 59) = 2.97$, $p < .05$, $\eta^2 = .17$. Follow-up analyses on each scenario showed that the interaction between age and gender was only significant in the neighborhood scenario. While male young adults ($M = 3.39$) assigned more importance to emergency than female young adults ($M = 2.70$), old male adults assigned less value to this reason ($M = 2.17$) than old women ($M = 3.94$). There were no further differences between the age groups.

Necessity

Concerning necessity as reason, the analysis obtained a significant effect of scenario, $F(4, 57) = 11.49$, $p < .001$, $\eta^2 = .45$, and a main effect of age, $F(1, 60) = 29.68$, $p < .001$, $\eta^2 = .33$. Moreover, the analysis revealed an interaction effect between scenario and age, $F(4, 57) = 8.48$, $p < .001$, $\eta^2 = .37$, that indicated that differences between the age groups depended on the specific scenario. Follow-up ANOVAs for each scenario showed that the effect of age group differences was significant in all but the home scenario but differed in its effect size (see Table 20). Young adults assigned more relevance to necessity as a reason to be in the situation than old adults (Bank: $M_{young} = 4.64$ vs. $M_{old} = 1.79$; Park: $M_{young} = 3.05$ vs. $M_{old} = 1.62$; Neighborhood: $M_{young} = 3.43$ vs. $M_{old} = 2.07$; Street: $M_{young} = 3.74$ vs. $M_{old} = 2.90$, ps $< .05$; Home: $M_{young} = 1.93$ vs. $M_{old} = 1.56$, *n.s.*).

Utility

With regard to the utility associated with being in the situation, the MANOVA showed a significant main effect of scenario, $F(4, 56) = 6.92$, $p < .001$, $\eta^2 = .33$. Utility of the situation was much less a reason for the home scenario ($M = 1.92$) than for the street scenario ($M = 3.35$). Moreover, there was a significant main effect of age, $F(1, 59) = 24.13$, $p < .001$, $\eta^2 = .29$, that indicated that old adults saw utility as a less relevant reason to be in the situation than young adults ($M_{young} = 3.32$ vs. $M_{old} = 2.05$). Furthermore, the analysis showed a significant interaction effect between age and gender, $F(1, 59) = 4.63$, $p < .05$, $\eta^2 = .07$. Follow-up analyses show that the interaction is only significant in the park scenario, where male participants report utility as reason more than female participants in the old age group than in the young age group.

Pleasure

The analysis demonstrated that pleasure as a reason to bring oneself in the described situation varied across the situations, $F(4, 57) = 8.16$, $p < .001$, $\eta^2 = .36$. Again, it was a less relevant reason for the home scenario ($M = 2.05$) than for the street scenario ($M = 3.31$) with the other scenarios taking an intermediate place. Moreover, the effect was qualified by an interaction with age, $F(4, 57) = 3.92$, $p < .01$, $\eta^2 = .22$, that also qualified the main effect of age, $F(1, 60) = 25.49$, $p < .001$, $\eta^2 = .30$. Follow-up parallel ANOVAs for each scenario revealed that all scenarios but the home scenario had a main effect of age that varied in its effect size. The age groups differed the most in the bank scenario, $F(1, 60) = 32.57$, $p < .001$, $\eta^2 = .35$, while there was no significant difference in means in

the bank scenario, $F(1, 60) = 2.72$, $p = .11$, $\eta^2 = .04$. In all scenarios, old adults reported smaller relevance of pleasure as a reason to be in the situation than young adults (Table 20).

Table 20

Estimated marginal means[a], standard errors, and effect sizes in MANOVA for reasons for being in the specific situation

Reason	Scenario	*Mean*		*Standard errors*		*Effect size*[b]		
		Young	Old	Young	Old	Age	Scenario	A × S
Emergency	Bank	2.86	2.70	.23	.33	.02	.13*	.09
	Park	3.09	3.22	.23	.33			
	Neighborhood	3.23	3.05	.22	.32			
	Street	**2.91**	**3.83**	.20	.29			
	Home	3.18	3.53	.24	.34			
Necessity	Bank	**4.72**	**1.79**	.19	.28	.33***	.45***	.37***
	Park	**3.19**	**1.62**	.19	.28			
	Neighborhood	**3.44**	**2.07**	.21	.32			
	Street	**3.71**	**2.90**	.21	.32			
	Home	1.99	1.56	.17	.25			
Utility	Bank	**3.24**	**2.05**	.22	.34	.29***	.33***	.05
	Park	**3.63**	**2.30**	.20	.31			
	Neighborhood	**3.21**	**1.73**	.19	.29			
	Street	**3.85**	**2.68**	.20	.31			
	Home	2.08	1.48	.17	.26			
Pleasure	Bank	**3.41**	**1.20**	.22	.32	.30***	.36***	.22**
	Park	**3.73**	**1.80**	.22	.33			
	Neighborhood	**3.51**	**1.69**	.22	.33			
	Street	**4.18**	**2.48**	.22	.32			
	Home	2.40	1.71	.20	.30			

Note. A × S =Age × Scenario; [a] Estimated marginal means are given as they are less biased by differences in cell sizes [b]Effect sizes are partial eta squares (η^2). Bold: significantly different at $p < .05$ in ANOVA.
† $p < .10$ * $p < .05$. ** $p < .01$. *** $p < .001$.

4.3.2.4. Relation between Reasons and Precautious Behavior

Concluding from the results of the MANOVAs, effects of necessity, utility, and pleasure were relatively similar across the different situations as were effects of age on the reasons. The only scenario that did not fit was the home scenario. I computed the scales for each reason consisting of the responses to all but the home scenario.[24] Moreover, I calculated mean evaluations of danger and avoidance behavior across the scenarios. As can be seen in the correlation table (Table 21), the mean of reasons (mean across the three reason scales) was negatively related to precautious behavior ($r(118) = -.50$, $p < .001$), i.e.,

[24] I conducted confirmatory factor analyses (CFA) for each reason. Emergency: Chi² (2) = 3.37, $p = .19$, CFI = .983, RMSEA = .099; Necessity: Chi² (2) = 0.29, $p = .86$, CFI = 1.0, RMSEA = .00; Utility: Chi² (2) = 0.06, $p = .97$, CFI = 1.0, RMSEA = .00; Pleasure: Chi² (2) = 2.32, $p = .31$, CFI = .998, RMSEA = .048; Including the home scenario resulted in significantly less fitting models.

the more important reasons like necessity, utility, or pleasure were the less often people took preventive measures. Moreover, as predicted emergency as a reason was not significantly related to precautious behavior (r = -.04, p = .79).

Table 21
Correlation matrix

	2	3	4	5	6	7	8	9	10	11	12
1 Age	-.11	.05	.18	.48**	.19	-.57**	-.57**	-.58**	-.65**	.47**	.19
2 Gender		-.13	-.23	-.30*	-.06	.18	.15	.11	.17	-.18	-.34**
3 Affective			.61**	.59**	-.26*	-.12	-.32**	-.27*	-.27*	.49**	.46**
4 Cognitive				.52**	-.06	-.16	-.26*	-.20	-.23	.37**	.33**
5 Behavioral					-.04	-.41**	-.45**	-.48**	-.50**	.75**	.62**
6 Emergency						.10	.14	.18	.16	-.06	-.07
7 Necessity							.64**	.74**	.89**	-.46**	-.29*
8 Utility								.69**	.87**	-.47**	-.35**
9 Pleasure									.92**	-.59**	-.48**
10 Reasons										-.57**	-.42**
11 Avoidance											.80**
12 Danger											

Note. N = 64

Importantly, evaluation of a situation as being dangerous was positively related to precautious behavior, r = .62, p < .001, indicating that people who judged a situation as dangerous were also those who took more precautious behavior. This finding is also emphasized by the strong positive correlation between the evaluation of dangerousness and the importance of avoidance of the situation, r = .80, p < .001. The more dangerous the situations were judged to be, the more the person tried to avoid it. However, as age was not significantly related to the evaluation of dangerousness, this could not explain the increase in precautious behavior.

In order to test the hypothesis that the reasons to be in the situations despite their dangerousness would lose their relevance for old adults compared with young adults and that this would result in more precautious behavior, I conducted a regression analysis. In the first step, behavioral fear of crime was regressed on age (dummy-coded: young = 0, old = 1) and gender (effect-coded: female = -1, male = 1). In the second step, the average value of reasons (mean-centered) was included (Table 22). The analysis revealed that the effect of age on behavioral fear of crime significantly decreased from B = 0.83, β = .46, p < .001 to B = 0.49, β = .27, p = .06 (Sobel's Z = 2.02, p < .05). Accordingly, age was related to changes in reasons to be in specific situations (while both age groups did not differ in evaluating the situations as dangerous) and this was related to more precautious behavior. However, as can be deduced from the Beta-value, differences in reasons are not the only influence that relates age to behavioral fear of crime.

Table 22
Hierarchical regression analysis with reasons as mediator and behavioral fear of crime as criterion

	Behavioral Fear of Crime			
		Model 2		
Variable	Model 1 *B*	*B*	β	95% CI
Constant	2.14	2.29		[2.01, 2.58]
Age	0.83***	0.49†	.27	[-0.01, 0.98]
Gender	-0.23*	-0.20*	-.22	[-0.39, -0.01]
Reasons		-0.20*	-.29	[-0.40, -0.01]
R^2	.30		.21	
F	12.81***		10.43***	
ΔR^2			.03*	

Note. *N* = 119. CI = confidence interval. Age: young = 0, old = 1; Gender: female = -1, male = 1. Reasons mean-centered.
† $p < .10$ * $p < .05$. ** $p < .01$. *** $p < .001$.

4.4. Discussion

The presented correlational study was a first approach to investigate age-related differences in seeking out situations that are similarly perceived as dangerous by both age groups. The results of this study lend support for the assumption that the value of specific reasons decreases with age. Moreover, lower values of these reasons were related to precautious behavior, thereby mediating a part of the effect of age on precautious behavior.

Interestingly, the value of all three domains of reasons decreased with age. Future studies will have to examine, which processes and changes in the environment influence the decrease in value (at least relative to the threat of dangerous situations). Moreover, mechanisms that influence an age-related change in values may also influence precautious behavior. Accordingly, changes would have a common origin and differences in values do not influence the extent of precautious behavior. The relevance of different reasons (or associated goals) would have to be manipulated experimentally in future studies. Moreover, opportunities to achieve these goals and related risks would have to be experimentally varied. In this vein, the three types of probabilities could be varied within one study, i.e., whether risky behavior differs between young and old adults when there are a priori probabilities of achieving a specific goal or statistical probabilities. Estimates could be formulated as very vague probabilities of achieving the goal, while giving the opportunity to gain a little more control over the occurrence of a specific threatening event.