2. The Induction of Emotion: Situational Fear of Crime

In this section I will focus on the hypothesis that the age-related increase in precautious behavior is an expression of an increase in dispositional fear, i.e., the tendency to experience situational fear of crime and that this increase is related to age-related changes in subjective (physical) vulnerability. To do so, I will first give a brief overview of theories about and empirical findings concerning emotional development over the life course with specific focus on the development of fear. Then I will consider age-related changes in health and how they relate to vulnerability and fear. Ensuing, I will contemplate implications of these considerations for the microgenesis and ontogenesis of fear of crime and deduce hypotheses. These hypotheses will be tested with a vignette technique in three studies. Details of each study pertaining to hypotheses, methods, and discussion will be considered directly with regard to the presentation of each study followed up by a general discussion.

2.1. Developmental Theories of Emotion

A developmental perspective on emotions entails questioning in what regard emotions are supposed to develop. Developmental changes could occur pertaining to the processes that constitute an emotion. There could be, e.g., differences in the way appraisal processes or physiological processes take place or what is subjectively experienced as an emotion. Changes could also refer to the conditions that evoke emotions, i.e., intra-individual change in relevance of events with regard to goals, beliefs etc. and environments that evoke an emotion. Accordingly, the question would follow why there are changes in relevance (e.g., because bodily functions have changed; time to live decreases, although in comparison with prior cohorts it increased) and situations (either sought out by the person themselves or age-related changes of situations, e.g., because of retirement, differences in interacting with old adults). In relation, changes might occur with regard to the wish of experiencing emotions themselves, hence, influencing emotion regulation and changes with regard to the expression of emotion. It is difficult to disentangle these various potential changes and their interrelations, especially within one study. This is probably why most of the studies focus only on one or some aspects of potential change.

2.1.1. Theoretical Approaches and Their Implications for Fear

Several theories have been advanced regarding emotional development across the life span, among them optimization and selectivity theories (cf. Blanchard-Fields, 2007; Carstensen, 1992; Carstensen, Fung, & Charles, 2003; Lawton, 2001; Scheibe & Carstensen, 2010), dynamic integration theory (Labouvie-Vief, 2003, Labouvie-Vief, 2008), and differential-emotions theory (Izard & Ackerman, 1998; Magai, 2008; Magai, Consedine, Krivoshekova, Kudadjie-Gyamfi, & McPherson, 2006). Some theories pertain to an evolutionary perspective on discrete emotions, while others do not elaborate in much detail about the underlying emotional concept or only refer to distinctions between

positive and negative affect. Fear and especially different objects of fear have seldom been the focus of emotion developmental studies. I will first outline two variations of differential-emotions theory as a theory that distinguishes between discrete emotions. Then I will sketch the assumptions of socioemotional selectivity theory that is oftentimes referred to as theoretical scheme to explain the seemingly paradoxical finding of high emotional well-being in old age (which is relevant for the subsequent paragraph regarding studies of emotional experience). Additionally, I will refer studies that qualify the general finding.

Differential-Emotions Theory

Differential-emotions theory centers on the qualitatively different nature of the primary or basic emotions (e.g., joy, anger, fear, guilt) that are assumed to have discriminable patterns of motivational, expressive, and phenomenological aspects. Magai (2008) and Levenson (1999) see emotions as hard-wired relations between different components of emotion. Due to emotion's continued functionality across lifetime these relations are not assumed to be subject to age-related change. Yet, the function of, for example, the heart also remains the same but this does not prevent it from losing its capacities under some circumstances and thereby influences also its relations with other components of the body (for age-related overviews, e.g., Cacioppo, Berntson, Klein, & Poehlmann, 1998; Charles, 2010). Moreover, the relative importance of some functions may change and with this potentially also underlying relations between the components of emotion (e.g., children's overestimation of their skills (i.e., reduced meta-cognitive abilities) encourages exploration of new territories, cf. Bjorklund, 1997; the frequency of anger may reflect greater assimilative resources in young adults than in old adults, cf. U. Kunzmann, personal communication, September 25, 2012).

In contrast, Magai (2008) postulates changes concerning the "linkages with the cognitive and behavioral subsystems, which lead to elaboration and complexity" (p. 377). Accordingly, experience-based knowledge about the circumstances of the occurrence of own and other people's emotion is expected to increase resulting in more complex emotional experience. In the same vein, Levenson (1999) assumes that the control system (appraisal processes in contrast to the core system consisting of different components) influences the conditions that activate the core system and thereby manipulates the probability of emotion occurrence. Moreover, it affects the way response tendencies are acted on and thereby increases or decreases the probability of specific responses. Regarding group differences, Levenson (1999) suggests possible differences in the core system as well as in the control system. Differences in the core system could consist in "the required intensity and closeness to prototype required for events to match the prototypical situations that elicit different emotions" (p. 499). Moreover, there could be differences in the strength of the hard-wired connections to the response tendencies. Differences in the control system refer to constant learning of how to appraise events, what to feel (appropriate for the in-group), and how to display emotions.

However, it is difficult to differentiate between changes in the one or the other system. How would it be possible to distinguish differences in required intensity to match the prototypical situation as difference in the core system (and how do they develop?) from

differences in appraisal processes of an event? Levenson gives as example for the core system that "group A might require more intense threats that are closer to the idealized prototype to elicit fear than group B" (p. 499). In contrast concerning the control mechanism, group B may have learned to appraise the situation differently than group A. One and the same situation would result in differences in fear between the two groups due to two (seemingly) different causes. Besides questionable evidence for hard-wiredness of emotions (see chapter 1.2.1), what is the difference between the two options for change? From an appraisal perspective as outlined in chapter 1.2.1 it seems that both changes concern differences in appraisal processes that take into account situational phenomena and the internal state (regarding physical constitution and current and future goals). However, differences in appraisal processes could, for example, stem from internalized stereotypes about how old adults *should* interpret the situation, how they *want* to interpret the situation (in the sense of emotion regulation goals, including unconscious processes), or how they *must* interpret the situation (given specific goals such as self-protection and changed evaluation of vulnerability).

Socioemotional Selectivity Theory

The socioemotional selectivity theory (SST) mainly focuses on emotion regulatory goals as explanation for age differences in positive and negative affect (discrete emotions are seldom studied; Carstensen et al., 2003; Scheibe & Carstensen, 2010). According to SST old adults prioritize emotional goals over information seeking goals in contrast to young adults. This change in goal priorities is a consequence of motivational changes first studied with regard to social relations (Carstensen, 1992). Three aspects contribute to this change: (1) lifetime accrual of experience and knowledge (similar to Magai, 2008), (2) realization of physical aging, and (3) sense of expiring lifetime. The theory's origin is based on studies regarding the age-related increase in elective selection of interaction partners so as to invest in emotionally gratifying relationships rather than disengaging from the social world and preparing for one's death as disengagement theory would have it (Cumming & Henry as cited in Carstensen, 1992). The SST has been extended from its application in the realm of social relationships to emotion regulatory processes in information processing in general (attention: Isaacowitz, Allard, Murphy, & Schlangel, 2009; Mather & Carstensen, 2003; memory: Charles, Mather, & Carstensen, 2003; Kensinger, 2008; decision making: Löckenhoff & Carstensen, 2007). The studies show that old adults tend to produce a positivity bias, i.e., "motivated cognition operating in the service of emotion regulation. When high priority goals concern well-being, people adaptively focus relatively more on positive than negative information" (Scheibe & Carstensen, 2010, p. 137).

However, qualifications regarding the ubiquity of the phenomenon have been made. Kensinger (2008) demonstrated that the positivity effect in memory only occurs with nonarousing stimuli, while there is no age difference with high arousing stimuli. Old adults showed an advantage of remembering positive nonarousing words over negative nonarousing words in comparison with young adults. Kensinger (2008) interprets this as expressing differences between automatic information processing of high arousing stimuli that cannot be influenced by emotional goals as easily as the processing of nonarousing valenced stimuli. In the same vein, Mather and Knight (2006) and Hahn, Carlson, Singer,

and Gronlund (2006) showed by employing a visual search task that old adults' difference between detecting angry faces compared with happy (and sad) faces as discrepant face among otherwise neutral faces was equal to the difference in young adults; both age groups detected angry faces faster. In contrast, old adults were better in disengaging attention from angry faces compared with young adults (Hahn et al., 2006). The authors interpret this as showing that threat detection as a function of emotion is still intact. Moreover, depletion of cognitive resources such as working memory undermines processes behind the evocation of the positivity effect (Knight et al., 2007; Mather & Knight, 2005). Although the theory posits that positivity effects occur in service of emotion regulation, this is seldom directly demonstrated (see Isaacowitz & Blanchard-Fields, 2012, for a critical review). Socioemotional selectivity theory makes no direct assumptions about developmental changes in discrete emotions, but given the authors' interpretation of studies with threat stimuli, it seems that emotion regulation goals in a given fear eliciting situation do not apply.

2.1.2. Methodological Approaches to Measure Emotion Experience

Frequency Studies and Experience Sampling

In general, studies of age-related changes in positive and negative affect have been conducted more often than studies regarding discrete emotions; this specifically pertains to frequency studies of emotional experience. When discrete emotions have been addressed in empirical studies, they seldom included fear. Frequency studies of positive and negative affect show a decrease of negative affect from early adulthood to midlife in cross-sectional and longitudinal studies and stability beginning from about 60 years (e.g., Carstensen et al., 2000; Carstensen et al., 2011; Charles et al., 2001; Kunzmann, 2008; Mroczek & Kolarz, 1998). A study of Grühn et al. (2010) shows slightly different results with middle-aged adults indicating more frequent negative affect in the last year than young and old adults. An experience-sampling study yielded an age-related decrease in mean intensity of negative affect (Riediger, Schmiedek, Wagner, & Lindenberger, 2009). Studies specifically referring to frequency of fear indicate either stability (Gross et al., 1997; Scherer et al., 2004) or decrease with age (Grühn et al., 2010; worry: Basevitz, Pushkar, Chaikelson, Conway, & Dalton, 2008; Stone, Schwartz, Broderick, & Deaton, 2010). Thus, these findings are in line with frequency studies of the subjective experience of fear of crime.

Yet, frequency studies alone do not tell us *why* there are differences or stability. Similarly to the measurement of fear of crime with frequency measures about subjective experience of fear, frequency measures of positive and negative affect or discrete emotions may be subject to all kinds of influences. Some researchers have advanced this problem by including covariates to uncover their influence on the frequency of affects. For example, subjective and objective health indicators were included in some studies. Kunzmann, Little, and Smith (2000) found that functional health (vision, hearing, and mobility) influences the frequency of negative affect. When controlling for functional health, the nonsignificant relationship between age and negative affect transformed into a negative relationship indicating an age-related decrease in negative affect in an old population (70-

103 years). Accordingly, bad functional health suppresses other age-related effects on negative affect. In contrast, cognitive abilities (speed, memory, knowledge, and fluency) had no influence on negative affect (Kunzmann, 2008), while controlling for self-rated mental fitness also resulted in a negative relationship between age and negative affect in the same sample. However, other studies with a wider age range show that the age effect on negative affect remains intact even after inclusion of health variables (e.g., Carstensen et al., 2000, 2011; Mroczek & Kolarz, 1998). On the other hand, Carstensen et al. (2000) recruited explicitly a sample with relatively healthy old adults (18-94 years) and the age range (25-74 years) of Mroczek and Kolarz's (1998) study is not comparable to that of Kunzmann et al. (2000). Accordingly, the influence of health needs to be further addressed. Other studies have included sociodemographic variables and personality variables such as neuroticism and extraversion, which are partly related to negative affect and fear but do not weaken the age effect (e.g., Grühn et al., 2010; Mroczek & Kolarz, 1998).

Wrzus, Müller, Wagner, Lindenberger, and Riediger (2012) studied age differences in psychological and physiological responses to either circumscribed or complex unpleasant events, that is, events that affect more than one life domain. The findings show that there are no age differences in negative affect when the participants deal with circumscribed unpleasant situations and old adults even show less pronounced cardiovascular reactions. In contrast, psychological as well as physiological response is more pronounced in response to complex unpleasant situations in old adults than in young adults. The authors interpret the results in light of the overpowering hypothesis that states that age differences in affective responding are particularly pronounced in highly resource-demanding situations. The study focused on differences in emotion regulation motivations and diminished capacities in old adults in the face of complex unpleasant events; yet, the results could also be interpreted as age differences in the appraised severity of the situation (even when number of affected life domains is controlled). A daily diary study relates to this interpretation in that young adults report more daily stress and more negative affect; however, the positive relationship between stress and negative affect is more pronounced in old adults (Mroczek & Almeida, 2004). In referring to Gilbert, Mrozek and Almeida (2004, p. 4), Mroczek et al. (2004) interpret their findings with regard to a kindling effect: heightened sensitivity to specific (negative) stimuli may lead to easier activation of negative affect when a stimulus such as stress is encountered. They assume that alterations in the aging brain structure (amygdala and limibic system) are responsible for such a development. Crime-threatening situations could pose such stressful situations.

Laboratory Studies

In contrast to survey studies and experience sampling studies, laboratory studies can control the emotion eliciting event and investigate its impact on the intensity of emotional responding. Results of laboratory studies show a mixed result pattern regarding emotional responding. The studies vary with regard to the emotion induction method as well as considered emotions. In studies that asked participants to remember a recent event that evoked a strong emotional response (including fear situations), no differences in

subjective emotional experience were found (Labouvie-Vief, Lumley, Jain, & Heinze, 2003, conclusions about fear are limited because in the fear situation also other emotions were elicited; Levenson et al., 1991; Magai et al., 2006), although young adults exhibited greater physiological response than old adults. Yet, given that old adults experience stressful events less often, it is possible that they do not remember a comparable recent negative experience. Moreover, if they prevent such events from happening or bringing themselves in such situations, they also possibly do not remember the most threatening situation. Emotion regulatory goals could also prevent from remembering the most negative event.

Studies using standardized material provide an alternative to this approach; yet, they may lack ecological validity. Tsai, Levenson, and Carstensen (2000) used short film clips to induce happiness and sadness. Old adults indicated as much negative affect to the sad film as young adults and as much happiness to the amusing film clip. Yet, as with the relived emotions task old adults exhibited less physiological reactivity. Notably, the kind of employed stimulus material matters as suggested by several other studies that tried to elicit sadness. When using film clips that were more age relevant (loss of children, Alzheimer's disease), old adults reported more intense sadness and physiological response was at the same level as in young adults (Kunzmann & Grühn, 2005, two experiments; Kunzmann & Richter, 2009). Stimulus relevance does not seem to be the only relevant factor as, for example, both Seider, Shiota, Whalen, and Levenson (2011) and Beaudreau, MacKay, and Storandt (2009) used a film clip from the movie "The Champ"; however, there was no age difference in subjective experience of sadness in Beaudreau et al.'s study, while old adults exhibited more sadness in Seider and colleagues' study. Descriptively, old adults also indicated more sadness in Beaudreau et al.'s study but the age range of the old age group was wider, while cell size was smaller, potentially resulting in less reliable assessments (Seider et al.: 60-69 years (n = 73) vs. Beaudreau et al.: 60-89 years (n = 30)). To the best of my knowledge, only Beaudreau et al. (2009) examined age differences in fear response elicited with film clips in healthy adults ("Silence of the lambs" and "The shining"). There was no age difference in subjective and physiological response to the two film clips. Yet, reservations about the age relevance could be voiced. The portrayed victims are young and the film material does not necessarily refer to the self as potential victim.

In contrast, one study investigated age group differences for specific objects of fear, social threat and physical threat. Teachman and Gordon (2009) show that old adults reacted with higher anxiety than young participants when confronted with physical threat in ambiguous situations, whereas no age differences were obtained with social stressors. Accordingly, while no age differences have been identified using global measures of fear responsiveness, situational fear of crime stimuli that are equally or even more important to old adults could potentially evoke higher subjective fear.

Experimental Approaches to Fear of Crime

Only two experimental studies have been identified that attempted to evoke situational fear of crime in different age groups. Fisher, Allan, and Allan (2004) tested participants' state anxiety after watching three different formats of crime newscasts about a prison

escape. The old age group (65 to 75 years) experienced higher state anxiety than the middle-aged group (35 to 45 years) only when watching the standard report format. In contrast, there were no age differences when the prison escape was displayed as having happened 3000 km away or when the escapee was portrayed in a positive light. In both cases anxious responding was lower than in the standard format. Ziegler and Mitchell (2003) asked participants about their fear at home and fear of walking outside alone after watching a crime-related news report (i.e., about a bank robbery or violent burglary re-enactment). In contrast to Fisher et al., (2004) young participants (i.e., 18 to 29 years) reported a higher level of fear at home than the old participants (i.e., 61 to 78 years) after watching the burglary but not after watching the robbery. Independent from the kind of news report young adults indicated more fear of walking alone outside. Given that only two experimental studies regarding crime have been conducted it is difficult to draw conclusions about why their results differ (e.g., different age comparison groups, different crimes, stimulus material). Moreover, the studies do not situate crime in personal experience of everyday life and the relation between experience of situational fear and precautious behavior is not examined.

Farrall et al. (2000) chose another approach. Participants were given six scenarios of two to three sentences describing an ambiguous situation that could contain a criminal threat. After reading each description, participants were asked how unsafe they would feel in such a situation; responses were averaged across the situations. The older the participants were, the more they indicated that they would feel unsafe. Yet, this study was not intended to evoke situational fear and it does not allow for comparing with a control group. All three studies extend prior research about fear of crime in that they focus on evoking situational fear or use another strategy of assessing fear of crime. However, they are limited with respect to their fear evoking stimuli, dependent variables and conclusions regarding precautious behavior.

In sum, emotion developmental theories generally make no specific assumptions pertaining to discrete emotions but mostly focus on positive or negative affect. Most frequency studies show an age-related decline in negative affect; however, experiencing daily stress or complex unpleasant events is related to more negative affect in old adults than in young adults. This suggests that old adults may be more sensitive or less able to down regulate negative emotions in specific situations. Potentially, crime-threatening situations belong to this category. When studies focus on discrete emotions, fear is rather not the topic of investigation; even less attention is paid to age relevant fear events. Relived emotions studies show no age difference in subjective experience of fear; neither does a study using film clips. However, the film clips may not be perceived to be self-relevant and especially not as relevant to old adults. A study distinguishing between social and physical threat demonstrates that physical threat results in higher anxiety in old than in young adults given ambiguous scenarios. This concurs with studies pertaining to sadness that demonstrate that the use of age relevant stimuli results in greater subjective experience of sadness, suggesting stimuli dependency. Moreover, previous studies that focused on other than componential measures of fear of crime allude to possible higher situational fear in old adults.

2.2. Health and Vulnerability

Taking a functionalist perspective, emotions as behavior-guiding factors should respond to changing life conditions and needs throughout the lifespan (e.g., Keltner & Gross, 1999; Magai, 2008). Given physical as well as cognitive losses in old age and a limited lifetime perspective to recover, it seems highly adaptive to maintain or even improve one's ability to detect threats and respond rapidly to them in old age or avoid threats altogether. I will first give a brief overview of some physical and cognitive changes with age that could be especially related to the enhancement of a perception of physical vulnerability. Then I will shortly discuss the concept of (physical) vulnerability, before presenting findings with regard to the relationship between fear of crime and health.

2.2.1. Age-related Changes in Health

In our society aging is perceived as being associated with a deterioration of health (as exemplified in age stereotypes, e.g., Kornadt & Rothermund, 2011). Although this perception is not mirrored in all aspects of physical and cognitive functioning, research findings lend support for the accuracy of stereotypes for some domains.

In a recent review, Salthouse (2010) describes age-related performance in five domains of cognitive functioning examined in cross-sectional studies. Oftentimes a distinction is made between crystallized abilities (cognitive pragmatics) as reflecting experience-based and culturally based knowledge and fluid abilities (cognitive mechanics) referring to abilities such as speed, accuracy, and executive functions based on biology (Cattell cited in Salthouse, 2010, p. 754; see also Baltes et al., 2006). However, Salthouse points out that age-related changes cannot be dealt with exclusively within these two domains as changes in, e.g., memory and speed follow different trajectories than would be expected from this distinction (i.e., pragmatics and mechanics are interdependent, cf. Baltes et al., 2006).

Vocabulary knowledge and general knowledge have been found to increase at least until people are in their 60s (Salthouse, 2010; longitudinal study: Finkel, Reynolds, McArdle, & Pedersen, 2005; Figure 3). In contrast, functions regarding efficiency or effectiveness of information processing pertaining to tasks that involve manipulations and transformation of abstract and familiar material and memory tasks (working and prospective memory) show an almost linear age-related decline (Bäckman, Small, Wahlin, & Larsson, 2000; Ferrer-Caja, Crawford, & Bryan, 2002; Finkel et al., 2005; Salthouse, 2010).

Age-related changes in sensory functioning is, on the one hand, related to cognitive decline (e.g., Baltes & Lindenberger, 1997; Lindenberger, Kliegl, & Baltes, 1992; for an opposing position: Hofer, Berg, & Era, 2003) and, on the other hand, cognitive resources may help in buffering the effects of sensory decline in everyday life (Heyl & Wahl, 2012). Sensory and motor functions are important in interacting with the world as they constrain which input can be processed and how we are able to respond. If, for example, visual function is disturbed, situational elements cannot be processed in detail, potentially

significant information is lost (and possibly substituted by more or less accurate knowledge about the situation; e.g., whether someone is carrying something dangerous, facial expressions). In the same vein, disturbances in auditory functioning may prevent from hearing warning signals. All these domains see age-related declines in functioning (Humes, Busey, Craig, & Kewley-Port, 2009; Schumm et al., 2009). Mobility declines constrict the possibility of fending off an attacker or run away (mobility declines refer to a variety of problems concerning balance, overweight, muscle strength, joints etc., cf. Wahl & Heyl, 2007). Moreover, long-lasting recovery processes and stays in hospital pose an additional threat to health particularly in old adults (e.g., frailty and fitness: Mitnitski, Graham, Mogilner, & Rockwood, 2002; femoral neck fractures: Verma, Rigby, Shaw, & Mohsen, 2010).

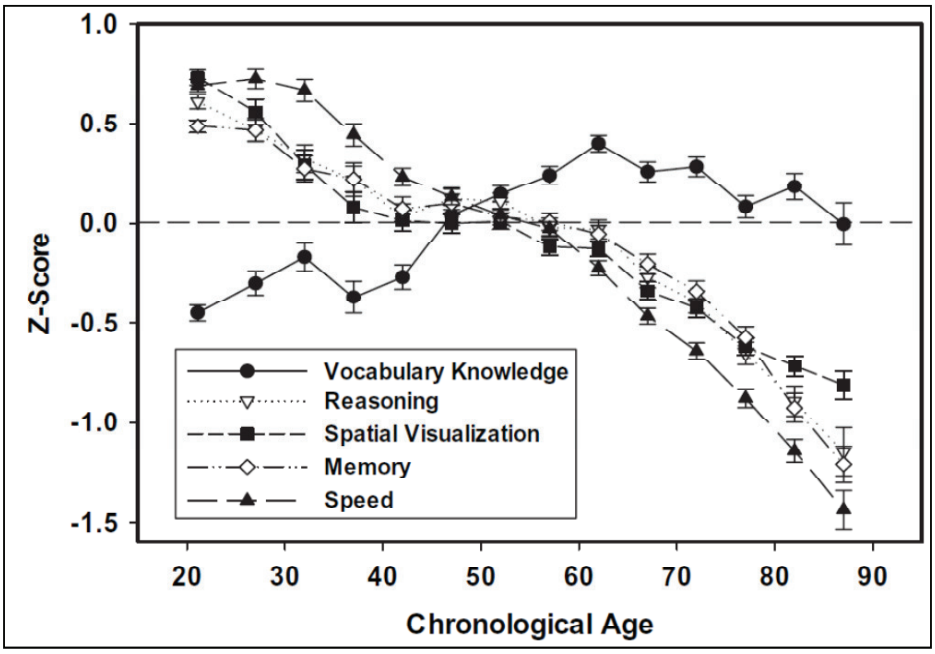

Figure 3. Means and standard errors for composite scores in five abilities as a function of age (Figure from Salthouse, 2010, p. 755).

In general, there is discussion about the question what age-related changes in cognitive and physical function reflect, i.e., are they (or what part of it) the result of normal aging processes (and when does this begin?) or reflecting illness and to what extent are they contingent on environmental conditions (cf. Schaie, 2005; Staudinger & Häfner, 2008)? In this thesis, I base further considerations on the observation that there are age-related declines in various bodily functions that potentially change the way how old adults relate to the world (and vice versa; cf. Dolan & Peasgood, 2007; Jackson & Stafford, 2009). These declines do not apply to all people at the same age to the same extent (actually, chronological age is only a crude approximation to these changes, for a critical review: Baars & Visser, 2007). Still, I assume that these changes *can* result in a sense of vulnerability, while not all old adults will perceive it that way (e.g., perception of risk of falling and associated consequences is also a construction process, cf., Ballinger & Payne, 2002; Hughes et al., 2008).

2.2.2. Vulnerability

Accordingly, I conceive (a sense of) physical vulnerability as the recognition of an "is-ought discrepancy" (e.g., Brandtstädter & Greve, 1994) between the assumption of how the physical constitution ought to be to deal successfully with the environment and how it is perceived to actually be. Greve and Strobl (2004) point out that "coping presupposes the existence of a problem" and that those problems can be described as "is-ought discrepancies with an aversive character" (p. 194). Generally, discrepancies can be solved by changing the "is"-side on the one hand (problem-centered/assimilative-mode, Brandtstädter & Greve, 1994). In the case of the physical constitution this may mean to improve it. However, although increases in fitness are possible even in old adults (e.g., Carvalho, Marques, & Mota, 2009; Dobek, White, & Gunter, 2007), improvements seem to be limited. Another way of solving the discrepancy consists in changing the "ought"-side (reaction-centered/accommodative-mode, Brandtstädter & Greve, 1994). This mechanism consists in reevaluating which physical functions are necessary to relate successfully to the environment (not consciously, though conscious efforts could give impetus). However, this reevaluation could be very costly, for example, when thinking one is strong enough to fend off an attacker and actually not being able to.

Greve and Strobl (2004) suggest that "a third option is avoidance of the problem (e.g., Haan, 1977; Vaillant, 2000), though this reaction mode cannot solve or resolve a problem but only dispute or reject its existence" (p. 196). Although avoidant problem solving in this sense may be helpful in some cases, it would equal the costs of accommodative problem solution in this case or hinder assimilative efforts if available. If the term 'avoidance' is reserved for not acknowledging the discrepancy as a problem, then maybe a fourth option of how to deal with the discrepancy needs to be added. This option consists of accepting that there is a discrepancy that cannot be solved either by assimilative nor by accommodative mechanisms. The solution would consist in protecting oneself and avoid situations that are deemed relevant for vulnerability to play out negatively.[14] However, when not being able to protect oneself or avoid the situation then higher fear should result as vulnerability is made salient (either by the actual situation or imagined).

2.2.3. Health and Fear of Crime

Although fear of crime has been associated with vulnerability right from the beginning (see chapter 1.4.2), its relation with health has scarcely been the subject of research. Yet, there are several studies that have investigated the relationship, although different measures for fear of crime complicate the picture as well as the age range of the studied

[14] Avoidance and protection behavior could also be framed as an alternative assimilative strategy to maintain the goal of physical integrity (or as compensating behavior in the terms of the theory of Selective Optimization and Compensation, cf. Baltes and Baltes (1990)). This aspect illustrates the difficulties in distinguishing between the different processes if specific behavior and goals are considered. Depending on the level of analysis and considered goals, different conclusions about the mechanisms at play can be drawn. I prefer recurring to the "fourth" option as assimilative coping implies a solution to the discrepancy, while the other conception allows retaining the discrepancy and the accompanying problems.

samples. Most studies focus only on old subjects; however, if the aim is to identify underlying mechanisms behind the victimization-fear paradox, then a larger age span had to be realized.

The existing studies still provide insights on the relationship between physical health and fear. All studies show that various indicators of health are negatively related to fear, i.e., the less physically healthy the subjects are the more they are afraid of crime (variations of standard question: McCoy, Wooldredge, Cullen, Dubeck, & Browning, 1996; McKee & Milner, 2000; Stiles, Halim, & Kaplan, 2003; worry about different offense types: Jackson & Stafford, 2009; behavioral fear: Donder, Verté, & Messelis, 2005; Herbst, 2011). Stafford et al. (2007) demonstrated that subjective measures of physical health as well as objective measures (walking speed and lung function) were related to worry about different offense types. This reflects that self-reported ratings of health status map on physicians' physical examinations (Salthouse, Kausler, & Saults, 1990). Jackson and Stafford (2009) showed that subjective health (controlled for current depression) predicted worry about crime five years later.

Herbst (2011) examined the effect of mobility, vision, hearing, and subjective health on precautious behavior (i.e., behavioral fear of crime). All indicators were significantly related with age (age span: 40-85 years). Age was positively related to precautious behavior and this relation was partly mediated by each of the health indicators except for vision. However, the relationship between age and precautious behavior was still intact. This may be because subjective health indicators only partly reflect physical vulnerability. First of all, it is an assessment of one's health status but it may only to some extent reflect the subjective perception that this status does not satisfy the "ought"-side of being able to physically successfully relate to the world anymore. Still, with decreasing subjective health the probability is heightened that the "ought"-side cannot be fulfilled, which is potentially reflected in the relationship between health and fear of crime measures. Moreover, as pointed out above, perceived vulnerability should be most salient when precautions are not available, i.e., in situations that evoke state fear of crime.

2.3. The Microgenesis and Ontogenesis of Precautious Behavior

As outlined in the chapter on the measurement of fear of crime (chapter 1.2.3), situational fear refers to a *transitory* state of experiencing fear (e.g., while walking through a pedestrian tunnel at night or hearing strange noises in one's flat) whereas dispositional fear refers to the inter-individual difference in the tendency to experience fear when being in a situation that contains potential threat. When individuals are high in dispositional fear they are more likely to perceive situations as threatening much *faster* and more *easily* across different situations. With regard to fear of crime this means that situational fear of crime is more probable, and is likely to be more intense when it occurs. Importantly, dispositional fear does not *explain* situational fear but rather denotes differences in the propensity to experience situational fear of crime.

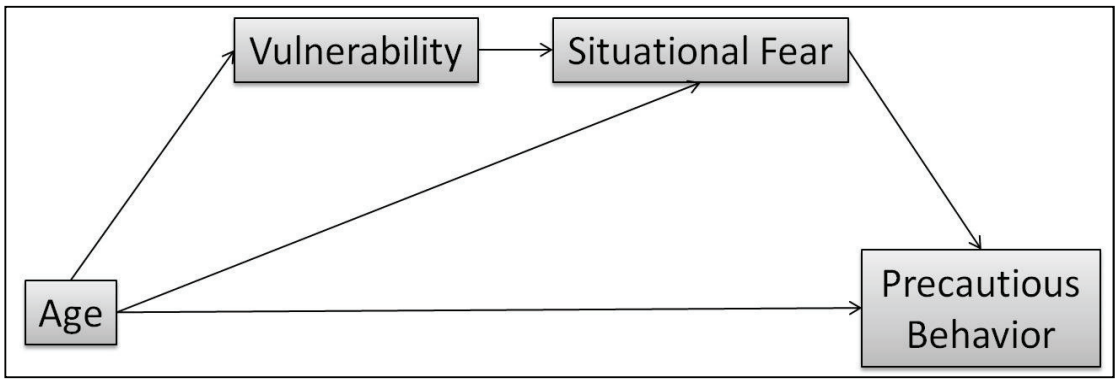

Figure 4. Theoretical model of the relation between age, vulnerability, situational fear and precautious behavior.

An individual's dispositional fear of crime may change as a consequence of long-term developmental processes (as described in the chapters on inter-individual differences in fear of crime, chapter 1.4). With increasing vulnerability to physical losses and a shortened time frame to recover, fear of physical and financial damage due to crime could be increased. This may result in perceiving situations as threatening more easily and more intensely, i.e., in experiencing situational fear of crime (see Figure 4). The experience of situational fear or being afraid, however, may also lead to an increase in precautious behaviors, i.e., the behavioral aspect of fear of crime, in order to avoid situational fear. If this was the case, frequencies of experiencing fear of crime (i.e., the affective component) would be lowered, potentially resulting in comparable frequencies as young adults experiencing fear. Moreover, by taking into account one's own precautious behavior, assessments of future victimization probability would be lowered, too. If this assumption should prove tenable, precautious behavior of old adults would be an *expression* of more intense (anticipated) situational fear of crime. In order to test the hypothesis that old adults are more afraid than young adults of becoming a victim of crime in fear-invoking situations, an experimental design is considered to be the most appropriate.

2.4. Hypotheses of Study 1 and Study 2

The first two studies addressed several aspects that have not been tested in this way and in unison before. First, a vignette technique is employed to induce fear of crime. This technique has been shown to be effective in inducing various emotions, especially negative ones (Westermann, Spies, Stahl, & Hesse, 1996). Stimuli were used that were more self-relevant in that they asked the participants to imagine themselves directly in a situation of potential threat and as a victim of such. This is in contrast to Fisher et al. (2004) and Mitchell and Ziegler (2003) where the described event had not to be interpreted as concerning the self but could also invoke vicarious fear. Moreover, these situations are much more specific than previous experimental studies of the induction of fear. Second, situations are addressed that are situated in everyday life to capture situations that could be experienced by young and old adults with equal probability (if old adults did not try to avoid such situations out of fear). Third, I wanted to test whether more situational fear is related to more precautious behavior, thereby mediating the

positive relation between age and precautious behavior. Fourth, the relationship between age, vulnerability and situational fear is studied. And fifth, I used different age groups for comparison but employing the same procedure in order to explore the boundaries of age differences. Accordingly, the same age span for the young age group (18 to 30 years) was sampled in both studies. The young age group's reaction is compared with a middle-aged age group that is still in working age (50 to 64 years) in Study 1 and with a group of old adults (65 to 84 years) in Study 2.

Non-situational Fear

In order to allow comparability of results with other studies, the more "classic" non-situational approaches to the measurement of fear of crime were included in the study. Accordingly, it is hypothesized that no significant age-related differences will be observed for the affective and cognitive component of fear of crime. However, significant age differences will be observed for the behavioral component of fear of crime. This will demonstrate that the middle-aged and old age group behave more cautiously than the young one. Moreover, significant age differences are hypothesized for the standard question with old adults indicating feeling less safe than young adults. Together, these findings ensure comparability of the samples with previous studies that employed these measures.

Situational Fear of Crime

In order to induce situational fear, participants were faced with five different fear of crime evoking everyday situations employing a vignette technique. As is implicated in the construct of fear of crime as a global emotional response, there is no *a priori* assumption, which situations should evoke more or less fear. Each situation varied in two threat levels; the higher threat level is assumed to induce more situational fear than the lower threat level.

Regarding age group effects, I expect either a main effect of age with old adults indicating more situational fear of crime than young adults or an interaction effect with old adults exhibiting a larger difference than young adults in situational fear of crime between the low and high threat level.

Moreover, physical vulnerability is assumed to be positively related to age and situational fear of crime, thereby mediating the positive relationship between age and situational fear. (This hypothesis will only be tested in Study 2.)

At last, it is hypothesized that situational fear is positively related to precautious behavior and that this mediates the positive relationship between age and the behavioral component of fear of crime. (This hypothesis will only be tested in Study 2.)

2.5. Study 1

2.5.1. Method

2.5.1.1. Participants

One hundred seventy-nine young adults (18 - 30 years old; *Median* = 24.0 years; 53% female) and one hundred and six middle-aged adults (50 - 64 years old; *Median* = 55.0 years; 49% female) were recruited by students as part of a coursework in Lower Saxony in summer 2009. Participants were for example family members, friends, neighbors, or passersby in a pedestrian precinct. There were no age group differences in self-reported life satisfaction as measured by a single item: "How satisfied are you with your present life?" (6-point scale ranging from *very unsatisfied* (1) to *very satisfied* (6)). Age group differences were found in self-reported health as measured by a single item: "How do you evaluate your health status in general?" (5-point scale ranging from *very bad* (1) to *very good* (5)). Young adults indicated better health than middle-aged adults (M_{young} = 3.91 vs. $M_{\text{middle-aged}}$ = 3.60, $t(279) = 3.86$, $p < .001$).

2.5.1.2. Measures

Non-situational Measures of Fear of Crime

The standard question of fear of crime was measured with the question: "How safe do you feel or would you feel if you were out alone in the dark in your living area?" (*very unsafe* (1), *quite unsafe* (2), *quite safe* (3), and *very safe* (4); scale was recoded for analyses so that higher values indicated feeling less safe; Greve, 2000).

The components of fear of crime scales were measured using items that were employed in previous studies (e.g., Greve, 2000). The affective component of fear of crime was operationalized as the frequency of experiencing fear with regard to eleven specific offences (i.e., theft of purse, theft in general, fraud, vandalism, burglary, threat or coercion, robbery, assault with and without a weapon, sexual coercion, and rape) in the past 12 months on a 5-point scale ranging from *never* (1) to *very often* (5). The cognitive component was measured by assessing the probability of becoming a victim of specific offences (same as aforementioned) on a 4-point scale ranging from *very unlikely* (1) to *very likely* (4). The item-scale correlations for the affective component ranged between r_{it} = .41 and r_{it} = .70. For the cognitive component they ranged between r_{it} = .32 and r_{it} = .63. Internal consistency was α = .85 and .82.

In order to measure precautious behavior (behavioral component) subjects were asked to indicate how often they undertook fourteen specific actions *in order to protect themselves from crime and violence* on a 5-point scale ranging from *never* (1) to *very often* (5) in the past 12 months. Items included, e.g., "did not leave home after nightfall"... "avoided certain streets, places or parks"..."avoided strangers"..."asked neighbors to watch out for the flat when away"..."did not let flat uninhabited or look like that when away"..."hid money/valuables in flat"..."opened door only when knowing who's outside". Participants were able to indicate when a specific behavior did not apply. The item-scale correlations ranged between r_{it} = .34 and r_{it} = .55; internal consistency was α = .81.

Vignettes and Situational Fear Scale(s)

The vignette situations were first created after collecting ideas from focus groups (i.e., students of a research methods course conducted unstandardized interviews with their older relatives and peers as part of course work). From this pool, five situations were chosen collectively and vignettes of about 130 words were written in second-person perspective to enhance vividness (see Table A-1). The vignettes described everyday situations that had the potential to induce fear of becoming a victim of crime. Each vignette had two versions that only differed in one detail entailing a different threat intensity (i.e., threat level 1 and 2). Threat levels were constructed per vignette by varying one indicator that was associated with threat, for example, being with or without partner, light vs. darkness, potential female or male perpetrator (see Table A-1, changes in level in parentheses). Scenarios were chosen that depicted places that young, middle-aged, and old adults could seek out in principle (i.e., being at the market, at a station, at home, on a country road, in the park, see Table A-1). Some scenarios were more open to the interpretation of physical threat (e.g., park, country road, station) and others could be rather interpreted with regard to financial threat (market, home) although they could also be interpreted to include physical threat.

Instead of comparing a neutral situation with different threatening situations, each vignette varied in two levels of threat intensity (threat level 1 and 2 with the higher number indicating higher threat). This was for two reasons. Firstly, it is difficult to create a suitable *neutral* situation that could serve as a comparison condition and fit equally well for young and old adults. Even if there was a comparable neutral situation, it could be problematic to compare responses to emotional stimuli with non-emotional stimuli. Second, demand characteristics are one of the problems inherent in emotion induction methods. Even if one chose a *within*-subject design with pre- and post induction measurement, young and old adults could be differentially prone to report feelings of fear, thereby confounding age differences in fear response with differences in demand characteristics. By varying threat level *between* subjects per vignette, demand characteristics (if they play a role) are given for both conditions. If there are differences in response to the threat level, they should not be due to demand characteristics because all subjects are asked to imagine themselves in the potentially threatening scenario.

Participants were instructed to read each vignette thoroughly and try to imagine the scenario in real life. After reading the story, participants were then asked to indicate to what extent they were able to relate to the story (*not at all* (1) to *very good* (4), henceforth called ‘story relation’). This was included to measure the extent that individuals are able to relate to the story as this is a person factor that may influence the effectiveness of the vignettes (Westermann et al., 1996). In the third stage of the task, participants were instructed to indicate, using a 7-point scale (i.e., *not at all* (1) to *very/extremely* (7)), the extent they would agree with 11 statements concerning feelings related to fear in various situations. Only six items from the State Anxiety Scale of the German version of the State-Trait Anxiety Inventory (Laux, Glanzmann, Schaffner, & Spielberger, 1981; e.g., feeling tense, worried, secure) were utilized in the two studies. Sylvers et al. (2011) and Englert, Bertrams, and Dickhäuser (2011) noted that the two subscales, measuring either state or trait anxiety, of the State-Trait Anxiety Inventory correlated highly with

instruments measuring depressive symptoms. Those items were chosen that shared face validity with the fear construct and added with five items related to fear in order to enhance scale properties (e.g., being scared, feeling panicky, feeling threatened; see Appendix C for the full scale in the questionnaire, p. 4). Three items from the State Anxiety Scale were keyed in a positive direction and reverse coded for analyses so that higher values on all items indicate higher situational fear. Scales were created by calculating the mean across the eleven statements for each vignette separately. Internal consistencies per vignette ranged from Cronbach's $\alpha = .92$ to $\alpha = .97$.

2.5.1.3. Procedure

The questionnaire was divided into three parts. The first part asked for the basic demographic information (i.e., age and gender), subjective health, life satisfaction, and the standard question. The second part of the measure included the five vignettes. Each participant read five vignettes, each of them being *one* of the two versions of a vignette (i.e., threat level as between-subjects factor per vignette). The five vignettes alternated within subjects in their sequence between threat level 1 in one vignette and threat level 2 in the next, i.e., this ensured that each participant did not receive five vignettes that were all within one threat level. The order of vignette content varied in 4 different ways, always ending with the car breakdown scenario. There were no effects of order.

The questionnaire was handed out to subjects in various settings (e.g., at home, at work, in the street) at different times of day; participants were asked to fill them out alone. Questionnaires could be given back immediately after answering or send back to university. The setting varied individually; however, because the different versions were randomly administered per gender-by-age group, this should not affect the differential age and threat effects systematically.

2.5.1.4. Data Analyses

In a first step, parallel univariate analyses of variance (ANOVA) were conducted on the non-situational measures of fear of crime and the standard question. Age (young vs. middle-aged) and gender (female vs. male) were between-subject quasi-experimental factors.

Second, in order to test the hypotheses with regard to situational fear of crime, 2 (age group: young vs. middle-aged) × 2 (threat level: 1 vs. 2) covariance analyses with gender and story relation as covariates were conducted for each vignette separately.[15] Self-reported situational fear was the dependent variable in each vignette. The partial eta squares representing the portion of explained variance in the dependent variable are reported for each significant effect. The following eta squares correspond with small (.10), medium (.25), and large (.40) effect sizes (f) respectively: $\eta^2 = .01$, $\eta^2 = .06$, $\eta^2 = .14$ (Cohen, 1988).

[15] Analyses showed no significant interaction effects between age and gender.

As this thesis is not concerned with gender effects, no explicit hypotheses regarding gender are tested. However, gender has been shown to be one of the most replicable factors associated with differences in fear of crime (for a review: Hale, 1996; May, Rader, & Goodrum, 2010). Therefore, gender is included in all analyses as control variable, which is especially important when cell sizes are not equally distributed across age-by-gender groups. Results for gender are reported but not discussed if not relevant for the research question.

2.5.2. Results

2.5.2.1. Non-situational Fear of Crime

The parallel ANOVAs on the affective, cognitive, and behavioral component of fear of crime as well as on the standard question showed that age was only significantly different for the behavioral component, $F(1, 267) = 7.73$, $p < .01$, $\eta^2 = .03$. As in prior studies, old middle-aged adults reported taking more precautions ($M = 2.29$) than young adults ($M = 2.09$, see Table 2). The results for the standard question deviated from prior studies by showing no significant age difference, $F(1, 267) = 0.19$, *n.s.*. Confirming prior studies, there were no significant differences between the age groups in the affective and cognitive component. Except for the results of the standard question, the results mirrored those of prior (large scale) studies.

Table 2
Mean and standard deviations in non-situational measures of fear of crime for young and middle-aged adults in Study 1 and young and old adults in Study 2

	Study 1				**Study 2**			
	Young		Middle-aged		Young		Old	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Affective component	1.88	.57	1.76	.60	1.96	.06	1.93	.07
Cognitive component	1.69	.37	1.67	.38	1.73	.04	1.85	.04
Behavioural component	2.09*	.57	2.29*	.73	2.31**	.06	2.95**	.06
Standard question	1.84	.64	1.80	.62	1.85**	.06	2.16**	.06

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

Regarding gender, there was a significant effect in the affective, $F(1, 267) = 4.34$, $p < .05$, $\eta^2 = .02$, and behavioral component, $F(1, 267) = 25.44$, $p < .001$, $\eta^2 = .09$, and a marginally significant effect in the cognitive component, $F(1, 267) = 3.73$, $p = .054$, $\eta^2 = .01$. Female respondents reported a higher frequency of feeling afraid, evaluated their risk of becoming a victim of crime higher, and took more precautions. Moreover, there was a significant effect of gender on the standard question, $F(1, 267) = 23.61$, $p < .001$, $\eta^2 = .08$, indicating that female participants felt less safe. There were no interaction effects between age and gender.

2.5.2.2. Situational Fear

Threat manipulation

As can be seen in **Table 3**, effectiveness of threat manipulation was achieved in three vignettes (car breakdown: $F(1, 265) = 87.49$, $p < .001$, $\eta^2 = .25$; park: $F(1, 268) = 5.20$, $p = .023$, $\eta^2 = .02$; market: $F(1, 271) = 16.54$, $p < .001$, $\eta^2 = .06$). Self-reported fear was higher in the more threatening scenario in each case (car breakdown: $M_{\text{threat level 1}} = 3.04$; $M_{\text{threat level 2}} = 4.58$; park: $_{\text{threat level 1}} = 4.45$; $M_{\text{threat level 2}} = 4.77$; market: $M_{\text{threat level 1}} = 2.07$; $M_{\text{threat level 2}} = 2.57$).

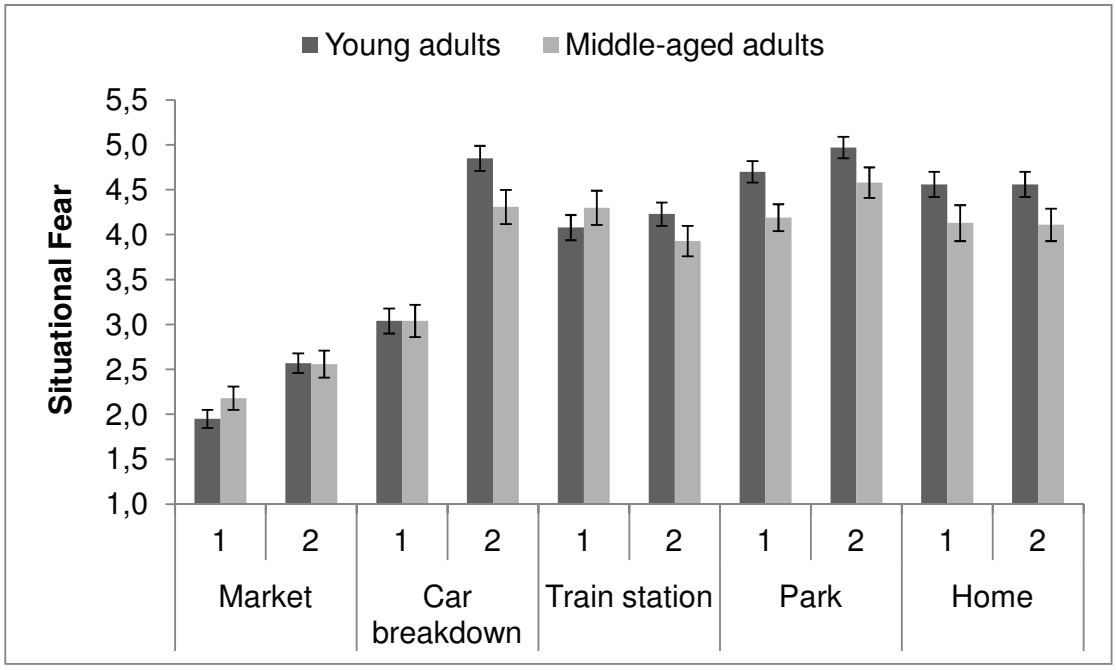

Figure 5. Estimated marginal means of young and middle-aged adults' situational fear by threat level (level 1 vs. 2) for each vignette in Study 1. (Gender and story relation as covariates. Error bars indicate one standard error above and below the mean.)

Age Effects

Age group differences were obtained in two vignettes (park: $F(1, 268) = 10.07$, $p < .01$, $\eta^2 = .04$; home: $F(1, 270) = 6.54$, $p < .05$, $\eta^2 = .02$). Contrary to hypothesis, young adults exhibited more situational fear than middle-aged participants (park: $M_{\text{young}} = 4.84$, $M_{\text{middle-aged}} = 4.38$; home: $M_{\text{young}} = 4.56$, $M_{\text{middle-aged}} = 4.12$). There were no further age group effects, $ps > .10$ (see Table 3 and Figure 5).

Story Relation and Gender

Overall, story relation was high ranging from $M = 2.60$ ($SD = 0.82$) in the car breakdown scenario to $M = 3.20$ ($SD = 0.78$) in the train station scenario. It showed significant

influences on situational fear in the park, home, and market vignette. Subjects who were better able to relate to the story showed higher situational fear; separate analyses showed that this effect was independent from age. Across all vignettes women indicated a higher situational fear than men.

Table 3

Mean Values and Standard Deviation in situational fear of crime for each vignette for young and old adults in Study 1 and Study 2.

Vignette	Threat Level	*Mean*		*Standard Deviation*		*Effect size*[a]		
		Young	Middle-aged	Young	Middle-aged	Threat	Age	T × A
Study 1								
Market	1	2.05	2.21	0.84	1.04	.06***	.00	.00
	2	2.65	2.69	1.02	1.18			
Car breakdown	1	3.00	3.01	1.31	1.39	.25***	.01	.01
	2	4.69	4.43	1.48	1.50			
Train station	1	4.16	4.17	1.30	1.44	.00	.00	.01
	2	4.22	3.91	1.34	1.28			
Park	1	4.60	4.06	1.43	1.38	.02*	.04**	.00
	2	4.97	4.67	1.46	1.44			
Home	1	4.59	4.24	1.48	1.53	.00	.02**	.00
	2	4.61	4.17	1.44	1.30			
Study 2								
		Young	Old	Young	Old	Threat	Age	T × A
Market	1	2.18	2.34	0.91	1.07	.05**	.00	.00
	2	2.73	2.69	1.05	1.05			
Car breakdown	1	2.95	3.73	1.31	1.61	.19***	.05**	.02*
	2	4.48	4.74	1.46	1.45			
Bus stop	1	4.17	4.12	1.22	1.45	.00	.01	.02*
	2	4.20	4.55	1.47	1.35			
Park	1	4.45	3.97	1.42	1.34	.01†	.01	.00
	2	4.84	4.46	1.58	1.61			
Home	1	4.63	4.27	1.41	1.35	.00	.03*	.00
	2	4.71	4.22	1.40	1.34			

Note. T × A =Threat × Age; [a] Effect sizes are partial eta squares (η^2) and relate to ANCOVAs including gender and story relation as covariates.
† $p < .10$ * $p < .05$. ** $p < .01$. *** $p < .001$.

2.5.3. Desiderata of Study 1

Compared with previous findings of the relation between age and non-situational measures of fear of crime, the data replicate the findings of large-scale studies except for the standard question. The five vignettes elicited different intensities of fear ranging from relatively low to moderate intensities in self-reported fear representing a broad spectrum of crime-threatening scenarios. Moreover, in three of the five scenarios the threat manipulation was effective, which allows interpreting group differences as stemming from differences in perceiving threat. Yet, two scenarios elicited no difference depending

on threat level that is why they were modified slightly in Study 2. Although this reduces the possibility of comparing the results of Study 1 and 2, this is done to increase the validity of the scenarios and improve testing age group differences. This is especially relevant with regard to ecological validity. The market scenario was situated in Spain, where old adults may not travel (anymore). Moreover, train stations may also be less relevant for rural inhabitants.

Regarding age effects, no interaction effects with age were obtained. Instead, two main effects of age revealed higher situational fear intensity in the young participants in the park and home vignette. In Study 2 it is tested whether these effects are also found for the comparison between young and old adults. Moreover, the relationship between physical vulnerability and situational fear is tested as well as the relationship between situational fear and precautious behavior. Situational fear is supposed to mediate the relationship between age and precautious behavior. As age was negatively related to situational fear in two vignettes in Study 1 and unrelated to the other vignettes, situational fear could not serve as a mediator in the present study.

2.6. Study 2

2.6.1. Method

2.6.1.1. Participants

Two hundred forty-three adults were recruited in Lower Saxony, Germany, in January 2010 (young: 18 - 30 years, N = 129; *Median* = 22.0 years; 51.9% female; old: 65 - 84 years, N = 114, *Median* = 71.0 years; 44.7% female). A broad spectrum of participants was represented in the sample. Young participants included students, technical and administrative employees at the university, pupils, apprentices, and employees at social welfare offices. Old participants were recruited from choirs, sports clubs, and facilities for further education. Originally, more subjects were sampled (N_{total} = 343) but were not retained in the study as they either did not meet the age range criteria or were recruited in nursing homes for the elderly. I decided to exclude the data of the nursing home residents after recruitment because their living arrangements differed considerably from those of the other participants, young and old.[16] Moreover, in order of this study to be comparable with other studies in the criminological field but adding a different methodology, a similar group of subjects should be sampled.

There were no age group differences in self-reported life satisfaction as measured by the same item as in Study 1. In addition to evaluating their general health status (reverse coded in comparison with Study 1), participants were asked to judge their flexibility of arms and legs, their vision (including glasses/lenses), hearing abilities, and fitness on a 4-point scale ranging from *very good* (1) to *bad* (4). Young adults indicated a significantly better health status than old adults on all items (global: M_{young} = 1.99 vs. M_{old} = 2.32, t(237)

[16] Interestingly, results for this subsample did not differ from the old age sample in situational fear, but participants in nursing homes indicated less precautious behavior.

= -3.92, $p < .001$; flexibility: $M_{young} = 1.43$ vs. $M_{old} = 2.32$, $t(239) = -7.46$, $p < .001$; vision: $M_{young} = 1.53$ vs. $M_{old} = 2.17$, $t(239) = -7.09$, $p < .001$; hearing: $M_{young} = 1.61$ vs. $M_{old} = 2.58$, $t(238) = -7.59$, $p < .001$; fitness: $M_{young} = 2.16$ vs. $M_{old} = 2.58$, $t(239) = -4.03$, $p < .001$).

2.6.1.2. Measures

Non-situational Measures of Fear of Crime

The same measures as in Study 1 were used. The item-scale correlations for the affective component ranged between $r_{it} = .41$ and $r_{it} = .79$. For the cognitive component they ranged between $r_{it} = .36$ and $r_{it} = .68$. Internal consistency was $\alpha = .89$ and $\alpha = .79$. Regarding precautious behavior, item-scale correlations ranged between $r_{it} = .18$ and $r_{it} = .55$; internal consistency was $\alpha = .79$.

Vignettes and Situational Fear Scale(s)

The same vignette scenarios as in Study 1 were used with two modifications (see Table A-1). The market scenario was transferred from Spain to Germany and the train situation was replaced by the same situation taking place at a bus stop. This was done in order to render those situations more applicable to old adults and to increase the difference between the threatening levels.

Again, the 11 statements concerning fear in such a situation were measured. Internal consistencies per vignette ranged from Cronbach's $\alpha = .91$ to $\alpha = .95$.

Physical Vulnerability

Items to measure subjective physical vulnerability in Study 2 were extracted from a larger set of vulnerability related items that were used in an unpublished master thesis (Ehrhorn & Greve, 1999). Physical vulnerability comprised eight items measured on a 4-point scale ranging from *not at all true* (1) to *very true* (4). The items were worded without reference to crime but rather focused on the perception of the constitution of the body: 'I feel fragile', 'I get ill easily', 'I am quite fit for my age' (reverse coded), 'I have more health problems than other people', 'If I broke my bones right now, it would be devastating', 'I am burdened by illness', 'I feel physically inferior to most other people', or 'I only heal very slowly if injured'. For the scale, higher values indicated greater physical vulnerability. Item-scale correlations ranged between $r_{it} = .27$ and $r_{it} = .52$; internal consistency was Cronbach's $\alpha = .71$.

2.6.1.3. Procedure

The procedure was the same as in Study 1 except for order. Sixteen different orders were realized, always starting with the market scenario. There were no order effects detected on the outcomes.

2.6.1.4. Data Analyses

Analytical procedures replicated those of Study 1. Additionally, path analyses were conducted. As a possible mediator in the relationship between age and situational fear, an age-related increase in physical vulnerability has been hypothesized. In order to test whether age differences in situational fear can be attributed to differences in physical vulnerability, 5 path analyses were conducted for each vignette using Mplus (Muthén & Muthén, 1998 - 2008). In order to test whether effects of age group on situational fear are mediated by vulnerability, the direct and indirect effect of age group have to be calculated in a mediation analysis (e.g., MacKinnon & Fairchild, 2009; Preacher & Hayes, 2004; see Figure 6). The direct effect of the predictor on the criterion (path c') is expressed in the regression coefficient when controlling for the mediator variable. The indirect effect is calculated by multiplying the unstandardized regression coefficients of the predictor variable on the mediator variable (path a) and the mediator on the criterion (path b) when simultaneously controlling for the predictor variable. When this multiplication term (a × b) is significant, there is at least partial mediation.

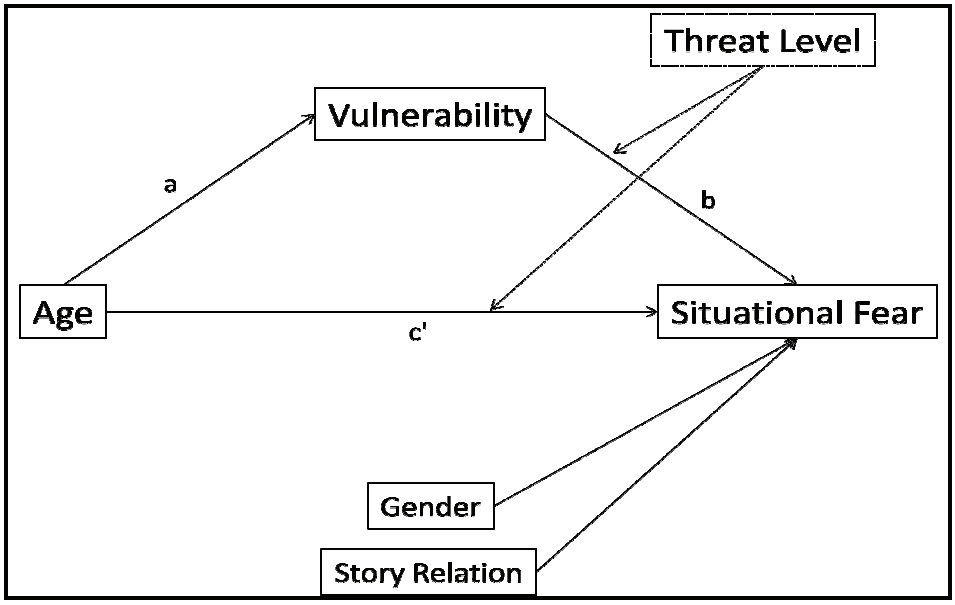

Figure 6. Conceptual model for the path analyses with situational fear as criterion, age as predictor, and vulnerability as mediator variable. Threat level and its interactions with age or vulnerability were included in the model in some cases (dashed lines). Gender and story relation as covariates.

Besides demonstrating that a variable mediates (part of) the influence of a predictor on a criterion, it would be of interest to quantify the size of this mediation effect. However, there is still debate about which effect size measure fulfils the desiderata posed at such a descriptor the best. Preacher and Kelley (2011) suggest an effect size index that quantifies the indirect effect as the proportion of the maximum possible indirect effect that could have been obtained and the actual effect (κ^2). In order to report κ^2, I used an SPSS macro

written by Hayes (2012). Unfortunately, elaboration on effect size measures has not developed so far yet as to calculate effect sizes in models that include covariates and moderators. Therefore, effect sizes are reported for coefficients in simple path analyses with only one mediator and the residuals of the criterion being z-standardized after being regressed on the other predictor variables that cannot be included in the model to calculate the effect size. Preacher and Kelly (2011) compare the properties of κ^2 to that of r^2_{xy}, which is why Cohen's definition of small, medium, and large effect sizes as .01, .09, and .25 can be applied (Cohen, 1988).

For the path analyses age group, gender, and threat level were effect-coded beforehand (age: young = -1, old = 1; gender: female = -1, male = 1; threat: low = -1, high = 1). Moreover, vulnerability and story relation were centered on their sample mean (Aiken & West, 1991). Situational fear of crime for each vignette was the criterion, which was regressed on age group and threat level as predictors. Situational fear was also regressed on vulnerability as mediator variable, which was regressed on age group. As will be shown there were significant interaction effects between age group and threat level on situational fear in the car breakdown and bus stop scenario. Consequently, interaction terms were included in these analyses. The interaction terms were constructed by multiplying the simple terms (Aiken & West, 1991). Accordingly, situational fear was additionally regressed on the interaction term of age group with threat level and vulnerability with threat level (see Figure 6 dashed lines) in these cases. If age group effects on situational fear are moderated by threat level, this effect could still be mediated by vulnerability. The threat level could influence whether perceptions of vulnerability are relevant or at least vary as a function of the level of threat. In this sense, a mediated moderation is tested when including these interaction terms (e.g., Muller, Judd, & Yzerbyt, 2005). Finally, gender and story relation were included as covariates.

Moreover, a structural equation model (SEM) was tested to examine the relationships between age, vulnerability, situational fear, and precautious behavior. However, as the application is partly adapted to the results of previous analyses, the details of the analysis are reported in the respective chapter.

As in Study 1, gender effects are included as covariates and results are reported. I only refer to the results in the main text when they contribute to the research question.

2.6.2. Results

2.6.2.1. Non-situational Measures of Fear of Crime

As in Study 1, I conducted four parallel ANOVAs on the non-situational fear-of-crime measures and the standard question with age and gender as between-subject factors. As hypothesized, there was no significant difference between the age groups with regard to the affective component, $F(1, 220) = 0.19$, *n.s.* (see Table 2). There was a marginally significant difference between the age groups concerning the cognitive component, $F(1, 220) = 3.87$, $p = .05$, which showed that old adults judged their victimization risk somewhat higher ($M = 1.85$) than young adults ($M = 1.73$). Replicating previous findings,

old adults differed significantly from young adults with regard to precautious behavior, $F(1, 220) = 56.92$, $p < .001$, $\eta^2 = .21$, and the standard question, $F(1, 220) = 13.60$, $p < .001$, $\eta^2 = .06$. Old adults indicated higher values on the behavioral component ($M_{young} = 2.31$, $M_{old} = 2.95$) and feeling more unsafe in the standard question ($M_{young} = 1.85$, $M_{old} = 2.16$) than young adults.

Concerning gender, female respondents reported taking more precautious behaviors, $F(1, 220) = 12.65$, $p < .001$, $\eta^2 = .05$, and feeling less safe in the standard question, $F(1, 220) = 51.16$, $p < .001$, $\eta^2 = .19$. There was no significant gender effect regarding the affective and cognitive component. Moreover, there were no significant interaction effects between age and gender.

2.6.2.2. Situational Fear

Threat Manipulation

The threat manipulation was efficient in two vignettes (car breakdown: $F(1, 216) = 51.35$, $p < .001$, $\eta^2 = .19$; market: $F(1, 218) = 11.27$, $p < .01$, $\eta^2 = .05$) and marginally significant in the park vignette (park: $F(1, 214) = 3.03$, $p = .083$, $\eta^2 = .01$), thus replicating results of Study 1. In each of those vignettes, the more threatening scenario elicited a higher value of situational fear (car breakdown: $M_{threat\ level\ 1} = 3.31$ vs. $M_{threat\ level\ 2} = 4.64$; park: $M_{threat\ level\ 1} = 4.34$ vs. $M_{threat\ level\ 2} = 4.64$; market: $M_{threat\ level\ 1} = 2.26$ vs. $M_{threat\ level\ 2} = 2.73$).

Age Effects

Age group effects were obtained in three vignettes (see Table 3 and Figure 7). Old adults indicated significantly more situational fear in the car breakdown vignette than young adults, $F(1, 216) = 11.09$, $p < .01$, $\eta^2 = .05$ ($M_{young} = 3.67$ vs. $M_{old} = 4.28$). This effect was qualified by an interaction between age group and threat level, $F(1, 216) = 4.94$, $p < .05$, $\eta^2 = .02$. The difference in situational fear between young and old adults was larger in the vignette version with lower threat ($M_{young} = 2.80$ vs. $M_{old} = 4.53$; difference = 1.73) than in the vignette with higher threat ($M_{young} = 3.83$ vs. $M_{old} = 4.74$; difference = .91). Two follow-up covariance analyses for both threat levels separately revealed that the difference between the age groups was only significant in the lower threat condition (lower threat: $F(1, 100) = 11.17$, $p < .01$, $\eta^2 = .10$ vs. higher threat: $F(1, 114) < 1.0$, $p > .10$). Moreover, an interaction effect between age group and the threat manipulation was found in the bus stop vignette, $F(1, 116) = 4.24$, $p < 0.05$, $\eta^2 = .02$ (lower threat: $M_{young} = 4.27$ vs. $M_{old} = 4.19$; difference = -0.08 vs. higher threat: $M_{young} = 4.00$ vs. $M_{old} = 4.65$; difference = 0.65). Follow-up covariance analyses separately for both threat levels showed that old adults indicated more fear of crime than young adults only in the higher threatening vignette version (lower threat: $F(1, 123) < 1.0$, $p > .10$ vs. higher threat: $F(1, 91) = 5.70$, $p < .05$, $\eta^2 = .06$). Looking at these results, the hypothesis of increased situational fear with age seems to be at least partly supported.

Yet, contrary to hypothesis but replicating findings of the first study, young participants were significantly more fearful than old participants in the home vignette, $F(1, 213) = 6.55$, $p < .05$, $\eta^2 = .03$ ($M_{young} = 4.70$ vs. $M_{old} = 4.24$). Moreover, although not significantly different for the two age groups, young adults exhibited also greater situational fear in the park vignette than old adults, which mirrored the results of Study 1 (see Table 3).

Story Relation and Gender

Again, being able to relate to the story had an influence on the bus stop, park, and home vignette independent from age. The better a participant could relate to the scenario the higher was situational fear of crime. Story relation was also high ($M_{Car\ breakdown} = 2.80$, $M_{Home} = 2.99$, $M_{Park} = 3.13$, $M_{Bus\ stop} = 3.15$, $M_{Market} = 3.17$). Moreover, as in Study 1, women indicated more situational fear across all vignettes but the market scenario.

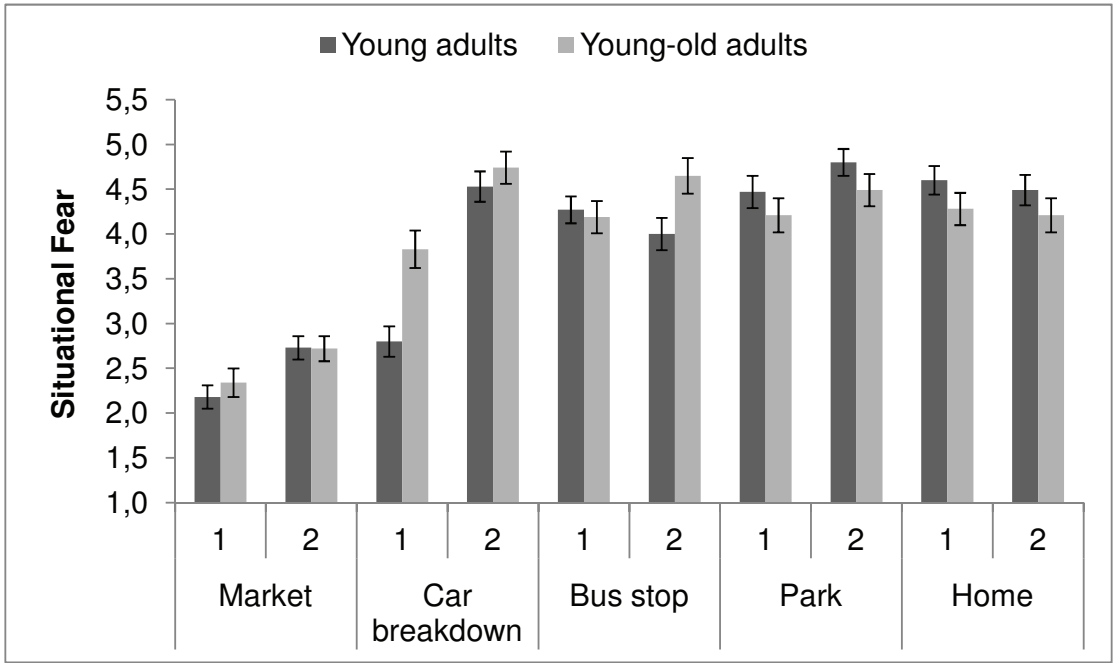

Figure 7. Estimated marginal means of young and old adults' situational fear by threat level (level 1 vs. 2) for each vignette in Study 2. (Gender and story relation as covariates. Error bars indicate one standard error above and below the mean.)

2.6.2.3. Influence of Vulnerability

As can be seen in Table 4, age was significantly positively correlated with vulnerability ($r = .18$, $p < .05$), i.e., old adults saw themselves as being physically more vulnerable than young adults. Furthermore, a higher vulnerability perception was significantly related to more situational fear of crime in all but one vignette (ranging from $r_{park} = .11$ to $r_{market} = .41$; situational fear is z-residualized on threat level manipulation in this case). Moreover, although subjective health and vulnerability are positively correlated with $r = .45$, $p < .01$ (sharing 20% of variance), it can be seen that physical vulnerability is not the same as subjective health.

In order to test mediational effects of vulnerability and situational fear in the relation between age and precautious behavior, i.e., the behavioral component of fear of crime, I conducted five path analyses (Table 5 and Table 6). As could already be seen from correlation, age had a positive relation with vulnerability (B = .08, β = .18, p < .01). Moreover, vulnerability was positively related to situational fear in all vignettes ($B_{\text{Car Breakdown}}$ = 0.96, $B_{\text{Bus Stop}}$ = 0.63, B_{Park} = 0.47, B_{Home} = 0.57, and B_{Market} = 0.94; ps < .05) indicating that greater vulnerability is connected to greater situational fear. Regarding mediating effects of vulnerability, it can be seen in the tables that the indirect effect of age on situational fear is significant in three of the five vignettes (ab_{Car} = .07, $ab_{\text{Bus Stop}}$ = .06, ab_{Market} = .07, ps < .05; κ^2_{Car} = .06, $\kappa^2_{\text{Bus Stop}}$ = .05, κ^2_{Market} = .08) and marginally significant in the other two (ab_{Park} = .04, ab_{Home} = .05, ps < .10; κ^2_{Park} = .03, κ^2_{Home} = .04). The older a person was the more they perceived themselves as vulnerable and the more situational fear was expressed.

Table 4
Correlation matrix

	Age	G	Aff	Cog	Beh	H	Vul	Car	Bus	Market	Park
Gender (G)	.07										
Affective (Aff)	-.03	-.08									
Cognitive (Cog)	.11	-.10	.65**								
Behavioral (Beh)	.44**	-.17**	.38**	.44**							
Health (H)	.51**	.02	.13	.17**	.26**						
Vulnerability (Vul)	.18**	.00	.32**	.36**	.26**	.45**					
Car breakdown	.16*	-.34**	.27**	.30**	.41**	.18**	.31**				
Bus stop	.04	-.26**	.25**	.25**	.33**	.12	.22**	.48**			
Market	.02	-.06	.39**	.26**	.24**	.18**	.41**	.35**	.35**		
Park	-.14*	-.50**	.27**	.21**	.23**	-.09	.11	.49**	.59**	.33**	
Home	-.15*	-.27**	.26**	.20**	.22**	.02	.17**	.42**	.50**	.42**	.64**

Note. Age and gender effect-coded (young = -1 vs. old = 1; female = -1 vs. male = 1). Situational fear was z-residualized on threat level for each vignette.
* p < .05. ** p < .01.

Looking at the effect sizes indicates that a small to medium part of the age effect on situational fear can be attributed to perceptions of vulnerability. This is also expressed, on the one hand, in the remaining significant positive effect of age in the car breakdown vignette. Old adults indicated more situational fear independent from vulnerability (M_{young} = 3.93 vs. M_{old} = 4.37). On the other hand, the age group effect on situational fear became marginally significant in the park vignette and was significant in the home vignette. Yet, in those scenarios young adults reported more situational fear than old adults (park: M_{young} = 4.72 vs. M_{old} = 4.40; home: M_{young} = 4.82 vs. M_{old} = 4.28). A significant indirect effect of age group via vulnerability suggests in this case an attenuating effect of vulnerability. The inclusion of the mediator controls for the part of variance in the age group that is opposite to the sign of the overall age group effect in those scenarios. Consequently, once this

influence is controlled for, the negative effect of age group even increases.

Moreover, I included the interaction terms between age and threat level, and vulnerability and threat level, respectively. As indicated by the significant indirect effect of the age-by-threat level interaction on situational fear in the bus stop scenario (ab = 0.05, $p < .05$), some part of the influence of the interaction term on situational fear was mediated by the threat level-moderated influence of vulnerability. This indirect effect was not significant in the car breakdown vignette.

Furthermore, as the lack of a correlation between gender and vulnerability already indicated, the effect of gender on situational fear remained unchanged after inclusion of vulnerability (Table 5 and Table 6).

Table 5

Hierarchical Regression Analyses for Situational Fear in the scenarios car breakdown and bus stop

	Car Breakdown				**Bus Stop**			
	Model 1	Model 2			Model 1	Model 2		
Variable	*B*	*B*	β	95% CI	*B*	*B*	β	95% CI
Constant	4.02	4.15		[3.97, 4.32]	4.28	4.36		[4.19, 4.53]
Age	0.31**	0.22*	0.14	[0.04, 0.41]	0.14	0.06	0.05	[-0.13, 0.25]
Threat Level	0.66***	0.61***	0.38	[0.43, 0.78]	0.05	0.07	0.05	[-0.11, 0.25]
Age × Threat Level	-0.19*	-0.14	-0.08	[-0.32, 0.04]	0.18*	0.11	0.08	[-0.08, 0.29]
Vulnerability		0.96***	0.26	[0.64, 1.31]		0.63**	0.20	[0.26, 1.00]
Vuln. × Threat Level		-0.26	-0.08	[-0.59, 0.07]		0.19	0.06	[-0.20, 0.57]
Gender	-0.54***	-0.53***	-0.33	[-0.70, -0.36]	-0.39***	-0.37***	-0.27	[-0.53, -0.21]
Story Relation	0.11	0.06	0.03	[-0.18, 0.30]	0.47**	0.47**	0.24	[0.20, 0.74]
R^2	.32	.39			.15	.18		
Chi²	12.17**				2.21			
RMSEA	.112 [0.05, 0.18]				.000 [0.00, 0.10]			
Indirect effect of Age on Situational Fear (ab_{Age})	0.07* [0.01, 0.14]				0.06* [0.00, 0.11]			
κ^2 (ab_{Age})	.06 [.01, .12]				.05 [.01, .11]			
Indirect effect of Age × Threat Level on Situational Fear	-0.03 [-0.09, 0.03]				0.05* [0.00, 0.09]			

Note. The number of missing observations (and thus the size of *N*) differs between the several models. CI = confidence interval. Age, gender, and threat level effect-coded (age: young = -1, old = 1; gender: female = -1, male = 1; threat: low = -1, high = 1).

Vulnerability and Story Relation mean-centered. RMSEA: 90% confidence interval in brackets. Indirect effects and κ^2: 95% confidence interval in brackets.

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

Table 6

Hierarchical regression analyses for situational fear in the scenarios park, flat, and market

	Park				**Flat**				**Market**			
	Model 1	Model 2			Model 1	Model 2			Model 1	Model 2		
Variable	*B*	*B*	β	95% CI	*B*	*B*	β	95% CI	*B*	*B*	β	95% CI
Constant	4.50	4.56		[4.40, 4.73]	4.47	4.55		[4.39, 4.71]	2.49	2.61		[2.48, 2.75]
Age	-0.12	-0.16†	-0.10	[-0.33, 0.02]	-0.22*	-0.27**	-0.19	[-0.44, -0.09]	0.03	-0.05	-0.05	[-0.18, 0.08]
Threat Level	0.17*	0.18*	0.12	[0.02, 0.35]	0.02	0.01	0.01	[-0.15, 0.18]	0.24***	0.21**	0.21	[0.09, 0.33]
Vulnerability		0.47*	0.13	[0.08, 0.85]		0.57**	0.18	[0.20, 0.95]		0.94***	0.40	[0.64, 1.24]
Gender	-0.71***	-0.70***	-0.46	[-0.88, -0.53]	-0.36***	-0.36***	-0.26	[-0.52, -0.19]	-0.06	-0.05	-0.03	[-0.18, 0.07]
Story Relation	0.32*	0.33*	0.14	[0.03, 0.62]	0.42***	0.38**	0.22	[0.16, 0.61]	-0.12	-0.05	-0.05	[-0.26, 0.17]
R^2	.29		.31		.14		.17		.06		.20	
Chi²			1.50				2.78				3.56	
RMSEA			.00 [.00, .08]				.00 [.00, .11]				.03 [.00, .12]	
Indirect effect of Age on Situational Fear (ab_{Age})			0.04† [-0.01, 0.08]				.05† [-0.00, 0.09]				0.07* [0.01, 0.14]	
κ^2 (ab_{Age})			.03 [.00, .07]				.04 [.01, .09]				.08 [.02, .15]	

Note. The number of missing observations (and thus the size of *N*) differs between the several models. CI = confidence interval. Age, gender, and threat level effect-coded (age: young = -1, old = 1; gender: female = -1, male = 1; threat: low = -1, high = 1).
Vulnerability and Story Relation mean-centered. RMSEA: 90% Confidence Interval in brackets. Bootstrap: 1000 samples.
† $p < .10$ * $p < .05$. ** $p < .01$. *** $p < .001$.

2.6.2.4. Situational Fear, Vulnerability, and Precautious Behavior

As outlined above, one potential explanation for the more frequent precautious behaviors of old adults consists in an increase of dispositional fear being visible in an increase of situational fear across various situations. This is assumed to be related to precautious behaviors in order to avoid such situations. The increase in situational fear is hypothesized to be based on an increase in vulnerability. The prior analyses already showed that being old was only related to expressing more fear in some vignettes and that this was only partly explained by increases in vulnerability. Still, it is of interest whether this specific age-related increase in situational fear is connected with more precautious behavior.

Accordingly, I employed a structural equation model to test the hypothesis that the effect of age on precautious behavior is mediated by situational fear that is mediated by an increase in vulnerability. Covariance matrices were analyzed by applying the maximum likelihood procedure as a method of parameter estimation. Moreover, to retain as much of data information as possible, Full Information Maximum Likelihood (FIML: Maximum Likelihood Estimation with an item missing data imputation routine, Wothke, 2000) was used as estimation procedure. A structural equation model was chosen because it allowed including shared variance of different scenarios while simultaneously controlling for non-shared variance treated as residual variance.

Since old adults indicated more situational fear only in the vignettes of car breakdown and bus stop, only those variables were included in the model. Both variables were regressed on threat level beforehand in order to control for differences due to this manipulation. The residuals were z-standardized and correlated positively with each other (r = .48, $p < .01$; Table 4). Therefore, both variables were included in the model as manifest variables being represented by the latent factor ‘situational fear’. Moreover, vulnerability was included as latent factor being represented by two indicators (each indicator was created by the mean of four vulnerability items). As in the path analyses, age group and gender were effect-coded (age: young = -1, old = 1; gender: female = -1, male = 1). Precautious behavior was included in the model as a manifest continuous dependent variable. As can be seen in Figure 8, precautious behavior was regressed on age group as predictor variable and on vulnerability and situational fear as mediators. Furthermore, precautious behavior was regressed on gender as covariate. Residual variances were specified as being uncorrelated. This model showed acceptable fit, $\chi^2(8)$ = 9.88, *n.s.*; CFI = .994; RMSEA = 0.031 (0.000, 0.085). As depicted in Figure 8, all factor loadings were reasonable, which is a further indication of an acceptable fit.

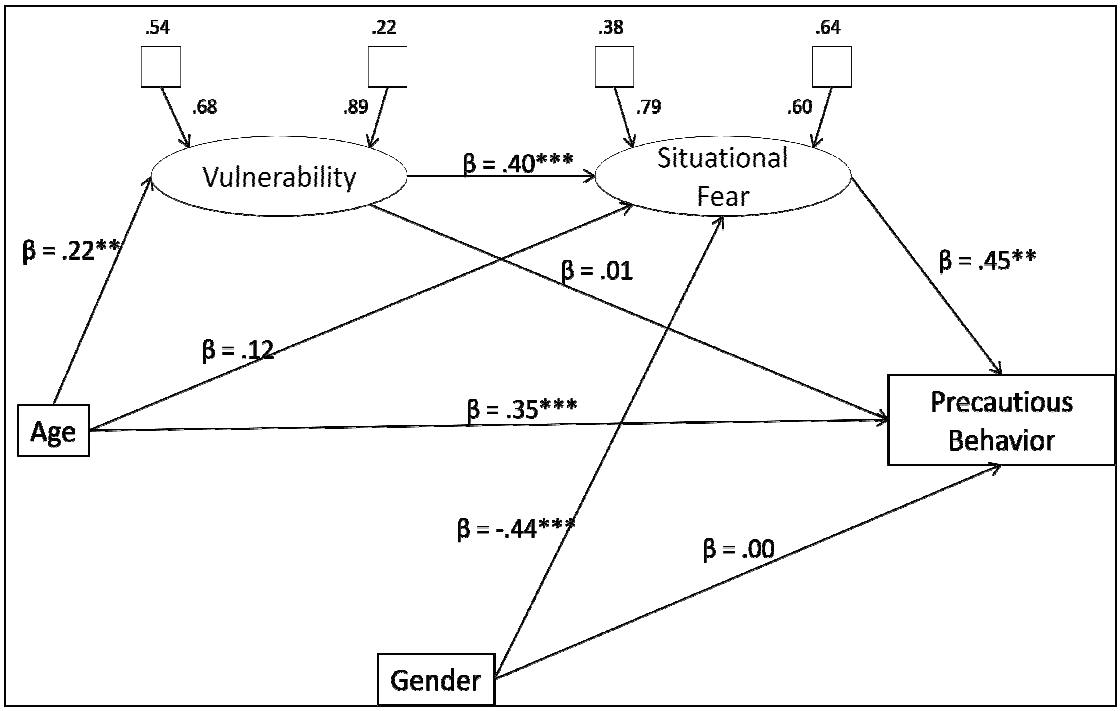

Figure 8. Cross-sectional structural equation model: Mediation of the effect of age on precautious behavior via vulnerability via situational fear. Here, N = 243; $\chi^2(8)$ = 9.88, n.s.; CFI = .994; RMSEA = 0.031 (0.000, 0.085); *p < .05, **p < .01, ***p < .001. $R^2_{behavior}$ = .39.
On the measurement level, standardized factor loadings and standardized residual variances of the indicators are shown.

The model can be decomposed into different parts. The first part concerns the relations between age, situational fear, and vulnerability as studied in the previous chapter. Age was positively related to vulnerability (B = 0.08, β = .22, p < .01), which was positively related to situational fear (B = 0.92, β = .40, p < .001). The direct effect of age on situational fear was nonsignificant (B = 0.10, β = .12, *n.s.*), while the indirect effect of age via vulnerability was significant (ab = .07, standardized ab = .09, p < .05), which reiterates the results of the prior path analysis. Age-related differences in situational fear are attributable to differences in vulnerability (at least regarding the included vignettes).

The second part concerns the prediction of precautious behavior through age mediated by vulnerability and situational fear. While situational fear was significantly positively related to precautious behavior (B = 0.40, β = .45, p < .001), vulnerability was not (B = 0.03, β = .01, *n.s.*). This was due to the indirect effect of vulnerability on precautious behavior via situational fear (ab = 0.37, standardized ab = .18, p < .05). Hence, differences in precautious behavior due to vulnerability were reflected in differences in situational fear. What is of interest is, whether the effect of age on precautious behavior was mediated by vulnerability via situational fear. The total indirect effect ab = 0.07 was significant (standardized ab = 0.10, p < .05). The indirect effect can be separated into specific indirect effects, i.e., indirect effects via vulnerability only (standardized ab = .003, *n.s.*), situational fear only (standardized ab = .06, *n.s.*), and vulnerability and situational fear together (standardized ab = .04, p = .07). Only the indirect effect via

situational fear via vulnerability was marginally significant, indicating that old adults perceived higher vulnerability resulting in higher situational fear, which again was related to more precautious behavior. This is in concordance with the hypothesis. However, there remained a considerable positive direct effect of age group on precautious behavior even after inclusion of the mediators (B = 0.25, β = .35, p < .001). This indicates that parts of age-related differences in precautious behavior cannot be explained by differences in vulnerability, and hence, situational fear.

The third part of the model concerns the effects of gender. As could already be seen in the ANCOVA's for situational fear, female participants reported more situational fear in all but one scenario. This is reflected in the significant regression coefficient in the SEM (B = -0.35, β = -.44, p < .001). However, there was no significant correlation between gender and vulnerability so that it could function as a mediator (see Table 4). Yet, gender showed a negative correlation with precautious behavior (r = -.17, p < .01), signifying that female participants took more precautions than male participants. In the SEM the direct effect of gender on precautious behavior was no longer significant, while the indirect effect via situational fear was significant (ab = 0.14, standardized ab = .20, p < .01). This means that female adults reported more situational fear, which was related to indicating more precautious behavior.

2.6.3. Desiderata of Study 2

As in Study 1, a mixed result pattern was obtained in Study 2. Two scenarios indicated higher situational fear in the old age group at one of the two threat levels (car breakdown and bus stop). This result would lend support for the assumption that old adults respond more strongly with fear of crime, when they are asked to imagine themselves in specific threatening situations, i.e., they respond with more situational fear indicating an increase in dispositional fear. Yet, young adults reported more situational fear in the same scenarios as in Study 1 (home and descriptively in park scenario). This result speaks against a *general* increase of situational fear of crime with age and, thus, against an age-related increase in dispositional fear.

Young adults tended to indicate more fear of crime in moderately threatening situations (given the theoretical mean of the scale for situational fear), while old adults indicated more fear than young adults in the lower threatening car breakdown scenario (although the bus stop scenario contradicts this observation). Similar to Study 1, threat level manipulation did not result in differences in situational fear in all vignettes. In order to distinguish whether age differences vary in dependence of a specific situation or threat intensity, a better variation of threat level within situations would be necessary. Accordingly, four threat levels are implemented in Study 3 to test whether age group differences depend on the level of threat or situation. I will attend to potential explanations of this in the general discussion of this section (chapter 2.8).

Given that young adults reported higher situational fear than old middle-aged and old adults in two scenarios, it seems that the two old age groups are comparable in their fear response. However, old adults responded with more situational fear than young adults in

two scenarios (under different threat levels), while middle-aged adults did not. Yet, direct comparisons of results between young, old middle-aged and old adults are not possible as I have used modified vignettes. However, the car breakdown vignette was not modified and still obtained age differences between the young and the old age group in Study 2, while there were no age differences in Study 1. This suggests that old adults may be more susceptible to threat than old middle-aged adults at least in some situations.

Moreover, in some experimental studies young adults indicated higher values in negative affect and lower values in positive affect already at baseline (Labouvie-Vief et al., 2003; Beaudreau et al., 2009). This age group difference could transfer into the response to the vignettes, possibly undermining underlying age group differences in response to the vignettes. Consequently, in Study 3 a baseline measurement is included. In order to minimize demand characteristics when only asking for fear responses at baseline and in response to the vignettes, a different measure is employed that includes a variety of positive and negative items.

This also provides the opportunity to test other responses to the crime-threatening scenarios. As Ditton et al. (1999; cf. also Jackson, 2009) have criticized, fear is not the only possible response to crime. They suggest that anger would also be a highly relevant response to crime. Similarly, feeling ashamed is a crime-related emotion oftentimes studied with regard to post-victimization symptoms (e.g., Andrews, Brewin, Rose, & Kirk, 2000; Semb, Strömsten, Sundbom, Fransson, & Henningsson, 2011; Shorey et al., 2011).

2.7. Study 3

2.7.1. Innovations Compared With Study 1 and 2 and Hypotheses

Innovations

There are several innovations implemented in Study 3 resulting from desiderata of Studies 1 and 2 and first attempts at approaching alternative explanations to the relation between age and precautious behavior. These innovations concern:

(1) Four age groups are included (young adults = YA, young middle-aged adults = YMA, old middle-aged adults = OMA, old adults = OA; abbr. used as subscripts) in order to simultaneously test age group differences with the same stimulus material.
(2) A baseline measure is integrated to control for potential age group differences in emotional response prior to emotion induction.
(3) Besides measuring situational fear, anger responses as well as shame responses are tested.
(4) Four different levels of threat are implemented so as to be able to identify whether age group differences depend on the realized level of threat (intensity) or the specific scenario.
(5) A question regarding importance of prevention of specific situation was included. This question relates to theoretical aspects that will be discussed in the fourth section of this dissertation. Description of results is included in this section because they are based on the same methodology.

Hypotheses

Non-situational Fear of Crime

Non-situational measures for fear of crime are included for comparability reasons. No age group differences are expected for the affective and cognitive component of fear of crime. In contrast, behavioral fear of crime is supposed to increase with each successive age group with the oldest age group indicating the highest behavioral fear and the youngest age group the lowest. Regarding the standard question, feelings of safety are assumed to decrease with each successive age group.

Situational Fear of Crime

Depending on whether only scenario is relevant in age differences or intensity level plays a role, different effects are hypothesized (see Figure 9).

Scenario-Hypothesis: A 3-way interaction between threat level, age group and scenario is expected. While there is no age group difference at the lowest threat level, young adults report more fear than old adults with increasing threat level in one scenario (see 'Scenario 1' in Figure 9), while the reversed pattern is displayed in another scenario ('Scenario 2').

Intensity-Hypothesis: A 3-way interaction between threat level, age group and scenario is expected. While there is no age group difference at the lowest threat level, old adults exhibit more fear than young adults at a low level of threat, but young adults report more fear at high levels of threat.

Middle-aged adults are assumed to be positioned between the young and the old age group in both hypotheses.

Fear, Anger, and Shame

Fear responses to the vignettes are hypothesized to be larger than anger and shame responses.

Importance of Prevention

An interaction between threat level and age group is expected. The oldest age group is assumed to indicate the highest importance of preventing the described situation, while the youngest adults report the lowest importance. The two middle-aged age groups are assumed to adopt a position in between the other two age groups. The age group differences grow with each successive threat level being highest at the highest threat level.

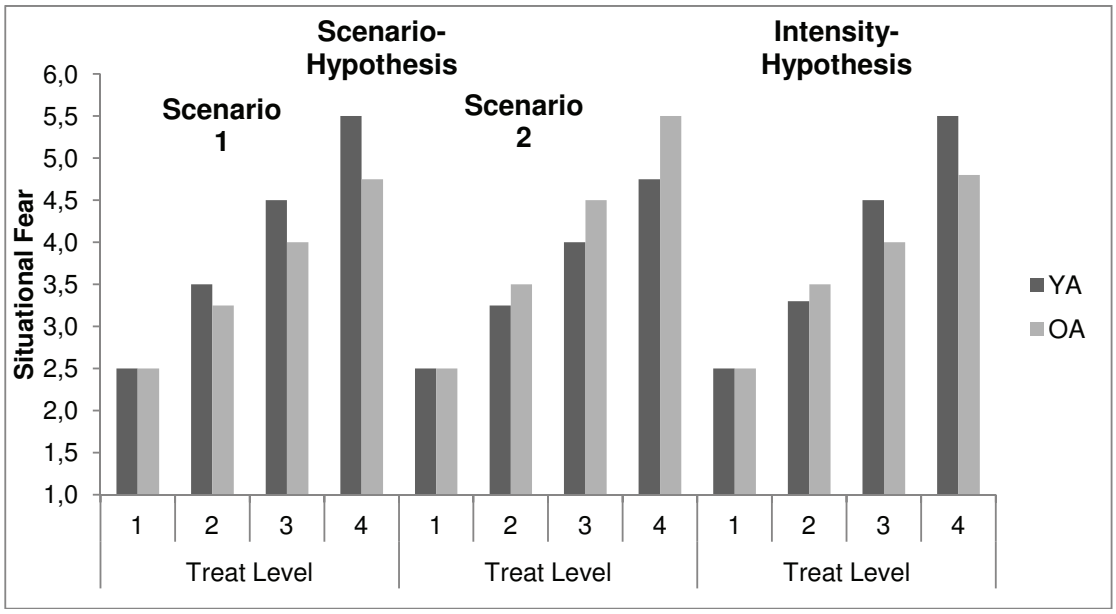

Figure 9. Overview of different outcomes depending on scenario- versus intensity hypothesis. (Only young adults and old adults are displayed for lucidity; the middle-aged age groups are expected to be positioned between the young and old age group.)

2.7.2. Method

2.7.2.1. Participants

Two approaches were chosen to recruit participants. In a first approach, participants were sampled with an online questionnaire (from June 2011 to May 2012) using Unipark. Participants were recruited either in a snowball-like system of personal contacts, via students who could earn extra course credits for recruiting participants, or by placing the link to the survey on internet platforms (e.g., www.elterntreff.de, www.seniorentreff.de, www.maennerboard.de, www.gofeminin.de). However, only small numbers of old participants could be recruited this way which is why printed versions of the survey were distributed in sport clubs, community meeting groups, and facilities for further education with a specific focus on old and middle-aged adults.

Regarding the online sampling procedure, 1,611 clicks have been registered on the introductory page of the survey. Of those, 1,034 persons continued to page two that asked for the gender and age of participants and further demographic variables. Eight-hundred eighteen participants fitted the age group criteria of this study. Seventy-four percent of those completed the questionnaire at least up to the last vignette (ranging from 65% in the young middle-aged male group to 81% in the female sample of old middle-aged adults, see Table 7). I intended to sample 100 persons per age-by-gender group. The female young age group was oversampled to have a larger subject group for studying another research question implemented within the questionnaire but irrelevant in this context. For the present study, only the first 100 subjects in the data set who completed the questionnaire at least up to the last vignette were chosen as subsample for this specific

group.[17] In the other age-by-gender groups only a fraction of the intended sample size could be reached with the online-approach (ranging from $N_{OA,\ female} = 6$ to $N_{YA,\ male} = 73$, see Table 7).[18]

The print version of the questionnaire was completed by 140 participants. Because especially those groups were targeted that were hardly represented in the online sample, comparisons regarding differences in sample characteristics between the two methods cannot be conducted.

Table 7
Distribution of participants and percentage of completed questionnaires

		YA		YMA		OMA		OA		Total	
		N	%	N	%	N	%	N	%	N	%
Online	Male	73	74	24	65	35	70	17	71	149	71
	Female	339 (100)	75	71	75	42	81	6	67	458 (219)	75
Print	Male	1	100	11	100	7	100	29	100	48	100
	Female	1 (0)	100	15	100	19	100	57	100	92 (91)	100
Total	Male	74	74	35	73	42	74	46	87	197	76
	Female	340 (100)	75	86	78	61	86	63	96	550 (310)	79
	Total	414 (174)	75	121	77	103	81	109	92	747 (507)	78

Note. YA = Young adults, YMA = Young middle-aged adults, OMA = Old middle-aged adults, OA = old adults. In parentheses is given the number of participants when only the subsample of female young adults is considered.

In total, five hundred and seven adults were recruited that completed the survey at least up to the last vignette (young: 18 - 30 years, $N = 174$, *Median* = 23.0 years, 57.5% female; young middle-aged: 31 – 49 years, $N = 121$, *Median* = 37.0 years, 73.6% female; old middle-aged: 50 – 64 years, $N = 103$, *Median* = 57.0 years, 59.2% female; old: 65 - 84 years, $N = 109$, *Median* = 73.0 years; 57.8% female; more sample descriptives can be seen in Table 8). Descriptively, the age groups differed most markedly in the percentage of females. In all but the oldest age group female participants were represented to a higher degree than in the population (about 49% in the age group of 18 to 64 year olds, from 65 years: 57%, cf. Federal Office of Statistics, 2010).[19] In the young middle-aged group female participants were significantly overrepresented, while the other age groups showed comparable distributions. Moreover, age groups differed with regard to living conditions. Old participants were less likely to live in a city with at least 100,000 inhabitants. This variable showed no significant effect on the outcome variables.

[17] There were no significant differences with regard to life satisfaction and health between the subsample and the remaining young female sample that completed the questionnaire. However, the subsample was slightly older ($M_{subsample} = 23.7$ years vs. $M_{rest} = 22.3$ years).
[18] Differences between completers and non-completers were calculated with regard to age, life satisfaction, well-being, and overall health for each age-by-gender group separately. There were no significant differences.
[19] http://www.datenportal.bmbf.de/portal/K0.gus?rid=T0.12#T0.12

Regarding psychological variables, age was positively correlated with life satisfaction as measured in Study 1 and Study 2 ($r = .15$, $p < .01$). Moreover, the older participants were, the more they indicated higher general well-being ($r = .23$, $p < .001$) as measured with five items from the WHO-5 index (Brähler, Mühlan, Albani, & Schmidt, 2007) using a 4-point scale ranging from *at no time* (1) to *the whole time* (4). In contrast, evaluations of health as measured in Study 2 decreased significantly with age (global health: $r = -.22$, flexibility: $r = -.36$, hearing: $r = -.33$, fitness: $r = -.15$, vision: $r = -.31$, ps $< .001$).

Table 8
Sample statistics including psychological variables

	YA	YMA	OMA	OA
Age (*Median*)	23.0	37.0	57.0	73.0
Age range	18 – 30 years	31 – 49 years	50 – 64 years	65 – 84 years
Female	58%	71%	59%	58%
Partner	54%	74%	79%	68%
Highly educated°	82%	69%	80%	71%
City inhabitants°	62%	57%	42%	41%
Life satisfaction	4.51^{a}	$4.54^{a,b}$	$4.75^{a,b}$	5.02^{b}
Well-being	3.72^{a}	$3.79^{a,b}$	$4.08^{b,c}$	4.27^{c}
Health (overall)	4.01^{a}	$3.83^{a,b}$	3.75^{b}	3.65^{b}
Flexibility	4.48	4.39	4.14	3.84
Hearing	4.32	4.30	3.89	3.74
Fitness	3.62	3.54	3.39	3.32
Vision	4.37	4.30	3.91	3.90

Note. Within any row, means with different superscripts are significantly different at $p < .05$ (only calculated for life satisfaction, well-being and overall health). °Highly educated: Participants younger than 50 years had to complete college degrees (i.e., *Abitur*); participants older than 50 years had to complete higher level high school program (i.e., *Realschule*) (cf. Kunzmann & Richter, 2009); City: at least 100,000 inhabitants.

2.7.2.2. Measures and Material

Non-situational Measures of Fear of Crime

Regarding the affective and cognitive component, the same measures as in Study 1 and 2 were used. The item-scale correlations for the affective component ranged between $r_{it} = .51$ and $r_{it} = .74$. For the cognitive component they ranged between $r_{it} = .53$ and $r_{it} = .68$. Internal consistency was $\alpha = .89$ and $\alpha = .88$, respectively.

Precautious behavior was measured with eight items consisting of seven items from the scale in Study 2 and an additional item ("avoided unsupervised parking lots and decks"). The scale was shortened in order to include a variation of this scale without creating too much complexity. As in Study 1 and 2 and in comparable studies, subjects were asked to indicate, how often they took precautious measures in the last 12 months out of fear of crime on a 5-point scale ranging from *never* (1) to *very often* (5). Moreover, they were asked, how often they behaved that way out of other reasons in order to measure how often those behaviors are shown independent from fear. Moreover, this method puts more emphasis on the frequency of precautious behavior out of fear in contrast to other reasons.

Item-scale correlations for the behavioral fear component ranged between r_{it} = .36 and r_{it} = .69; internal consistency was satisfying with α = .81.

Vignettes

For each scenario of Study 2, the higher threatening version of the scenario was kept and served as threat level three in Study 3 (the car breakdown scenario had the lowest values in story relation in Study 1 and 2 and was excluded completely to shorten the study). Three new vignettes were constructed for each scenario with the goal of creating more pronounced differences in threat. Threat level one was created as representing the basic situation with minor threatening clues of threat if any. At each consecutive level at least one more clue that has shown to be threatening (see chapter 1.3) was added or replaced in contrast to the prior lower threat level (see Table A-2 for an overview of the scenarios and within scenario variations).

Emotional Responses

Emotional responses were assessed with a German translation of the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988; German translation: Krohne, Egloff, Kohlmann, & Tausch, 1996). The PANAS consists of 20 items, 10 of which measure positive affect and the others measure negative affect. The PANAS-X (Watson & Clark, 1994) is an extended form of the standard version and includes the measurement of three broad categories: negative emotions (fear, hostility, guilt, and sadness), positive emotions (joviality, self-assurance, and attentiveness), and other affective states (shyness, fatigue, serenity, and surprise). In order to measure fear as in the PANAS-X, 2 items from this scale were added to the 20 items of the standard PANAS. Participants indicated the extent to which they felt those states when relating to the scenario on a 7-point scale ranging from *not at all* (1) to *extremely* (7). For the analysis of the present study, I am only interested in the fear measure consisting of the six items 'afraid' ('ängstlich'), 'frightened' ('furchtsam'), 'nervous' ('nervös'), 'jittery' ('unruhig'), 'shaky' ('unsicher'), and 'scared' ('verängstigt'). Four of these items mirrored items used in Study 1 and 2 (albeit two were phrased reversed). Internal consistency was high for all scenarios (Cronbach's α_{Home} = .94, Cronbach's α_{Bus} = .96, Cronbach's α_{Park} = .96, and Cronbach's α_{Market} = .94).

Moreover, analyses were conducted with the two items upset ('verärgert') and ashamed ('beschämt').

Prevention importance

Participants were asked for each scenario how important it would be for them to avoid such a situation on a 4-point scale ranging from *very unimportant* (1) to *very important* (4).

2.7.2.3. Design and Procedure

The questionnaire was divided into three parts. The first part asked for basic demographic information, health questions, and the standard question. The second part of the

questionnaire included the four vignettes. Before reading the vignettes, subjects were asked to indicate how they feel at the moment using the PANAS. The vignette-reading part was introduced by stating that the participants were going to read short descriptions of a fictional scenario that could happen in real life and where people respond differently. They were asked to try to imagine themselves in the scenario as well as they can and notice how they would feel. Directly after reading the scenario subjects were asked to answer some questions regarding their feelings and judgments. Participants were randomly administered to one of the four intensity levels of the vignette scenarios stratified by age group and gender. In contrast to Study 1 and 2, each participant read all scenarios belonging to only one intensity level. In the third part of the questionnaire, subjects answered questions regarding the non-situational measures of fear of crime (affective, cognitive, and behavioral component of fear of crime).

The home scenario was always presented as first vignette. Which scenario was presented as second, third, and fourth vignette was randomly administered by the program in the online approach and approximately equally distributed across the age-by-gender groups. The printed version only had two variants. Either the park scenario was presented as second or fourth vignette or the bus stop scenario, respectively. Order of vignettes did not show any effects on the outcomes.

2.7.2.4. Data Analyses

The analysis of the non-situational measures of fear of crime involved four parallel univariate analyses of variance with gender (female vs. male) and age (young vs. young middle-aged vs. old middle-aged vs. old adults) as between-subject factors. Significant effects were followed-up with multiple comparisons with Bonferroni-corrected significance levels.

The analysis of the vignettes consisted of four $4 \times 2 \times 4 \times 2 \times 3$ multivariate repeated measures analyses of variance (MANOVA) for each vignette. Dependent variables were self-reported emotions fear, anger, and shame at baseline and after reading the vignette. Between-subject factors were age (young vs. young middle-aged vs. old middle-aged vs. old adults), gender (male vs. female), and intensity level of threat (ranging from one to four). *F* values were computed on the basis of Pillai's trace as this is assumed to be robust against unequal and small cell sizes as well as violations of homogeneity of covariances (Tabachnick & Fidell, 2007). To isolate changes in particular outcomes, each overall MANOVA was followed by parallel univariate repeated measures analyses of variance (ANOVAs). Planned orthogonal contrasts (Helmert) were tested when examining differences between different levels of a factor (e.g., four age groups) or different outcome variables (e.g., three different emotion measures). In Helmert contrasts the mean of one level of the variable or outcome variable is compared with the mean of the consecutive levels or other outcome variables combined. The partial eta squares are reported for each significant effect. Univariate follow-up ANOVAs were conducted on difference values and post-hoc comparisons (Bonferroni) were tested to detect which groups and threat levels differed significantly from each other.

In order to test for the intensity- and scenario-hypothesis, a 4 × 2 × 4 × 4 MANOVA with repeated measures on fear in the four different scenarios was calculated. Age (young vs. young middle-aged vs. old middle-aged vs. old adults), gender (male vs. female), and threat level (ranging from one to four) were between-subject factors.

Finally, I conducted a 4 × 2 × 4 × 4 MANOVA with repeated measures on importance of preventing the situation for the four scenarios with age (young vs. young middle-aged vs. old middle-aged vs. old adults), gender (male vs. female), and threat level (ranging from one to four) as between-subject factors.

2.7.3. Results

2.7.3.1. Non-situational Measures of Fear of Crime

I conducted four 4 (age) × 2 (gender) analyses of variance with the affective, cognitive, and behavioral component of fear of crime as well as the standard question as dependent variables. As can be seen in Table 9, there was a main effect of age group in the affective component [$F(3, 488) = 3.43$, $p < .05$, $\eta^2 = .02$], the behavioral component [$F(3, 488) = 11.63$, $p < .001$, $\eta^2 = .07$], and the standard question [$F(3, 488) = 4.11$, $p < .01$, $\eta^2 = .03$]. The main effect of age group in the standard question was qualified by a small interaction with gender [$F(3, 488) = 3.62$, $p < .05$, $\eta^2 = .02$]. Post-hoc multiple comparisons of age group differences with Bonferroni-corrected significance levels revealed that only the oldest age group differed significantly from the youngest ($M_{YA} = 1.93 > M_{OA} = 1.70$, $p < .05$) in the affective component indicating that old adults experienced fear of crime significantly less often. Regarding the behavioral component, only the oldest age group differed significantly from the other age groups ($M_{YA} = 2.16 = M_{YMA} = 2.09 = M_{OMA} = 2.26 > M_{OA} = 2.67$, ps $< .001$). Accordingly, only the oldest age group behaved significantly more precautious. This stands in contrast to Study 1 where the old middle-aged group also differed significantly from the young age group.

Concerning the interaction effect between age group and gender on the standard question, follow-up analyses showed that only the young male age group differed significantly from the oldest male age group ($M_{YA} = 1.56 < M_{OA} = 1.93$, $p < .01$) indicating that the old age group felt less safe. Contrasting, female young and old participants differed significantly from young middle-aged adults ($M_{YA} = 2.23 > M_{YMA} = 1.96 = M_{OMA} = 2.07 < M_{OA} = 2.35$, ps $< .05$). However, the oldest age group reported the lowest feelings of safety.

Table 9
Means and standard deviations for non-situational fear-of-crime measures

		YA		YMA		OMA		OA	
Measure	**Gender**	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Affective	Male	1.85[a]	.62	1.74[a,b]	.70	1.79[a,b]	.60	1.64[b]	.43
	Female	2.01[a]	.64	1.92[a,b]	.67	1.71[a,b]	.66	1.75[b]	.68
Cognitive	Male	1.50[a]	.40	1.56[a]	.44	1.60[a]	.31	1.66[a]	.34
	Female	1.69[b]	.44	1.71[b]	.43	1.57[b]	.44	1.69[b]	.48
Behavioral	Male	1.86[a]	.73	1.78[a]	.69	2.18[a]	.68	2.36[b]	.63
	Female	2.46[c]	.75	2.40[c]	.93	2.34[c]	.82	2.98[d]	.89
Standard	Male	1.56[a]	.55	1.83[a,b]	.62	1.66[a,b]	.57	1.93[b]	.70
	Female	2.23[c]	.70	1.96[a,d]	.61	2.07[c,d]	.76	2.35[c]	.63

Note. Within any two rows belonging to one measure, means with different superscripts are significantly different at $p < .05$.

2.7.3.2. Situational Fear of Crime

The first analyses concern the three different outcomes (fear, anger, shame) for each scenario separately in comparing baseline responses with responses to the scenario in dependence of threat level including age and gender as factors. These analyses give a first overview and are followed up by analyses regarding differences between the different measures to test for the hypotheses that fear responses to the vignettes are more pronounced than anger responses and those are more pronounced than shame responses. Afterwards analyses focus on the fear response.

MANOVA

The four overall MANOVAs for the self-reported emotions revealed main effects for **age** [Home: $F(3, 457) = 8.53$, $p < .001$, $\eta^2 = .05$; Bus Stop: $F(3, 444) = 7.72$, $p < .001$, $\eta^2 = .05$; Park: $F(3, 455) = 6.70$, $p < .001$, $\eta^2 = .04$; Market: $F(3, 456) = 10.28$, $p < .001$, $\eta^2 = .06$], **vignette** [Home: $F(1, 457) = 699.36$, $p < .001$, $\eta^2 = .61$; Bus Stop: $F(1, 444) = 686.35$, $p < .001$, $\eta^2 = .61$; Park: $F(1, 455) = 492.46$, $p < .001$, $\eta^2 = .52$; Market: $F(1, 456) = 102.53$, $p < .001$, $\eta^2 = 0.18$], as well as **threat level** [Home: $F(3, 457) = 7.25$, $p < .001$, $\eta^2 = .05$; Bus Stop: $F(3, 444) = 6.69$, $p < .001$, $\eta^2 = .04$; Park: $F(3, 455) = 12.40$, $p < .001$, $\eta^2 = .08$; Market: $F(3, 456) = 50.04$, $p < .001$, $\eta^2 = .25$] for each scenario. Importantly, the effect of vignette, i.e., differences between reported emotions at baseline and after reading the vignette, depended on the different levels of threat as indicated in an **interaction effect of vignette with threat level** [Home: $F(3, 457) = 4.69$, $p < .01$, $\eta^2 = .03$; Bus Stop: $F(3, 444) = 5.51$, $p < .01$, $\eta^2 = .04$; Park: $F(3, 455) = 9.93$, $p < .001$, $\eta^2 = .06$; Market: $F(3, 456) = 65.02$, $p < .001$, $\eta^2 = .30$]. Moreover, the effect of vignette was qualified by an interaction with gender [Home: $F(1, 457) = 14.76$, $p < .001$, $\eta^2 = .03$; Bus Stop: $F(1, 444) = 7.74$, $p < .01$, $\eta^2 = .02$; Park: $F(1, 455) = 17.77$, $p < .001$, $\eta^2 = .04$; Market: $F(1, 456) = 3.69$, $p = .055$, $\eta^2 = .01$].

Additionally, there were large **main effects of emotion** [Home: $F(2, 456) = 789.94$, $p < .001$, $\eta^2 = .78$; Bus Stop: $F(2, 443) = 653.16$, $p < .001$, $\eta^2 = .75$; Park: $F(2, 454) = 585.95$, $p < .001$, $\eta^2 = .72$; Market: $F(2, 455) = 236.00$, $p < .001$, $\eta^2 = .51$]. Differences between

baseline and scenario depended on the self-reported emotion measure, as signified by an **interaction between vignette and emotion** [Home: $F(2, 456) = 582.92$, $p < .001$, $\eta^2 = .72$; Bus Stop: $F(2, 443) = 388.77$, $p < .001$, $\eta^2 = .64$; Park: $F(2, 454) = 365.64$, $p < .001$, $\eta^2 = .62$; Market: $F(2, 455) = 57.58$, $p < .001$, $\eta^2 = .20$]. This interaction effect was further qualified by a small **interaction effect of emotion with threat level for each vignette** (Vignette × Emotion × Threat Level, see Table B-1). This three-way interaction means that differences between baseline and response to the scenario varied in dependence of the threat level and this was different for the specific emotional measure.

Differences between emotional response measures were also qualified for three vignettes through an **interaction effect of emotion with age** [Home: $F(6, 914) = 7.12$, $p < .001$, $\eta^2 = .05$; Park: $F(6, 908) = 2.16$, $p < .05$, $\eta^2 = .01$; Market: $F(6, 910) = 2.87$, $p < .05$, $\eta^2 = .02$] indicating that differences between reported emotions were dependent on the age of the participant.

Furthermore, there were some more 4-way interaction effects specific for only one or two vignettes. The details will be studied when focusing on the different vignettes (see Table B-1 for full list of F-values).

Different Emotions

As seen in the previous analyses, there are meaningful differences between the three emotional responses to the vignettes. Planned Helmert contrasts with fear as reference variable revealed that mean ratings for self-reported fear were significantly larger than the ratings for the mean of anger and shame together and that the mean rating for anger was significantly larger than that for shame (all contrasts were significant at $p < .001$; Table 10) for means and standard deviations of fear responses; Table B-4 and Table B-5 for means and standard deviations of anger and shame responses). This demonstrates that fear was the strongest emotional response to the vignettes given the three examined responses, followed by anger (see Figure 10 exemplarily for the differences between emotional responses). As found in the overall MANOVAs, however, this effect was qualified by interactions with age in three vignettes. Moreover, there were interactions with gender, with threat level, vignette, and the interaction between threat level and vignette. Not all of these interactions are followed up here, as many of them are rather small and need to be replicated in future studies.

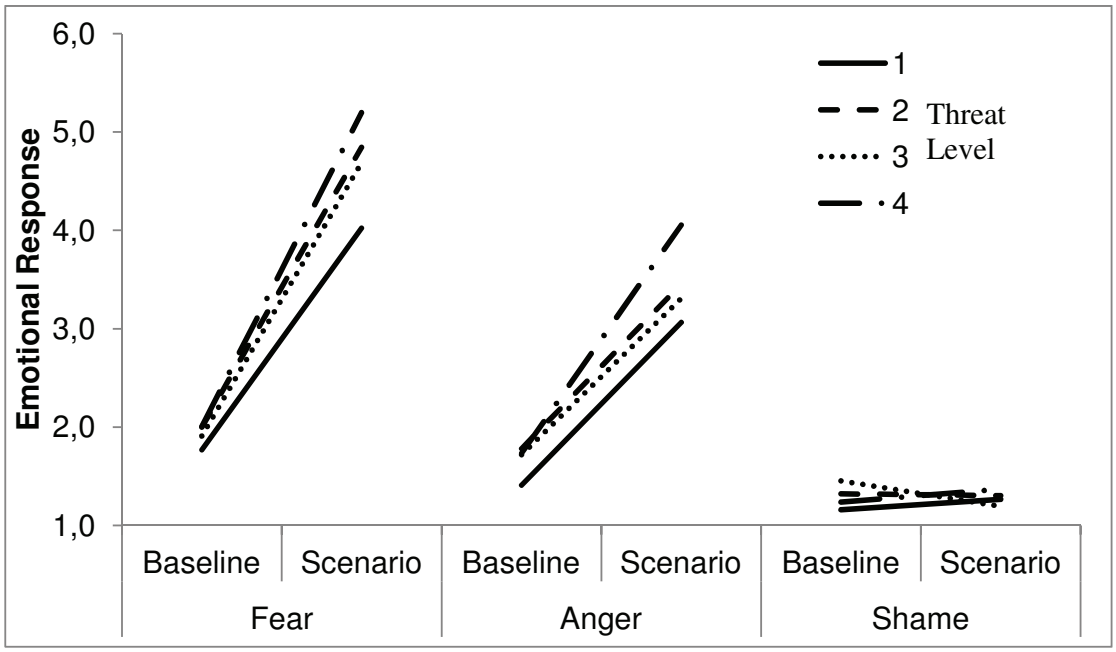

Figure 10. Comparison of different emotional responses between baseline and flat scenario for different threat levels.

Furthermore, differences between self-reported emotions were dependent on vignette (all contrasts but one were significant at least at $p < .05$, one was only marginally significant). As expected, the difference between self-reported fear and the mean of anger and shame after responding to the scenarios was much more pronounced than at baseline (e.g., $Diff_{baseline} = 0.45$ vs. $Diff_{Home} = 2.31$). Similarly, the difference between anger and shame was low at baseline ($Diff_{baseline} = 0.38$) in contrast to responding to the scenario (ranging from $Diff_{Park} = 1.41$ to $Diff_{Bus\ Stop} = 2.20$). This lends further support for the assumption that the vignettes are sensitive to fear. Concurring, the interaction effect between emotions, vignette, and threat level showed that the difference between fear and the mean of anger and shame was more pronounced after responding to vignettes of threat level two to four in contrast to the lowest threat level (all contrasts were significant at $p < .001$).

Interaction of Helmert contrast effects showed that age influenced the difference between fear and the mean of anger and shame in the home, bus stop, and market vignette ($ps < .05$). Young adults had the largest difference between fear and the other two emotions, whereas the oldest age group had the lowest difference. As will be seen, this is due to lower fear responses in the older age group. Moreover, the age groups differed with regard to the size of the difference between anger and shame. The oldest age group had the lowest difference, followed by the youngest age group. The other two age groups had higher differences. In general, however, anger was rated higher than shame in all age groups.

Fear

Success of vignettes in eliciting fear at different threat levels

As could already be seen from the MANOVAs, follow-up ANOVAs with repeated measures on vignette (baseline vs. scenario) for all scenarios revealed significant effects for vignette (for F-values see Table B-2). For all scenarios, self-reported fear was larger after reading the scenario than at baseline (M_{baseline} = 1.94 vs. M_{Home} = 4.71 vs. $M_{\text{Bus Stop}}$ = 4.67 vs. M_{Park} = 4.55 vs. M_{Market} = 2.60). Beside a main effect of threat level for all scenarios, there was an interaction effect between vignette and threat level [Home: $F(3, 468) = 6.29$, $p < .001$, $\eta^2 = .04$; Bus Stop: $F(3, 457) = 8.71$, $p < .001$, $\eta^2 = .05$; Park: $F(3, 468) = 6.66$, $p < .001$, $\eta^2 = .04$; Market: $F(3, 465) = 40.66$, $p < .001$, $\eta^2 = .21$] indicating that differences between baseline and vignette were dependent on threat level.

Table 10 depicts mean levels and standard deviations of situational fear separately for baseline, scenario, age, and threat level. Post-hoc analyses (Bonferroni) on the difference values (fear response to scenario - baseline) for each vignette showed for the home and park vignette that fear responses increased significantly less at threat level one compared with all other threat levels (Home: $Diff_{\text{level 1}} = 2.23 < Diff_{\text{level 2}} = 2.84 = Diff_{\text{level 3}} = 2.82 = Diff_{\text{level 4}} = 3.20$; Park: $Diff_{\text{level 1}} = 2.00 < Diff_{\text{level 2}} = 2.67 = Diff_{\text{level 3}} = 2.69 = Diff_{\text{level 4}} = 3.10$; ps < .01). The other threat levels did not significantly differ from each other. In contrast, in the bus stop vignette fear responses did not differ significantly between level one and two, only marginally between one and three ($p = .06$), and significantly between threat level one and four ($p < .001$). Level two and level three did not differ significantly from each other but from level four (ps < .01; $Diff_{\text{level 1}} = 2.29$, $Diff_{\text{level 2}} = 2.49$, $Diff_{\text{level 3}} = 2.74$, and $Diff_{\text{level 4}} = 3.46$). Descriptively, fear responses increased from one threat level to the next. In the market vignette, all threat levels differed significantly from each other ($Diff_{\text{level 1}} = -0.28$, $Diff_{\text{level 2}} = 0.14$, $Diff_{\text{level 3}} = 0.89$, and $Diff_{\text{level 4}} = 1.90$; ps < .001; level 1 vs. 2: $p = .09$) with the largest increase at the highest threat level. Accordingly, fear responses to the vignettes have been elicited; however, the moderating effect of threat level played out slightly different for the four scenarios, which has to do with further interaction effects detailed below. In any case, threat level four evoked more fear than level one.

Table 10

Means, standard deviations, and effect sizes for situational fear

		Mean				*Standard Deviation*				*Effects*						
Scenario	T	YA	YMA	OMA	OA	YA	YMA	OMA	OA	A	T	V	A × T	A × V	T × V	A × T × V
Baseline	1	2.28	1.77	1.66	1.59	1.17	1.02	1.00	0.75	.04**	.01	-	.03	-	-	-
	2	2.07	2.36	1.84	1.74	1.19	1.45	1.26	0.97							
	3	2.04	2.11	1.78	1.81	1.06	1.44	1.18	0.88							
	4	2.20	1.90	1.36	2.15	1.23	1.14	0.45	1.04							
Home	1	4.46	4.40	4.24	3.48	1.78	1.72	1.82	1.89	.10***	.06***	.73***	.03	.03**	.04***	.03†
	2	5.61	5.41	4.65	4.13	1.34	1.36	1.61	1.67							
	3	5.64	5.07	4.36	4.42	1.44	1.85	1.87	1.75							
	4	5.71	6.17	4.67	4.48	1.52	0.83	1.49	1.54							
Bus Stop	1	4.39	4.06	3.98	4.09	1.86	1.44	2.00	1.92	.04***	.05***	.70***	.01	.00	.05***	.02
	2	4.69	4.77	4.12	4.23	1.67	1.64	1.34	1.81							
	3	5.29	5.24	4.16	4.23	1.55	1.57	2.04	1.96							
	4	5.30	6.17	5.26	5.12	1.66	1.14	1.58	1.62							
Park	1	4.23	3.71	3.89	3.49	1.93	1.83	1.94	2.21	.05***	.05***	.66***	.02	.01	.04***	.02
	2	5.04	5.30	4.74	4.04	1.54	1.37	1.56	1.16							
	3	5.50	5.05	4.31	4.04	1.65	1.74	2.01	1.56							
	4	5.02	5.97	4.99	4.80	1.48	1.24	1.56	1.79							
Market	1	1.54	1.58	1.23	1.66	0.62	1.02	0.44	1.39	.06***	.18***	.15***	.01	.00	.21***	.02
	2	2.32	2.28	2.13	1.87	1.16	1.27	1.31	1.16							
	3	3.19	3.43	2.17	2.76	1.48	1.67	1.20	1.56							
	4	4.35	4.06	3.31	4.07	1.86	1.45	1.50	1.79							

Note. Effects for Baseline from univariate analysis, effects for scenarios from multivariate analysis with repeated measures on vignette (Baseline vs. Scenario). A = Age, T = Threat Level, V = Vignette.

† $p < .10$ ** $p < .01$. *** $p < .001$.

Age Differences in Subjective Reactivity

For all vignettes a main effect of age group was obtained [Home: $F(3, 468) = 17.23$, $p < .001$, $\eta^2 = .10$; Bus Stop: $F(3, 457) = 6.98$, $p < .001$, $\eta^2 = .04$; Park: $F(3, 468) = 8.91$ $p < .001$, $\eta^2 = .05$; Market: $F(3, 465) = 9.08$, $p < .001$, $\eta^2 = .06$]. Post-hoc analyses (Bonferroni) for the home, park, and bus stop scenario revealed that the young and young middle-aged group reported significantly more fear than the old middle-aged adults and old adults (all ps < .01). Slightly different results were found for the market scenario. The old middle-aged group had the lowest fear responses, which is why their responses were significantly lower than those of young and young middle-aged adults (ps < .001). The oldest age group was positioned in-between and did not differ significantly from any other age group. Conducting an ANOVA for fear at baseline showed a significant age effect [$F(3, 472) = 5.67$, $p < .01$, $\eta^2 = .04$]. Post-hoc analyses demonstrated that the old middle-aged subject group differed significantly from the youngest age group ($p < .01$) and was marginally significant from the young middle-aged group ($p = .08$). This age group reported lower fear levels already at baseline.

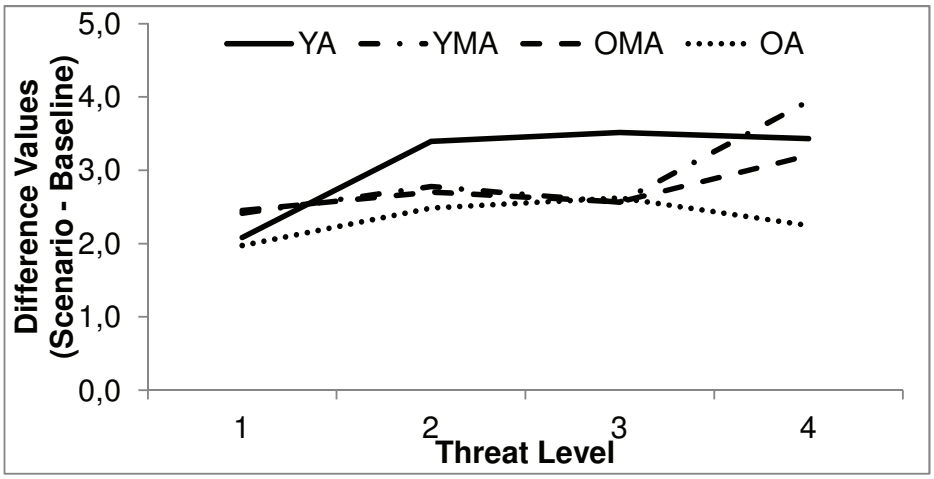

Figure 11. Fear difference values between home scenario and baseline for each threat level for age groups separately.

There was only one interaction effect obtained between vignette and age for the home scenario [$F(3, 468) = 4.82$, $p < .01$, $\eta^2 = .03$]. This interaction effect indicated that the increase in fear from baseline to vignette response differed between the age groups with the youngest age group exhibiting the highest increase and the oldest age group showing the lowest increase ($Diff_{YA} = 3.10$, $Diff_{YMA} = 2.92$, $Diff_{OMA} = 2.73$, and $Diff_{OA} = 2.33$). The middle-aged groups reported fear responses placed between young and old adults. This strengthens the results of Study 1 and 2 as it points out that differences between the age groups do not only reflect already existing differences at baseline but are age-related differences in response to the described situation (see Figure 11; interaction with threat level is not significant).

Regarding the park vignette, there was a 4-way interaction between vignette, threat level, age, and gender [$F(9, 468) = 2.02$, $p < .05$, $\eta^2 = .04$]. While the interaction effect between vignette and threat level showed that only the increase in fear at the highest threat level differed significantly from all other threat levels, the 4-way interaction demonstrated that the pattern of increases between baseline and scenario differed between gender, age group, and threat level. As depicted in Figure 12, female old middle-aged and female old adults showed less increase in fear at threat level two and three (and the old age group also at level four) than the two other age groups. In contrast, male young participants reported less increase in fear at threat level two and four but slightly more at level three than the two oldest age groups. The finding for female participants is in accord with the results from Study 1 and Study 2 and suggests that age differences were not the result of already existing differences at baseline but are reflective of differences in response to threatening situations.

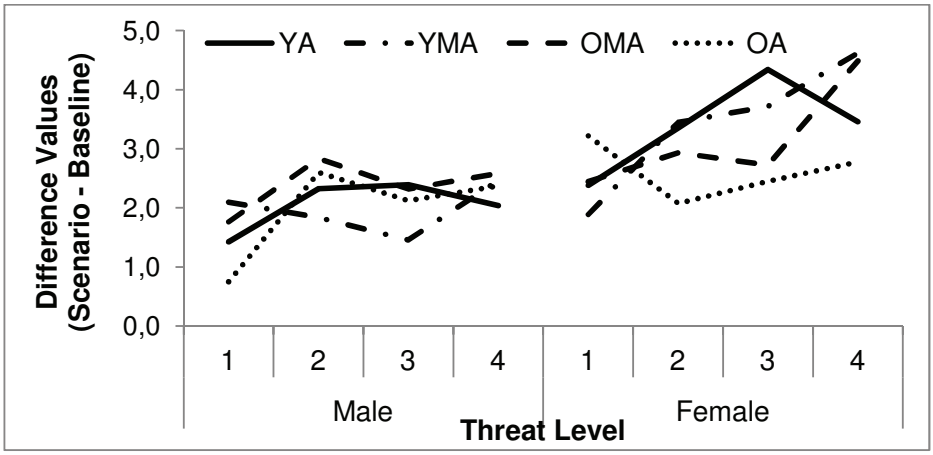

Figure 12. Fear difference values between park scenario and baseline for each threat level for age groups and gender separately.

Differences Between Age Group Differences: Intensity versus Scenario Hypothesis

One further question resulting from Study 1 and 2 was whether differences between age group differences depended on the intensity level of threat or on the specific situation or a combination of both. I conducted a 4 × 2 × 4 × 4 MANOVA with repeated measures on the difference values of fear (scenario - baseline) for the four different scenarios with age, gender, and threat level as between-subject factors. The analysis showed a significant effect of scenario, $F(3, 451) = 286.23$, $p < .01$, $\eta^2 = .66$. This means that mean increases in fear were different for the scenarios. This effect was moderated by interactions with threat level, $F(9, 1359) = 5.76$, $p < .001$, $\eta^2 = .04$, and, more importantly, with age, $F(9, 1359) = 3.24$, $p < .01$, $\eta^2 = .02$. There was no significant interaction between threat level and age or scenario, threat level, and age. This indicates that differences between the age groups in the different scenarios as described above are a function of the specific situation, i.e., there are differences in the size of age group differences in response to the scenarios that vary depending on the situation.

As displayed in Figure 13, the difference between the oldest and youngest age group was higher in the home and park scenario than in the bus stop and market scenario. Overall, this finding corroborates the results of Study 1 and 2. While the analyses above indicated that there was a main effect of age across all scenarios, this effect was only qualified in the home and park scenario suggesting age differences in response to these situations. In contrast, there was a small interaction effect between age and threat level for the bus stop scenario in Study 2. This result could not be replicated in the present study. Concurring to the results in Study 1 and 2, there was no age-related difference in response to the market scenario.

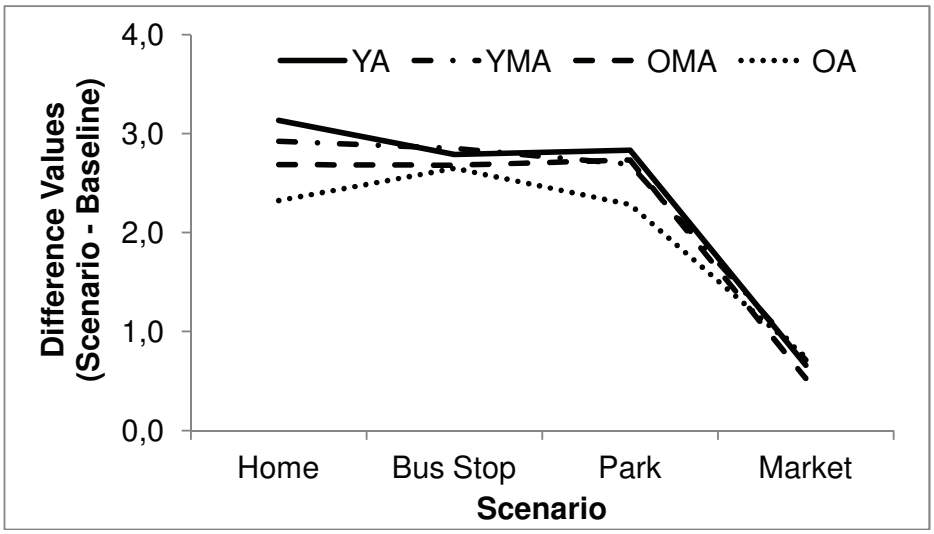

Figure 13. Comparison of fear responses separately for scenario, and age group.

Gender Differences in Subjective Reactivity of Fear

Main effects for gender were obtained for the home, bus stop, and park scenario (see Table B-2 for F-values). Those gender effects were qualified by an interaction with vignette, signifying that gender differences were different at baseline in contrast to vignette responses. An ANOVA for fear at baseline showed no significant gender differences. In contrast, ANOVAs with the difference values between baseline and vignette response as dependent variable revealed significant gender effects for all scenarios with female participants reporting more increase in fear than male participants. This effect was qualified by an interaction with threat level in the bus stop and market scenario and was even further qualified by an interaction with threat level and age in the park scenario (see above). Female and male participants differed in the differences between the threat levels (e.g., difference between level one and level four for the market scenario: male: *Diff* = 1.66 vs. female: *Diff* = 2.69).

2.7.3.3. Importance of Prevention

An alternative theoretical approach is tested in this chapter. It was hypothesized that the oldest age group indicates more importance of prevention for each scenario than the youngest age group, while the middle-aged groups are positioned in-between. The age differences were assumed to increase with each successive threat level, thus, being reflected in an interaction between age group and threat level.

I conducted a 4 × 2 × 4 × 4 MANOVA with repeated measures on importance of preventing the situation for the four scenarios with age, gender, and threat level as between-subject factors. The analysis showed a main effect of scenario [$F(3,437) = 80.81$, $p < .001$, $\eta^2 = .36$], which indicates that the importance to prevent the described situation differed between the specific scenarios. Moreover, I obtained a main effect of age [$F(3,439) = 10.14$, $p < .001$, $\eta^2 = .07$] that indicated that the importance of prevention increased with age ($M_{YA} = 2.54$ vs. $M_{YMA} = 2.72$ vs. $M_{OMA} = 2.67$ vs. $M_{OA} = 3.00$), albeit not linearly. Finally, threat level had an effect on prevention importance as well [$F(3,439) = 31.54$, $p < .001$, $\eta^2 = .18$].

The main effect of scenario was qualified by interactions with age [$F(9,1317) = 2.04$, $p < .05$, $\eta^2 = .01$], gender [$F(3,437) = 80.81$, $p < .001$, $\eta^2 = .08$], and threat level [$F(9,1317) = 6.99$, $p < .001$, $\eta^2 = .05$], and by an interaction with age and gender [$F(9,1317) = 2.04$, $p < .05$, $\eta^2 = .01$]. The hypothesized 2-way interaction between threat level and age group was not significant, $F(9,439) = 1.56$, $p = .13$.

Post-hoc analyses revealed that the lowest importance of prevention was reported for scenarios at the lowest threat level, being significantly lower than all other threat levels (ps < .001). Prevention importance was the highest at the highest threat level, being significantly different from all other vignettes (ps < .001). The two medium levels did not differ significantly from each other ($M_{Level\ 1} = 2.30$ vs. $M_{Level\ 2} = 2.64$ vs. $M_{Level\ 3} = 2.83$ vs. $M_{Level\ 4} = 3.16$).

Follow-up ANOVAs separately for each vignette with importance of prevention as dependent variable showed a main effect of age for each vignette that was only qualified by threat level in the home scenario [$F(3,471) = 8.19$, $p < .001$, $\eta^2 = .05$, Table 11]. Post-hoc analyses of age group comparisons revealed that the oldest age group reported the highest importance of prevention and differed significantly from all other age groups in the market vignette (ps < .001), from the youngest and old middle-aged age group in the bus stop vignette (ps < .05), and only from the young adults in the park vignette ($p < .05$). Accordingly, while old adults indicated consistently more importance of prevention than the youngest age group, middle-aged adults were more similar to the old age group in some scenarios and more similar to the young age group in others. Regarding the interaction effect between age and threat level in the home scenario, young and young middle-aged adults had a greater increase in prevention importance from threat level one to level four than both old age groups (Table 11).

There was also a main effect of gender [$F(1,439) = 34.30$, $p < .001$, $\eta^2 = .07$] showing that female participants placed more importance on preventing the described situations

than male participants (M_{Male} = 2.55 vs. M_{Female} = 2.92). As was denoted by the interaction between scenario and gender in the MANOVA, there were main effects of gender for all but the bus stop vignette (*p*s < .001). Moreover, differences between threat levels varied as a function of the specific scenario, as indicated by the interaction between scenario and threat level. Threat level was significant in all scenarios, but was qualified by an interaction with age in the home scenario (see above). Post-hoc analyses revealed that only prevention importance stated at the highest threat level differed significantly from all other threat levels for the bus stop and market vignette (*p*s < .0019. In contrast, in the park vignette the least prevention importance was stated at threat level one, being significantly different from all other threat levels (*p*s < .001).

Table 11

Means, standard errors, and effects sizes for importance of prevention separately for scenario, age group, and threat level

		Mean				*Standard Error*				*Effect Size*		
	Threat Level	Y	YMA	OMA	O	Y	YMA	OMA	O	Threat Level	Age	T ×A
Home	1	2.07	2.57	3.03	3.08	.16	.18	.16	.16	$.06^{***}$	$.05^{***}$	$.05^{*}$
	2	2.82	2.82	2.67	2.99	.12	.17	.19	.17			
	3	2.65	2.96	2.92	3.35	.13	.16	.16	.16			
	4	3.13	3.28	3.39	3.28	.13	.16	.18	.18			
	Mean	2.67	2.91	3.00	3.18	.07	.09	.09	.08			
Bus Stop	1	2.63	2.42	2.76	2.88	.16	.19	.17	.17	$.04^{***}$	.03*	*n.s.*
	2	2.78	3.04	2.48	3.14	.12	.18	.2	.18			
	3	2.74	3.06	2.67	3.12	.13	.17	.17	.17			
	4	3.05	3.20	3.18	3.42	.15	.17	.19	.19			
	Mean	2.80	2.93	2.77	3.14	.07	.09	.09	.09			
Park	1	2.10	2.38	2.73	2.57	.16	.19	.16	.17	$.08^{***}$	$.03^{**}$	*n.s.*
	2	2.91	2.95	2.58	3.09	.12	.17	.21	.17			
	3	2.79	2.99	2.92	3.35	.13	.17	.17	.16			
	4	3.04	3.07	3.22	3.38	.13	.17	.18	.18			
	Mean	2.71	2.85	2.86	3.10	.07	.09	.09	.09			
Mar-ket	1	1.10	1.36	1.47	1.96	.17	.19	.17	.18	$.24^{***}$	$.08^{***}$	*n.s.*
	2	1.76	2.22	1.88	2.45	.13	.18	.21	.18			
	3	2.16	2.39	2.41	2.89	.13	.17	.17	.17			
	4	2.74	2.89	2.73	3.33	.14	.17	.19	.19			
	Mean	1.94	2.21	2.12	2.66	.07	.09	.09	.09			

Note. Effects for scenarios from ANOVA. A = Age, T = Threat Level.
* $p < .05$. *** $p < .001$.

2.7.4. Discussion

Study 3 was conducted to provide answers to some open questions from Studies 1 and 2. A baseline measure was included in Study 3 to test whether differences between the age groups prior to responding to the vignettes existed. The analyses showed that particularly the older middle-aged adults indicated less fear than both younger age groups, while the old adult age group reported a fear level between that of the older middle-aged and the younger age groups. Differences between the age groups in fear responses to the scenarios could be partly attributed to these baseline differences. However, there was an interaction between age group and vignette for the home scenario. This interaction replicated the finding of Study 1 and 2. The increase from baseline to fear response to the scenario was larger for the young adult age groups than for the older middle-aged and old age group. This suggests that age group differences regarding this scenario were reflecting differences in fear responses. The 3-way interaction between age group, vignette, and threat level was not significant. Descriptively, age-related differences in responses to the lowest and highest threat level were smaller.

Besides the home scenario, there was a 4-way interaction obtained between age group, vignette, threat level, and gender. Overall, female participants replicated the finding of Study 1 and 2, in which younger adults indicated more fear concerning the park scenario than older middle-aged and old adults with regard to the intermediate threat levels. Male participants did not show the same pattern of results. Noticeable in this regard is the male young middle-aged adult group. However, this age group had the smallest cell size, which could result in distorted estimates, although adjustment procedures were taken. The lack of an interaction between gender and age group with larger cell sizes in Study 1 and 2 suggests that the interaction in Study 3 may be due to this factor rather than reflecting true differences between female and male participants dependent on age. In sum, these results lend support for the finding that there is no general increase in situational fear with age; thus, there is no age-related increase in dispositional fear. In contrast, in some situations young adults may even experience more fear of crime than old adults.

A further aim of Study 3 was to examine differences between various age groups within one study. Unfortunately, the goal of obtaining an appropriate sample size was not achieved for all age-by-gender groups. This is particularly problematic for interactions involving more than two variables, because spurious effects can be obtained, on the one hand, but power could be too low to detect true effects, on the other hand. Replicating the results of Study 1 and 2 lends some credence to the findings in the present study. However, especially 4-way interactions should be treated as preliminary and in need of replication. Based on the present findings, there are indications that older middle-aged adults rather resemble old adults in their responses, while younger middle-aged adults seem to be more similar to young adults. Hence, if there are age-related differences, they do not seem to reflect linear changes. Averaging across the middle-aged adult group may not do justice to underlying differences. In general, however, there were only small age-related differences in situational fear.

In relation to age group differences was the question, whether older adults exhibit more fear of crime than young adults at lower levels of threat, while young adults show more fear at higher levels of threat. Alternatively, age differences may be a function of the specific scenario. In Study 3, different levels of threat could be realized for each vignette. The findings suggest that old adults do not generally report more fear at lower levels of threat than young adults and vice versa at higher levels of threat. Yet, it does not seem to be the case that young adults generally report more fear than old adults in some scenarios, while old adults indicate more fear in other scenarios. There are indications that young adults reliably state more fear than older adults in two scenarios (home and park), while there are no age differences in other scenarios.

In general, it is difficult if not impossible to distinguish the influence of threat level from scenario. Threat level itself is not an objective independent variable but is deduced from the intensity of fear response. The intensity of threat is derived from the meaning individuals attach to specific markers of threat. In this sense, every *level of threat* constitutes a new situation, which can be perceived differently threatening. As Frijda (2010) and Koskela and Pain (2000) emphasized, situations receive their threatening status from subjective attribution of meaning. For example, daylight versus darkness may have a different meaning depending on other situational factors. When being out in a deserted countryside, daylight versus darkness may play a lesser role than when being in a deserted park that is known for drug crimes. Being accompanied by your partner may be perceived as supporting or hindering depending on the perceived fitness of the partner. In this regard, every additional "signal" of threat within the scenarios only adds more intensity of fear if it is perceived as threatening. Therefore, each level of threat within each scenario constitutes a new situation that could be differently perceived as threatening by each age group. That old adults respond with less or equal fear to the threat levels of the different scenarios as young adults suggests that they perceive the same stimuli as threatening (and sometimes as less threatening). Moreover, comparable maximum intensity of fear responses implies that older adults are generally able to respond similarly fearful. Confronting the different age groups with a reasonable number of everyday life situations that could be related to crime-threat allows drawing conclusions about general subjective reactivity in fear of crime. Here, the findings of the three studies suggest that older adults do not respond with more situational fear. If anything, they show less fear than young adults.

Another aspect that was examined in Study 3 refers to different emotional responses to potentially crime-related situations. Ditton et al. (1999) and Jackson (2009) remarked that fear is only one possible response to crime, but that anger was a plausible if not more likely emotional response. With regard to trauma, feeling ashamed has been researched as well. The present study demonstrated that fear responses to the described scenarios were larger than anger and shame responses and that anger responses were more pronounced than feeling ashamed. Moreover, interactions between threat levels and differences between baseline and fear response to the scenario indicated that fear responses varied as a function of induced threat. These findings suggest that responding with fear is a more probable response than anger or shame when being confronted with impending personal threat. Anger responses may be more relevant with regard to vicarious victimization.

Shame responses were even less pronounced than anger responses. This indicates that feeling ashamed is probably rather a response to actual victimization in contrast to imagined or anticipated threat. The difference between anger and shame responses may result from being reminded by the scenarios that such threatening situations actually happen in real life, if not to oneself than potentially to others. In this sense, the scenarios may to some extent function as reminders of vicarious victimization, which could be more related to anger responses.

2.8. General Discussion of Studies 1 to 3

The aim of the first three studies was to assess the extent that increasingly precautious behaviors observed with age were the expression of an age-related increase in dispositional fear. Dispositional fear is understood as inter-individual differences in the propensity to experience situational fear of crime. Consequently, an age-related increase in dispositional fear should be visible in an age-related increase in situational fear across various situations. This age-related increase in situational fear was hypothesized to be dependent on an age-related increase in physical vulnerability. It was argued that with age, the increased intensity of situational fear across various situations, i.e., dispositional fear, is associated with an increase in preventive behavior in order to avoid such situations. If this was the case, this could explain, why older adults report similar frequencies of experiencing fear of crime (affective component of fear of crime) and assess equal probabilities of victimization risk (cognitive component) as young adults.

To assess the hypothesis that older adults are more likely to experience situational fear of crime across various situations, fear was evoked using the vignette technique. This represents an extension on previous criminological research that experimentally studied fear of crime as more contextualized and self-relevant threat scenarios were utilized. It also fills a gap in emotion developmental psychology in that fear was focused on a specific object (i.e., threat from criminal offenses) and a number of various situations were used.

In the present studies a relatively stable pattern of mixed results was obtained. In contrast to hypothesis, young adults reported more situational fear in the home scenario than older middle-aged and old adults. There were also indications that young adults exhibited more fear than older middle-aged and old adults in the park scenario; however, this finding was less reliable as it was only descriptively found in Study 2 and only obtained for female participants in Study 3. In contrast, old adults only indicated more fear than young adults in Study 2 given a lower threat level in the car breakdown scenario and a higher threat level in the bus stop scenario. While the car breakdown scenario was not used in Study 2, the finding of the bus stop scenario could not be replicated in Study 3. The higher threat level version of each vignette of Study 2 was retained as threat level three in Study 3. Descriptively, young adults reported more fear at this level than all other age groups. Consequently, the lack of replicating the finding of Study 2 is probably not due to low power of Study 3. In sum, it appears that there is no *general* increase of situational fear of crime with age. In contrast, the results corroborate recent findings of developmental

emotion psychology research in that age differences in emotional reactivity or the lack of differences depend on the specific stimulus material used (e.g., Kunzmann & Grühn, 2005; Kunzmann & Richter, 2009; Teachman & Gordon, 2009). While the finding that older adults also report more fear of crime in some situations is less reliable than the finding that young adults are more fearful in certain situations, the results support the observation that emotional responses are stimulus specific. Conclusions drawn from the employment of a set of stimuli may not generalize to another set of stimuli. This also implies that the opposing results observed in the studies of Fisher et al. (2004) and Ziegler and Mitchell (2003) may not have occurred by chance but may be attributable to the specific stimuli that were used. This result highlights the importance of embedding emotional stimuli within contexts that are relevant for both age groups in future studies. In this regard it is important to question what those situations entail for different age groups. The specification of fear of crime as a general construct does not reflect age-related differences in terms of the perception of the situation and resultant situational fear.

In the present studies, situations were selected that were equally applicable to young and old adults in terms of their general accessibility (accordingly, young and old adults did not differ in being able to relate to the story). This was based on the assumption that there is a general age-related increase in situational fear with regard to crime. Given that findings did not support this assumption, I can only speculate about what contributed to the age-related differences in the scenarios. Potentially, the age groups differed in their interpretation of the implied crime or its specific potential to harm. If this was the case, this would reflect differences in the perception of threat in those situations, i.e., differences in response to situational provocation, which varies between age groups dependent on the specific situation. The question remains, why they interpret the same situation differently. Similarly, the same potential crime could have been perceived but differently evaluated as threatening reflecting differences in the evaluation of the propensity that the implied crime would be carried out in real life; for example, older adults could tax the probability higher that they will be verbally attacked by youths, whereas they judge their chances of being physically attacked lower. Furthermore, age differences in the home scenario could reflect younger adults' comparatively novel experience of not living with their parents anymore or worse security equipment (see below). Moreover, the two situations that evoked more threat in younger adults (park, home) could have activated scripts (e.g., known from movies) that focus on young people as potential victims. Although both age groups indicated the same extent of being able to relate to the stories, younger participants could have answered more in line with the expected script that is associated with fear. Think-aloud protocols and open follow-up questions on the scenarios may give further insight in the underlying mechanisms. At any rate, the addressed accounts reflect context-specific threat interpretations and underline a lack of a general age-related increase in situational fear of crime. Based on these findings, future studies need to investigate systematically which factors contribute to constructing threat in different age groups and what are the factors influencing this change.

One such factor concerned the relation between an age-related increase in dispositional fear and perceptions of physical vulnerability. The findings of Study 2 demonstrated that perception of physical vulnerability was related to subjective health. But while subjective

health had a large correlation with age, there was only a small to moderate positive correlation between age and vulnerability. This suggests that decreases in subjective health do not necessarily lead to a perception of physical vulnerability indicating that moderating factors play a role in the relationship between health and vulnerability. Consequently, studies researching the relationship between health and fear of crime may profit from considering factors that influence this relationship. As mentioned in chapter 2.2.2, physical vulnerability could be conceptualized as the perception of a discrepancy between what people assume is necessary to successfully deal with the environment and how people perceive their actual state in relation to these expectations. While they may realize that their actual physical state degrades, this may not be perceived to be discrepant with expectations about how to deal with the environment. This may be because the standards had been low all along or have been (unnoticed) adapted to a new standard in the sense of accommodative adaptations (e.g., Brandtstädter, 2009; Greve & Wentura, 2010).

The measure of physical vulnerability was found to be positively related with situational fear in regression analyses for each scenario. The more physical vulnerability was perceived, the more situational fear the participant reported. The effect of age on situational fear was partly mediated by differences in physical vulnerability. In scenarios where old adults indicated more situational fear than young adults, the age effect decreased after inclusion of vulnerability. In contrast, in scenarios where young adults indicated more fear, the age effect on situational fear even slightly increased, suggesting that other factors in age differences were attenuated by the opposing effect of physical vulnerability, which replicates the finding of Jackson (2009). Overall, this suggests that perceptions of physical vulnerability play a role in age differences of situational fear. In contrast to prior studies that included a measure of vulnerability (e.g., Hirtenlehner, 2006b; Jackson, 2009), the measure of vulnerability in Study 2 did not directly pertain to crime-related perceptions of vulnerability but still obtained meaningful relations with situational fear of crime. This lends support for the importance of perceived physical vulnerability regarding fear of crime.

On the other hand, physical vulnerability was not the only factor relevant in the evocation of situational fear as young adults indicated more fear than old adults in some scenarios. Moreover, while female participants indicated more situational fear in all but the market scenario, there was no gender-related difference in physical vulnerability. These findings suggest that differences in situational fear are also attributable to other factors than physical vulnerability. One explanation regarding gender effects in fear research that uses self-report measures concerns the reluctance of men to report fear (e.g., Goodey, 1997). In a series of experimental studies to test this explanation, Sutton and colleagues found that perceptions of masculinity play a role in reporting fear. In employing a social desirability scale, the authors could show that men's affective fear of crime was underestimated (Sutton & Farrall, 2005). Moreover, when participants were instructed to answer the affective fear items according to their assumptions about typical men or women, men's fear was downplayed, while women's fear was reported to be even higher (Sutton, Robinson, & Farrall, 2011). The findings of a third study that distinguished between self-ascription of fear and ascription of fear to the average male and average

female participant corroborate the previous findings (Sutton & Farrall, 2008). Accordingly, gender differences in situational fear found in the present three studies and the lack of a relation with physical vulnerability may reveal that female participants were more willing to admit fear than male participants. On the other hand, the measure of physical vulnerability may not reflect gender-related differences in perception of vulnerability. A sense of vulnerability may not stem from the perception of physical inferiority but merely from believing that women in general are more likely to be the victim of crime or particularly the victim of rape. This knowledge, although it may not be accurate regarding most offense types, may alone create a sense of vulnerability. Applying this to the concept of vulnerability suggested previously, this would mean that people may have the perception that men are better able to deal with the environment successfully (without reflecting on the reasons for this). On the other hand, the person *is* either male or female. When being female, a discrepancy arises. This is not to say that all women and men perceive that discrepancy but rather that there need not be specific indicators of perceptions of physical vulnerability related to women to evoke more fear beyond the mere perception of *being* female. Moreover, the wording of the physical vulnerability items may not reflect specific gender-related perceptions of physical inferiority.

However, this would not explain the occurrence and direction of age differences in situational fear. Other factors related to reporting fear such as script-congruent responding or experience with the situation were mentioned above. Another explanation consists in differences in the processing of the scenarios. Although there were no age group differences in the extent of the ability to relate to the stories, it is possible that older adults have unconsciously down-regulated the threatening impact of at least some vignettes "on-line" (e.g., John & Gross, 2004; Scheibe & Carstensen, 2010). This could be due to the knowledge that preventive measures are already taken. Higher fear of young adults in the park and home scenarios and more fear of older adults in the car breakdown scenario lend support for this idea. The park and home vignettes describe scenarios, where a person can take preventive actions in order to avoid being in such a situation (i.e., not walking through the park at night or not having cash at home or at least have appropriate security devices). In contrast, the car breakdown scenario describes a scenario that can be less controlled and therefore less easily prevented. However, women also reported higher behavioral fear of crime but still have higher situational fear in almost every vignette scenario. Accordingly, the converse effect on situational fear of knowing that preventive measures are already taken does not seem to apply for women. Consequently, the employment of emotion regulation mechanisms could be an age-specific process in this case.

A related finding in emotional developmental research refers to motivationally changed differences in emotion regulation (e.g., Scheibe & Carstensen, 2010). As mentioned above, the socioemotional selectivity theory assumes that old adults privilege the processing of positive stimuli compared to negative stimuli as part of emotion regulation due to a shortened life time perspective. This phenomenon is called 'positivity effect'. Streubel and Kunzmann (2011) report positivity effects for moderately arousing stimuli, while they find no age-related differences with highly arousing stimuli in emotional

reactivity. Comparatively high fear intensity in the present studies constitutes a moderate intensity with regard to the scaling of the situational fear measure. More fear in young adults than in old adults in some scenarios may reflect emotion regulatory goals in processing. In order to test this assumption, regulation mechanisms should be manipulated both consciously and subconsciously. If this analysis should prove tenable, questions about the applicability of the vignette technique (or other emotion induction techniques) to test age differences in emotional reactivity arise. In section 3, I will present a technique that examines age group differences in a paradigm that supposedly measures automatic, i.e., uncontrolled, information processing.

Reservations about the validity of the vignette scenarios in examining emotional reactivity are considerably weakened when considering the relation between vulnerability and situational fear (as described above) and the relation between situational fear and precautious behavior. Situational fear showed moderate to large correlations with the general measure of precautious behavior. This finding underlines the conceptual relation between the two measures (cf. Gabriel & Greve, 2003). Precautious behavior expresses underlying fear at least to some extent. Concerning the relationship between age and precautious behavior that was hypothesized to be mediated by situational fear (or rather an increase in dispositional fear), it could be shown that age-related increases in situational fear were indeed related to the age-related variance in precautious behavior. Accordingly, older adults who indicated more situational fear than young adults also took more precautious behaviors. However, a large part of the age-related variance was left unexplained by including situational fear. This could be explained by at least three accounts. First, as mentioned above, age-related increases in situational fear may not be captured adequately by the employed technique. Second, the measurement of precautious behavior itself may contain measurement errors. This aspect will be considered in the general discussion in chapter 5. Third, there may be other explanations for the increase in precautious behavior than the one focused on in this section. The findings regarding an age-related increase in importance of prevention indicate that other factors than the intensity of situational fear may be related to the age-related increase in precautious behavior. This approach will be given a closer look in section 4; other accounts will be discussed in the general discussion.

Limitations Specific to Studies 1 to 3

Besides alternative interpretations of the results as suggested above, additional limitations of the studies may restrict the conclusions drawn from the conducted studies. Limitations that are specific to Studies 1 to 3 are considered here, while more general limitations that pertain to all presented studies are discussed in the general discussion (chapter 5).

In order to reach a more varied sample and achieve a larger sample size, an online study approach was employed in Study 3. While the female young and young middle-aged age groups were broadly represented in the online sample, other age groups were less easily accessible with this methodological approach. Particularly the oldest age group was underrepresented in the online sample, although attempts were made to recruit older adults at online platforms and computer clubs. However, this attempt was rather

unsuccessful. Given small sample sizes of older adults in the online approach, it is not possible to examine if the samples differed depending on online versus printed versions of the questionnaire. Older adults who are familiar with computers and the internet may still be the exception. In this sense, older adults who use a computer may be more open to new experiences and less anxious. This, again, could be confounded with the measurement approach of an online study that investigates fear. If older adults, who use the computer, were less afraid, this may underestimate the reported fear of crime in the study. Older adults of both measurement approaches were included as one sample. Because sample characteristics were comparable to previous studies as well as the findings concerning the componential measures of fear of crime were similar to other studies, it seems that the different methodological approaches did not impact on the findings to a large extent.

Another limitation concerns the measurement of vulnerability. On the one hand, physical vulnerability covers only one dimension of vulnerability that may be relevant in fear of crime. As mentioned above with regard to gender, other aspects of vulnerability may be relevant as well such as perception of belonging to a certain group. It may also concern other dimensions of vulnerability such as financial vulnerability or social support. Moreover, although physical vulnerability was shown to be correlated with situational fear, correlations do not allow drawing conclusions about causal relations. Future studies would have to manipulate perceptions of physical vulnerability in order to strengthen the validity of findings. An experimental approach in this respect could consist in priming studies or conditioning studies that relate the self to perceptions of strength versus weakness in a similar way as, for example, Hannover (2000) evokes a collective versus individual identity in study participants.

Furthermore, objections may arise regarding the use of the vignette technique as a measure to induce emotions. For example, demand effects may play a role in this kind of measurement. I tried to control this by varying the threat level within a certain scenario between subjects. Consequently, if subjects showed a difference due to threat level, this would be a response to threat instead of a general (demanded) response to the instruction to report what they feel. Particularly differences between threat levels in Study 3 suggest that participants responded to the threat level manipulation rather than to being instructed to report emotions. Another question concerns the intensity of felt emotions that can be induced with such a procedure. Westermann et al. (1996) report that film and vignette induction procedures with instructions show the largest effect sizes in inducing emotions (in comparison with, e.g., the Velten technique, music, gifts, or imitation of facial expressions). Participants were given the option to give comments at the end of the studies. Some of them reported that they felt very frightened. Moreover, for the studies' question it would not be necessary to induce fear as intense as it may be felt if actually walking through a dark park if assuming that inter-individual differences would also be reflected in imagined dangerous situations. If there was a difference between the two, this could have consequences for the predictive validity.