Fear of Crime and Its Relation to Other Worries About External Threats: Commonalities and Inter-individual Differences, With a Special Focus on Personal Values

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Abstract

Fear of crime is examined here as a specific type of worry. A facet-theoretical mapping sentence is developed for worries about external threats. Threats are classified by two facets: life-area and social environment of the threat. It is hypothesized that all worries are positively intercorrelated. When representing the intercorrelations as distances by multidimensional scaling, it is predicted that the threat's facets give rise to a radex, with life-area generating polar regions and social environment concentric regions. Worries of the secondary environment are expected to be stronger than those of the primary environment. Worry levels are also expected to be related to personal values, and to gender, education, but not age: Individuals prioritizing tradition/security should generally worry more than individuals striving for universalistic/benevolent goals, especially about immigrants; women are predicted to generally worry more than men, especially about becoming victimized; education is expected to be negatively correlated with worries; and age is predicted to be uncorrelated with worrying, in general. Based on the data from two recent representative surveys conducted in German cities (with 5,487 and 9,973 respondents), all hypotheses are confirmed and replicated. It is concluded that when considering actions to reduce fear of crime, one may also consider non-crime issues (e.g., economic well-being, education, or general order) while keeping an eye on people's personal values.

Keywords: fear of crime, facet theory, worry trait, radex of worries, personal values

1. Introduction

Fear of crime (FoC) has been a topic of major interest in the social sciences for decades (Franc & Sučić, 2021), with an exponential growth of citations in peer-reviewed research (Hart, Chataway, & Mellberg, 2025). Yet, summarizing the results of FoC research is hampered by a somewhat incomplete and unclear theoretical framework. What is needed is a comprehensive conceptualization that defines, differentiates, and interconnects the various facets of FoC. Moreover, little has been accomplished to date when it comes to relating FoC systematically to worries and concerns about non-crime issues, and also to personality variables. In the following, we discuss these issues and introduce a facet-theoretical mapping sentence for people's responses to external threats of harm in their living environment, with FoC as a special case.

1.1 Measuring FoC

FoC research has mostly been based on surveys that use a single item to measure FoC. Two typical variants are: "Is there any area right around here—that is, within a mile—where you would be afraid to walk alone at night?", and "How safe do you feel being outside and alone in your neighborhood at night?" (Hale, 1996; Hinkle, 2015; McGarrell, Giacomazzi, & Thurman, 1997). Although "most research published on single-item measures shows that they are often as valid and reliable as their multi-item counterparts" (Allen, Iliescu, & Greiff, 2022, p. 4), they do not allow a more differentiated analysis of the concept they measure. MacCoun & Martin (2015, p. 750) note that "the fear literature is plagued by inconsistent findings, perhaps due to a frequent reliance on crude, single-item 'fear' measures … that may not measure the experience of fear … and that surely tap other constructs, like perceived risk, attitudes toward the police and the courts, attitudes toward stereotypic offender groups (youth, males, and ethnic minorities), and so on." Farall, Jackson, & Gray (2012, p. 25) posit, moreover, that "Fear of crime is a slippery and contested concept, with doubts remaining over what the 'fear of crime' means as an everyday experience and as a social phenomenon." It remains "unclear what is actually being measured … [and] we are left with rather blunt methodological and conceptual tools … and vague 'global' summaries of intensity of worry".

Summative scale construction methods using multi-item scales can be more capable of robustly measuring a person's FoC. They also make it possible to study the dimensionality of FoC (Bilsky & Wetzels, 1997). Some studies report different dimensions, but these dimensions remain dependent on the particular context (Boers, 1993; Borg, Bilsky, & Hermann, 2020; Noack, 2014). A generally accepted version of a multi-item FoC scale does not exist. Previous proposals of such scales have been criticized because "the number of crimes and the specific crimes included in these measures are seemingly arbitrary" (Etopio & Bethelot, 2022, p. 49). Moreover, Hart, Chataway, & Mellberg (2022) criticize the various multi-item scales published in the literature as mostly ad hoc constructions meant to render measurements of vague content domains, often with unclear reliability and validity.

1.2 Explaining FoC Measures

Previous research was primarily interested in explaining measurements of people's global FoC by a variety of variables such as legal crime rates, gender, age, income, perceptions of incivilities in people's living environments, previous victimization, or generalized social fears and dwindling certainties (Cops & Pleysier, 2011; Franklin, Franklin, & Fearn, 2008; Hohage, 2004; Intravia, Stewart, Warren et al., 2016; Kaiser, Oberwittler, Janssen et al., 2024; Putnam, 2000; Robinson, Lawton, Taylor et al., 2003). The predictors studied were mostly objective rather than psychological variables.

1.3 Defining FoC

Various authors criticize that summarizing the results of previous research on FoC is also hampered by the absence of a commonly accepted definition of FoC (Bilsky, 2003; Bilsky, Pfeiffer & Wetzels, 1993; Bilsky & Wetzels, 1997; Franc & Sučić, 2021). Most research assumed that FoC does not need an explicit definition, but Hart, Chataway, and Mellberg (2022) argue that "the concept of fear of crime cannot be operationalized accurately within survey instruments without a consistent and more widely accepted definition."

Several scholars define FoC as a negative emotional response to perceived threats of crime (Ferraro & LaGrange, 1987; Hale, 1996; van der Wurff, Staalduinen, & Stringer, 1989). However, no agreement has been reached on whether FoC should be limited to emotions, or whether cognitive (risk perception) and conative (avoidance behavior) components should also be defining elements of FoC (Chataway & Hart, 2016; Gabriel & Greve, 2003; Jackson, 2005).

Some researchers argued that the term "concern" should *not* be used in items asking about FoC (Furstenberg, 1971), while Williams, McShane, and Akers (2000) and Jackson (2005) recommend conceptualizing FoC as "worry about victimization." This suggests linking FoC research to clinical psychology, where worries have been studied more generally and not just with a focus on crime(s).

1.4 Worry as a Personal Trait

Previous worry research in clinical psychology mainly studied a person's characteristic degree of overall worry as a personality trait. This worry trait was shown to be central to generalized anxiety and related to social phobia, panic disorder, obsessive-compulsive disorder, mood disorders, and self-confidence (Bredemeier & Berenbaum, 2008; Olatunji, Etzel, Tomarken et al., 2011; Starcevic, Berle, Milicevic et al., 2007; Startup & Erickson, 2006).

The instrument typically used to measure a person's worry trait is the Penn State Worry Questionnaire (Meyer, Miller, Metzger et al., 1990). It aims at a quantitative assessment of the worry trait, using rather abstract items. For example, the ultra-short version of the PSWQ (Berle, Starcevic, Moses et al., 2011) consists of only three of the original items: "Many situations make me worry", "Once I start worrying, I cannot stop", and "I worry all the time", with a 5-point response scale from "not at all typical of me" to "very typical of me."

Other worry scales are less interested in pathological or overall worry. The Worry Domains Questionnaire (Tallis, Eysenck, & Mathews, 1992) is one example. It asks the respondents how much they worry about 25 "common topics" (e.g., "that my money will run out" and "that I feel insecure", with a 5-point response scale ranging from "I worry not at all" to "I worry extremely"). The items assess worries in five "life areas" (relationships, lack of confidence, aimless future, work, and finances). Empirically, the WDQ generates four or five factors that are substantially positively intercorrelated (Stöber, 1995; Stoeber & Joormann, 2001).

There are also worry scales that aim at other content areas. One example is the Student Worry Questionnaire (SWQ; Davey, 1993). Many content areas are conceivable, but without clear definitions of the respective universes of content, it remains difficult to see how general and content-specific worries are related to each other or to external variables. It also prevents the development of effective interventions based on specific worries rather than on people's overall worry levels (Stöber & Joormann, 2001).

What is generally missing in worry research is clear criteria that specify how worries differ from related constructs, in particular from "concerns." It is often argued – psychologically, grammatically, or semantically – that worry and concern are closely related or even synonymous (Luiciani, 2023). There is also a general tendency to understand worry as an incessant, ruminative, and emotional speculation of what might go wrong, while concern

is seen as behavior that is more fact-based and geared toward problem-solving (Amin, 2015). These distinctions suggest criteria that could be used when formulating a comprehensive definitional framework of worries and related concepts.

2. Theory and Hypotheses

2.1 A Facet-Theoretical Framework for FoC and Other Worries

A methodological approach that has been proven useful for advancing psychological research in complex domains is facet theory (Borg & Shye, 1995; Fisher & Hackett, 2016; Roazzi, Campello, & Bilsky, 2015; Shye, Elizur, & Hoffman, 1994). Its central tool is the mapping sentence (MS). Mapping sentences articulate how individuals (with different characteristics) respond (in certain ways) to stimuli (with various features). In Figure 1, we propose a mapping sentence that explicates and interconnects some of the major facets of a person's response to threats caused by events or conditions in the individual's environment. This MS includes fear of crime(s) as a special case.

The extent to which **person *p*** with [person facets]={ [age] × [gender] × [education] × [worry trait] × [personal values] }

is **responding** by [response modality]={being aware of; caring about; being afraid of becoming affected by; acting to avoid/prevent} a [time]={present, future] [likelihood]={not so likely but possible … highly likely; uncertain} **external threat** of [harm]={low harm … major harm} in *p*'s [social environment]={primary, secondary} in [life area]={society & system; city; city district; refugees/immigrants; crime; victimization} and where *p* feels that [accountability]={*p*´s family; politics; police and courts; "they" or "those up there"; unclear} is/are ultimately accountable

→ [observation]={ low … high } in the sense of the particular [response modality]

Figure 1. A mapping sentence of people's worries about external threats; facets are shown in brackets, their elements in braces; the arrow indicates the researcher's mapping of an element of the domain of the MS into an observation, typically a score of a rating scale

The terms enclosed in brackets in the MS are "facets." Their elements are shown within braces. The various facets that differentiate among persons are exhibited as a product (see the "×" operators). Hence, each person corresponds to exactly one element of this product, i.e., each person is characterized by exactly one profile of age, gender, education, worry trait level, and personal values.

The facets of the MS are interconnected by verbal operators so that each facet receives a particular contextual role in this sentence. The arrow that maps the domain of the MS into its range denotes the researcher's (theoretically possible) types of observations of how a person with a certain profile assesses a particular object in terms of the categories of the response modality facet. The MS in Figure 1 specifies four different modalities of an individual's response to external threats: How aware is s/he of them? How concerned is s/he about them? How afraid is s/he of them? To what extent is s/he acting to avoid or mitigate them?

The MS also distinguishes numerous types of threats. An example is the class of all items that ask the respondent to assess to what extent s/he cares about possible economic threats for which "those up there" are considered responsible (Borg & Hermann, 2023). Formally, this threat may be assigned to the facet profile "future, quite likely, major harm, secondary social environment, society & systems, those up there." In a concrete item, not all of these facets are typically explicitly presented, nor are they always relevant for hypothesis construction and testing. However, pondering about them when constructing items on worries can help to avoid distracting verbal noise.

The life-area facet has been used repeatedly in content-based worry questionnaires. Tallis, Eysenck, and Mathews (1992) derived life-area categories by analyzing data on "common worries" about "relevant topics." Davey (1993) formulated categories for his Student Worry Scale (SWQ) conceptually based on what he considered "major area[s] of concern or worry expressed by students."

The social-environment facet has been utilized previously in studies of various topics (see, e.g., Levy, 1981; Levy & Guttman, 1989; Bilsky, 1996; Canter, 1996; Fisher & Hackett, 2019). It classifies items in terms of the degree of primacy of the individual's interaction with other persons, social groups, or social and economic issues, ranging from personal, direct, and frequent to impersonal, distant, and temporary-occasional contents. Schwartz, Sagiv, and Boehnke (2000) proposed a similar facet that classifies worries into "micro worries" and "macro worries". The former are worries about the self or persons/groups with whom one identifies closely, while macro worries are about the wider society, the world, or the universe.

The accountability facet is somewhat speculative in this context. Its role is to express the individual's view of persons or institutions that can control or mitigate the threat. Worries should be higher if the individual feels that,

for example, "those up there" can reduce a threat but are not trustworthy, incompetent, unwilling to act, or even responsible for the problem. If, on the other hand, a new "sheriff" is voted into office, and this is a person who comes with high expectations to "clean up" things, worries about crime should be reduced by hopes for future improvements.

2.2 General Hypotheses About Worries

A general hypothesis on individuals' responses to different external threats is that they are positively intercorrelated (in the population). That is, the more an individual worries (Note 1) about threat X, the more s/he tends to worry about threat Y. Such a "positive manifold hypothesis" is a classic in item-based attitude research (Guttman, 1994; Borg, 2018). It requires that the items have a "common range" (Shye, Elizur, & Hoffman, 1994; Borg & Shye, 1995). That is, they must all be measurements in the same substantive sense, regardless of how they are formulated. In the present context, all items assess the respondent's degree of worrying about external threats in various modalities and regardless of the particular content of the threat.

Positive manifold hypotheses sometimes come with the side constraint that they hold only for samples that are not "artificially selected" (Levy & Guttman, 1981). That is, different items should not be contradictory or competing for the selected individuals. For worries, such samples of persons are hard to imagine, but not impossible. For example, people who worry much about climate change may worry relatively little about the economy. However, such cases of particular subsamples and particular issues seem contrived and hardly transferable to the general population.

Viewed more theoretically, a simple explanation for the hypothesized positive manifold of different worries is based on the individual's unidimensional worry trait, plus a component that is unique for each specific item. Such a "g" model is best-known from early intelligence research, where it was later disproved and replaced by a model with several "common factors." A common factors model is also more convincing for worries, because for FOC items alone, focusing on different specific crimes, factor analysis typically uncovers several underlying factors (Stöber, 1995; Borg & Hermann, 2023). For worries, one would additionally require that each item loads only non-negatively on each worry component. For more than two factors, this is a non-trivial and testable assumption that is not automatically guaranteed by the observed positive intercorrelations (Borg, 2018).

2.3 Degree of Worrying and Personal Values

Within individuals, the degree of worrying about different issues can be assumed to depend, to some extent, on the values a person is striving for. If s/he is strongly striving for values that are threatened by an event, s/he is expected to worry more than if the expected damage affects only values of minor importance. Hence, tradition-oriented people should, for example, feel especially threatened by migrants and immigrants, while universalistic and benevolent individuals are likely to feel relatively less threatened.

Following the Schwartz value theory (Schwartz, 2012), personal values are competing to some extent. The theory postulates, however, that every individual strives, more or less, for each of these values so that conservatives and hedonists, for example, differ only in the relative (but positive) weights they assign to the various values. Hence, based on this theory, there is no reason to predict that differences in people's value orientations would lead to negative correlations among worry items, nor that the structure of worry items should be affected by such weightings.

2.4 Hypotheses About Worries in People's Life Areas and Living Environments

When people are interviewed about external threats they worry about, they typically discuss numerous problems that seem to come from "mental file drawers" differing on two facets. First, many threats are located in a person's daily ("primary") social environment. Other threats are more impersonal, remote, or abstract (e.g., the state of the economy, politics, climate change). A second classification of issues people worry about is described by the life-area facet of the MS (e.g., crime, living district, society/systems). Some of its categories can be ordered, but taken together, they form a nominal scale.

A classification of different types of worry by the qualitative life-area facet and the ordered social-environment facet can be used as a springboard for predicting the structure of correlations among worry items. Based on previous research (Bilsky, 2003; Borg & Shye, 1995), their intercorrelations should lead to a radex (Note 2) when represented by multidimensional scaling (MDS) in a geometric plane. The life-area facet should correspond to the radial wedges of the radex, and the social environment facet should induce concentric regions, with the primary environment in the center.

The radex hypothesis implies that primary social environment worries are more intercorrelated than secondary social environment worries. It does not imply that primary-environment worries are stronger. Indeed, we hypothesize the opposite. Primary-environment threats (such as dirt and garbage in one's neighborhood, run-down buildings, drugs in one's district, or getting mugged) are relatively closely related to people's daily lives. Many of

these threats can be reduced, avoided, or even ignored by the individual. Secondary-environment issues are typically different: Natural disasters, a declining economy, or dubious political leadership cannot be avoided by the individual. These issues also tend to cause relatively serious damage. Hence, we predict relatively stronger worries for threats of the secondary social environment.

2.5 Person-Facet Predictors of Worries

Various studies have found that some of the basic values of the Schwartz value theory (Schwartz, 2012) are correlated with the overall level of FoC (Borg & Hermann, 2023): People striving for conservation values (security, tradition) rate their levels of FoC substantially higher than people striving for universalistic values (benevolence, harmony). This could be interpreted as evidence that security and tradition-minded people believe that being victimized by crimes is relatively likely and that it violates important values. Universalistic people, in contrast, believe in the goodness of people and therefore assume that victimization is less likely. Thus, conservative and universalistic persons should differ most in the degree to which they worry about threats related to people from different cultures, social subgroups, or age cohorts.

Personal values can also be expected to impact worries that belong to the primary or the secondary social environment. This facet is similar to what Schwartz, Sagiv, and Boehnke (2000) referred to as micro vs. macro worries. They report that "giving priority to self-transcendence values (universalism and benevolence) is associated with low micro and high macro worry, whereas giving priority to self-enhancement values (power, hedonism, and—to a lesser degree—achievement) is associated with high micro and low macro worry" (p. 309).

Demographic variables can also be considered as predictors of worries. Previous research has led to rather complex findings. Age, for example, is often negatively correlated with FoC, but Ferraro & LaGrange (1992) report that this only holds "for most types of crime." Hale (1996, p. 26) concludes, accordingly, that "the elderly's fear varies across different environmental conditions, being higher where there is greater risk and weaker or non-existent where risk is less." Similarly, women typically exhibit higher levels of FoC than men, particularly for sex crimes (Borg, 2019; Johansson & Haandrikman, 2023; Stanko, 2013), but the gender difference becomes substantially smaller with increasing age. Education reduces FoC (Hale, 1996; Reese, 2009), but education is itself correlated with income, which in turn is correlated with vulnerability to crime. Thus, if one does not single out specific types of external threats, one can predict that worries should be generally higher for women than for men and be negatively related to educational level. The relation of age and worries, on the other hand, seems difficult to predict in general because it depends largely on the person's personal circumstances and the specific type of threat.

One can change the theoretical perspective and view the observed relation of age and FoC by considering age-related changes in the relative importance of different personal values. Health and physical capabilities become increasingly important issues when people get older (Baltes & Baltes, 1990), so that older persons strive more for preservation than for openness to change. On the other hand, education and career challenges become smaller when people get older, so achievement-related worries largely vanish. This tendency is also supported by theories that predict that age is positively related to the importance of self-transcendence values (see Ritter & Freund, 2014, for a review). Similarly, Erikson (1982) stressed that generativity goals increase with age (see also McAdams, Diamond, de St Aubin et al., 1997). Moreover, focusing on perceived future time as a resource (e.g., Brandstätter, Rothermund, Kranz et al., 2011; Carstensen, 2006) predicts that instrumental and informational goals (e.g., achievement, autonomy) become less important when future time becomes more restricted, because the likelihood that these goals can be achieved diminishes. Thus, while values change differently with age, one cannot predict, based on values, that older persons should generally worry more than younger persons.

Regarding the structure of worries, we follow Borg, Hertel, and Herrman (2017). They showed that the structure of basic values remains essentially stable with age, while the relative importance of these values changes systematically toward preserving what one has and away from stimulation and fun.

2.6 Summary of Main Hypotheses

H1: Worry items are positively intercorrelated.

H2. The intercorrelations exhibit a radex in MDS space, with the life-area facet partitioning the radex radially, and the social environment facet leading to concentric regions.

H3: The radex is stable across gender, age, education, and sub-samples of persons with different value priorities.

H4: Secondary social environment issues lead to higher worry levels than primary environment issues.

H5: Persons prioritizing tradition and security have generally higher levels of worry than persons striving for universalism and benevolence. The difference is largest for worries about refugees/immigrants.

H6: Gender and education are significantly correlated with people's worries. Age is generally not correlated with worries.

3. Methods

3.1 Samples and Data Collection

The data utilized in this study are from two surveys, one conducted in Mannheim, Germany, from December 2022 to January 2023, and the other in Stuttgart, Germany, in November/December 2023. Their main purpose was to collect information for crime prevention. The design of the surveys is described in detail in Hermann (2023) and in Hermann and Wachter (2024).

The Mannheim survey was administered to a representative random sample of 25,000 persons, aged 14 years or older, all residents of the city of Mannheim drawn from the city's register of residents. The Stuttgart survey had the same design, but a larger sample of 50,000 citizens.

The persons in the samples received, by mail, an invitation letter with a password and a link to the online survey. Moreover, an explicit declaration from the cities' administrations, the University of Heidelberg, and the company that collected the data concerning data protection (including information on how to contact the responsible data protection officers) was sent to each participant. The participants provided informed consent before beginning the survey.

In the Mannheim sample, all potential participants later received a second letter thanking them for their participation and reminding them to participate if they had not already done so. No such mail was sent in the Stuttgart sample.

No incentives were given, but the survey conductors asked the selected potential respondents to help their city prevent crime by providing relevant information for effective actions.

The number of wrong addresses was 2,023 in Mannheim and 1,477 in Stuttgart. Hence, the net return rates were 24% (N=5,487) in the Mannheim sample and 21% (N=9,973) in the Stuttgart sample. These return rates can be considered satisfactory when compared to the participation rate of about 30% in the interviewer-based (!) European Social Survey in Germany (Jowell, Roberts, Fitzgerald et al., 2007). The demographics of the participants (age, gender, educational level, place of birth: own/mother/father, etc.) closely matched the demographics of the populations.

3.2 Items

The questionnaires in both samples were very comprehensive, containing 445 items (Mannheim) and 365 items (Stuttgart) on various topics, including risks and threats in the respondent's living environment, his/her trust in the city's institutions, his/her own and his/her family's crime and victimization history, proposals for crime-preventive measures, fear of crime, personal values, political voting preferences, attitudes toward criminal norms, and numerous demographics such as age, gender, city district of residence, countries where parents were born, etc. The items were typically displayed in the questionnaire in blocks introduced with a headline such as "the city district where you live," followed by a list of "possible problems," and a brief explanation of these problems.

The items selected from the Mannheim sample were 49 items on concerns and worries, plus the 36 items of the IRVS scale of personal values, and three items on demographics. Below, we list the worry items, sorted into the six categories of the life-area facet of the MS shown in Figure 1. Most of these items were presented in different parts of the questionnaire, interspersed with items addressing other issues (e.g., evaluating the city's measures to prevent crime, questions on quality of life, ratings on the badness of various crimes).

The Stuttgart questionnaire contained 52 items on worries, mostly identical or highly similar to the items of the Mannheim sample. In the following, we list and analyze the Mannheim data in detail and then utilize the Stuttgart sample as a replication study.

3.2.1 Threats in Society and Systems

Rated on a 7-point scale from "absolutely no fear" to "very great fear": (1) Cost of living keeps rising; (2) Gas/electricity becomes a major burden; (3) More fragmentation of society; (4) Politics unable to handle energy crisis; (5) Me getting corona; (6) Politics unable to handle Corona pandemic; (7) More natural disasters; (8) Politics unable to handle climate change; (9) War in Germany; (10) Politics unable to handle war in Ukraine

3.2.2 Problems in the Respondent's City District: Refugees and Immigrants

Rated on a 4-point scale from "no problem" to "great problem *in my city district*": (1) Migrants who came here a long time ago (long-term migrants); (2) Tensions caused by refugees/new migrants; (3) Immigrants isolating themselves; (4) Multi-culture generated by migrants; (5) Parallel societies.

3.2.3 Problems in the Respondent's City District

Rated on a 4-point scale from "no problem" to "great problem *in my city district*": (1) Bored and idle young people; (2) Drug users; (3) Drunks; (4) Traffic bullies; (5) Traffic accidents; (6) Poverty; (7) Intolerance; (8) Lack of

respect; (9) Run-down/shabby buildings; (10) Graffiti; (11) Garbage, dirt, and filth; (12) Theft/vandalism/violence; (13) Wild car parking; (14) Anonymous neighborhoods; (15) Gap rich/poor.

3.2.4 Problems in the Respondent's City

Rated on a 4-point scale from "no problem" to "great problem *in the city of Mannheim*": (1) No bike lanes; (2) Missing parking lots; (3) Public transportation; (4) Affordable housing; (5) Dirt/garbage in the city center; (6) Situation at the railroad station.

3.2.5 Fear of Crime

(1) FoC_cd: "How safe do you feel in your city district?" (4-point scale: "very safe … very unsafe"); (2) FoC_cogn: "How often do think about becoming a victim of crime?" (4-point scale: "very often (every day) … never"); (3) FoC_night: "How often afraid …when out at night by yourself in your city district?"; (4) FoC_day: "How often …. during the day?"; (5) FoC_st: "Have you generally reduced your spare time activities in the last 12 months because you were afraid of becoming a victim of crime?" ("yes, no", rev.); (6) FoC_avoid: "When out at night in your city district ... Did you avoid certain streets or locations to prevent becoming a victim of crime?" ("yes, no", rev.)

3.2.6 Victimization

"How likely do you think it is that you will be victimized in your city district within the next 12 months by the following?" (4-point scale: "not likely at all … very likely"): (1) Get harassed; (2) Get hit/injured; (3) Burglary; (4) Get mugged; (5) Theft; (6) Get sexually attacked; (7) Get sexually molested.

3.2.7 Personal Values

Personal values were assessed using the Individual Reflexive Value Scale (Hermann, 2014). The IRVS addresses 36 topics such as "respecting law and order," "being industrious and ambitious," and "having a good conscience." The respondent is asked to rate these topics on a 7-point scale from "that is completely unimportant for me" to "that is very important for me." Based on these items, scores were computed for each respondent for the ten basic items of the Schwartz value theory (Schwartz, 2012; Bilsky & Hermann, 2016; see Table 1).

3.2.8 Demographics

Gender (male=1, female=2); age (eight cohorts, from 14-19, 20-29, to 80+); education (four levels).

3.3 Statistical Methods

All data analyses were carried out within the R environment. To test the positivity hypothesis, both linear and monotone correlations were computed. For monotone correlations, we chose the *mu2* coefficient (Raveh, 1978) because this coefficient is both metric and monotone. The significance of the correlations is assessed by comparing the results with 5% quantile values (one-sided) for *r* and *mu2*, respectively, computed for 500 random variables with 5,000 cases each.

The structure of the intercorrelations of the worry items was analyzed using multidimensional scaling (MDS). All MDS analyses were run by the R-package smacof (Mair, Groenen, & de Leeuw, 2022). We used the *Stress-1* criterion to assess the fit of the MDS model and random benchmarks and permutation tests to check its statistical significance (Borg, Groenen, & Mair, 2018).

The similarity of different MDS solutions was assessed by first applying Procrustean transformations to eliminate differences not based on the data and then computing the Pearson correlation of the *XY* coordinate values of corresponding points (Borg & Mair, 2022). The resulting fit values were checked for statistical significance using 1,000 simulations, each fitting a pair of random configurations of 49 points to each other.

Overall worry measures were computed by averaging each person's worry ratings across all items in the selected sample of items. The items were first transformed to a 0-to-3 range, where 0 always indicated the absence of worry, concern, threat, etc., and higher scores indicated more negative responses (i.e., more worried, more concerned, less satisfied). Items #4 and #5 of the fear-of-crime group of items were skipped when computing average worry scores because these items used dichotomous answer scales.

Summative scores for the basic personal values were computed using the standard procedure in personal value research, i.e., by first centering the observed ratings, person by person, and then averaging the respective indicator items (see Borg, Hermann, Bilsky et al., 2019).

4. Results

We first turn to the results of the Mannheim sample and then later (see Section 4.7) report to what extent the data of the Stuttgart sample replicate the findings of the Mannheim sample.

4.1 Positivity Hypothesis

The positivity of the 1,128 intercorrelations of the 49 worry items was checked by computing both linear (*r*) and

monotone (*mu2*) correlations. For *r,* the average intercorrelation is 0.24, with *sd*=0.14, *min*=-0.08, and *max*=0.95. For *mu2*, the average value is *m*=0.40, with *sd*=0.21, *min*=-0.14, and *max*=0.99. The number of negative correlations is 21 (1.79%) for both *r* and *mu2*. Less than 0.26% (0.34%) of the *r* (*mu2*) values are smaller than the 1% quantile of *r* (*mu2*) correlations for random vectors. Thus, the positivity hypothesis is statistically supported.

Positivity of the intercorrelations of the worry items also holds for demographic subgroups. For the two gender subgroups, we obtained only 21 and 22 negative correlations, respectively, both with a minimum of merely -.09. For the eight age subgroups, the number of negative correlations ranged from 14 to 64, with the greatest negative correlations in all subgroups ranging from -.01 to -.19. For the four education subgroups, the number of negative correlations ranged from 3 to 50, and from *min*=-.03 to *min*=-.19. The two youngest subgroups and the subgroup with the lowest level of education generated the greatest negative correlations (-.19) and also the greatest number of negative correlations (64 or 5.44%).

Positivity also holds for subsamples based on the respondents' personal values. We formed 20 subsamples of persons with scores below/above the overall mean score for each of the ten basic values. The mean number of negative correlations was 19.64 (*sd*=8.2), ranging from 5 to 37 of the total number of 1,128 correlations in each subsample. For extreme subsamples (with scores below/above the mean personal value score +/-1 *sd*) the mean number of negative correlations was 23.4 (*sd*=13.3), ranging from 4 to 54.

4.2 Degree of Worry: Primary vs. Secondary Social Environment Issues

To achieve comparability, the scores s of the items measuring large-scale threats using unipolar 1-to-7 response scales were transformed to (*s*-1)/2, thus turning an observed rating of *s*=1 into a substantively meaningful zero value and the maximum score s=7 into 3. The scores of the items using 1-to-4 scales were also transformed to a 0-to-3 scale, where "0" indicates the absence of worry, threat, concern, etc., and the greatest possible scale value is 3. Subsequently, mean worry levels were computed for the two classes of social-environment items, skipping the FoC items #5 and #6 because of their dichotomous answer scales. This led to mean worry scores of 1.79 for secondary-environment items and 1.05 for primary-environment items (*sd* = 0.46 and 0.52). A paired-comparison *t*-test concludes that the difference of the means is highly significant (t = -105.97, df = 5,474, p-value < 2.2e-16), as predicted.

4.3 Structure of Worries: Radex Hypothesis

Multidimensional scaling (MDS) of the intercorrelations of the 49 worry items leads to the configuration in Figure 2. The fit of this (ordinal) MDS solution is *Stress* = .179 (p < .01; Mair, Borg, & Rusch, 2016).

The MDS configuration is easy to interpret because all correlations are essentially non-negative. Thus, it holds that the smaller the distance between two points, the higher the correlation of the respective items.

The MDS configuration can be partitioned as a radex, as predicted. Its radial regions (wedges) correspond to the different life-area items. The concentric regions exhibit the primary social environment items in the central region and the secondary social environment items in the surrounding region.

The MDS configurations for men and women, respectively, are almost identical to the configuration in Figure 2. The gender-specific MDS solutions are, therefore, also highly similar to each other, with a similarity coefficient of *r*=.98.

High overall similarity is also found for seven of the eight age groups. The MDS solutions for all age cohorts have an average similarity of *r*=.94, with *sd*=.04. Only the youngest age cohort differs somewhat more from the configuration in Figure 2, with *r*=.87.

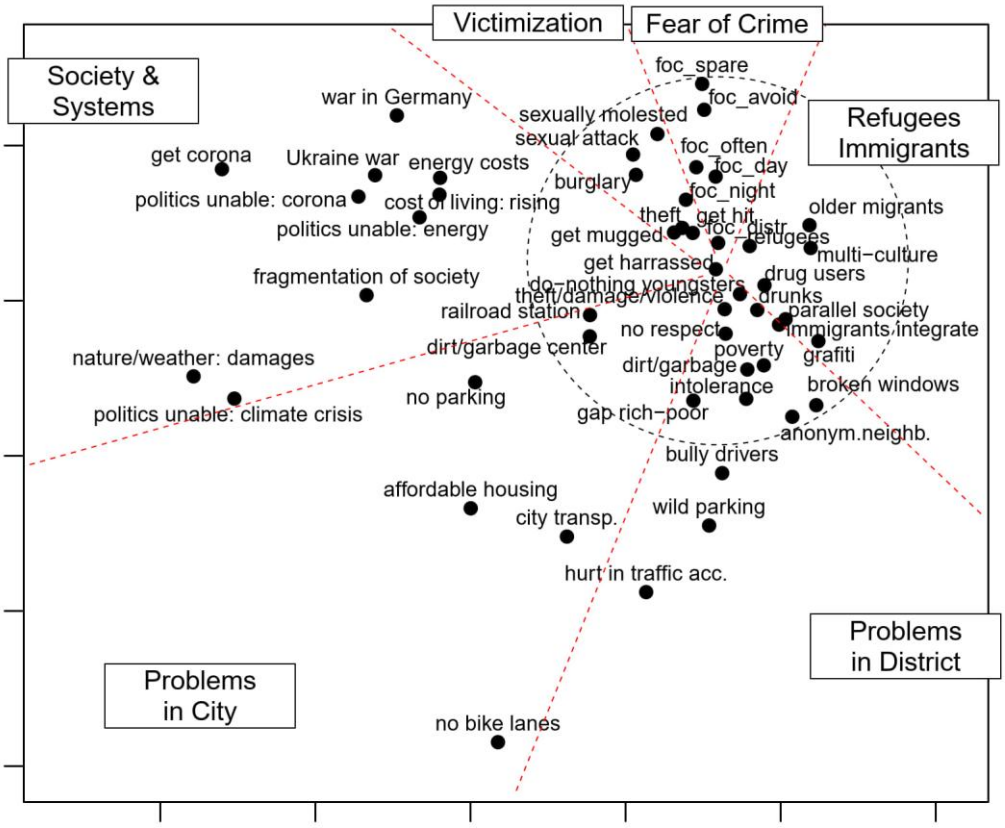

Figure 2. MDS representation of the intercorrelations of 49 worry items; distances among points correspond inversely to the size of the correlations of the respective items; partition lines distinguish life areas (radial) and primary vs. secondary social environment (circular) threats

For the four different education levels, the similarity indexes are .94 on average, with *sd*=.04. The group with the lowest level of education is least similar to the global configuration, with *r*=.88.

Finally, we look at the subgroups based on the respondents' scores of ten basic values, value by value. For the 20 subgroups with personal value scores below/above the mean score on one of the ten respective basic values, the MDS solutions are all highly similar to the solution in Figure 2 (*mean(r)* = .99, *sd* = .02, *min(r)* = .93). For the 20 extreme subgroups with scores smaller/greater than the mean personal values plus 1 *sd*, the mean similarity is r = .96 (*sd* = 0.04, *min* = .88).

Simulation studies where 1,000 random configurations of 49 points are fitted to each other by Procrustean transformations (Borg, Groenen, & Mair, 2018) lead to a distribution where 99% of the fit values are smaller than .32, with a maximum fit of .39. Thus, the similarity indexes for the various empirical MDS solutions reported above are all highly significant.

4.4 Personal Values, Demographics, and the Level of Worry

The intercorrelations of the respondents' importance ratings of the personal values were also scaled by MDS. The resulting configuration perfectly supports the predictions of Schwartz's (2012) value theory, exhibiting a circle of personal values with four groups of values that correspond to the higher-order values, and with the typical oppositions of these higher-order values on the value circle (Figure 3). The fit of the solution is good and significant (*Stress* = .075**, $p < .01$).

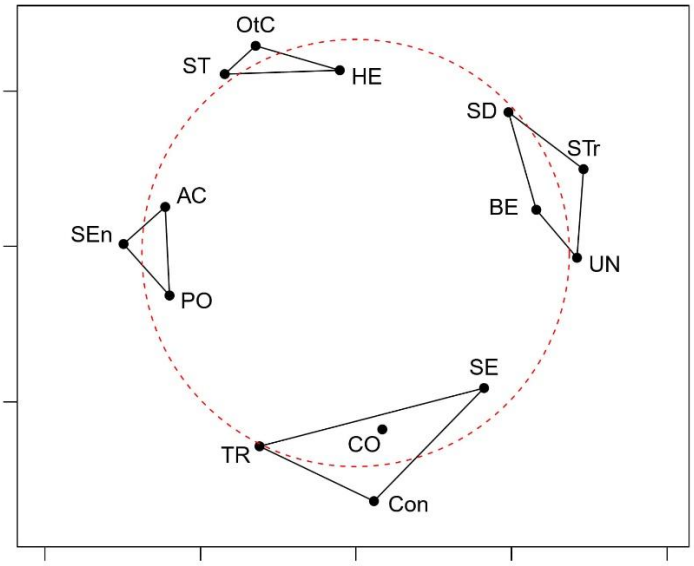

Figure 3. MDS configuration of the intercorrelations of ten basic personal values; convex hulls envelop those values that form higher-order values according to the Schwartz value theory; circle optimally fitted to points

Table 1 (column 1) presents the correlations between people's importance ratings for the ten basic personal values (grouped into their higher-order values categories) and their worry ratings for issues in various life areas or social environments. One notes a general tendency for security-oriented people to have higher overall worry levels. The opposite is found for people emphasizing universalism.

Looking more closely, Table 1 exhibits that the correlations of personal values and worries differ substantially for different types of worries. While worries about migrants and immigrants are clearly correlated with universalistic versus tradition-oriented value orientations, worries about problems in the city are almost uncorrelated with any personal value. Moreover, threats related to a person's secondary social environment are less correlated with personal values than threats that belong to the person's primary environment.

Age is essentially not correlated with the degree of worrying, but gender and education are, as predicted. Women are generally more worried than men, in particular about becoming personally victimized. Finally, education is negatively correlated with all types of worry.

4.5 Replications With the Stuttgart Sample

The findings of the Mannheim sample can be replicated with the Stuttgart data. Here is a brief summary:

Positivity hypothesis: For both linear and metric-monotone correlations, only nine of the 1,431 intercorrelations of the worry items are negative, with *m*(*r*)=.27, *min*(*r*)=-.09, *m*(*mu2*)=.44, and *min*(*mu2*)=-.14.

Radex: The intercorrelations of the 52 worry items can be represented by MDS in a plane with *Stress*=.184**. Similar to Figure 2, the MDS configuration exhibits a radex where the social environment facet corresponds to the concentric regions and the life-area facet to the wedges of the radex. The only difference is that the items on immigrants do not establish a clearly separable wedge-like region, since there are only two such items.

The mean worry level for the primary social environment threats is 0.94 (*sd*=.53) on the 0-to-3 worry scale, and 1.63 (*sd*=.49) for the secondary social environment threats (paired *t*-test: t = -135.81, df = 9,465, p-value < 2.2e-16).

Personal values: The structure of the values exhibits the typical Schwartz value circle; it is almost identical to the MDS configuration shown in Figure 3 (with *Stress*=.082**). Personal values and worries: The Stuttgart sample replicates the finding that personal values and worries are mildly but systematically related (Table 2, lower half). Specifically, individuals striving for tradition/security are generally more worried than individuals who prioritize universalism/benevolence. The biggest differences are found for worries about immigrants.

Education is negatively related to worries. Women are generally more worried than men. Age is not systematically related to the various types of worries.

Table 1. Metric-monotone correlations of people's importance ratings of basic values (PO .. SE), higher-order values (Sen .. Con), and three demographics with (a) the mean level of worry across threats; with (b) the mean worry levels in six life areas; and with (c) the mean worry levels in people's primary or secondary social environments. Coefficients greater than |0.10| printed in bold.

	(a) Overall	(b) Life area of threat						(c) Social environment of threat	
Personal value	Mean level of worries	Society & System	Vic-tim-i-za-tion	Fear of crime	Immigrants	District	City	Primary	Secondary
Mannheim (N=5,487)									
PO	-.04	-.08	-.03	-.01	.03	-.04	-.05	-.02	-.08
AC	**.10**	.08	.08	.08	**.17**	.06	-.02	**.11**	.06
HE	-.06	-.01	-.07	-.09	-.07	-.04	.00	-.07	-.00
ST	-.05	-.06	-.01	-.07	-.03	.00	-.05	-.03	-.05
SD	**-.10**	-.08	-.06	**-.10**	**-.20**	-.01	.04	**-.11**	-.04
UN	**-.18**	-.06	**-.17**	**-.18**	**-.29**	-.05	-.03	**-.19**	-.04
BE	-.08	-.05	-.06	**-.11**	**-.17**	-.05	.07	**-.10**	-.01
TR	**.15**	**.14**	.09	**.13**	**.30**	.03	-.04	**.17**	**.08**
CO	-.09	-.09	-.07	-.04	-.05	-.07	-.08	-.07	**-.10**
SE	**.23**	**.15**	**.19**	**.29**	**.12**	**.12**	**.17**	**.20**	**.15**
Age	-.05	.05	.07	**.11**	-.04	-.05	-.02	-.05	.01
Gender	**.26**	**.31**	**.40**	**.27**	-.04	.02	**.24**	**.15**	**.33**
Educ.	**-.26**	**-.29**	**-.11**	**-.21**	**-.22**	**-.18**	**-.13**	**-.22**	**-.27**
Stuttgart (N=9,973)									
PO	-.03	**-.15**	-.03	-.03	.05	.00	-.05	.00	-.10
AC	**.15**	-.03	**.11**	**.10**	**.18**	**.15**	.05	**.16**	.00
HE	-.08	.00	-.07	-.03	-.08	-.05	-.06	-.03	-04
ST	**-.18**	-.15	**-.16**	**-.15**	**-.14**	**-.11**	**-.16**	**-.11**	**-.20**
SD	**-.14**	.02	**-.14**	**-.15**	**-.21**	**-.12**	-.05	**-.14**	-.02
UN	**-.18**	**.14**	**-.18**	**-.18**	**-.34**	**-.16**	-.7	**-.20**	-.01
BE	-.06	.08	-.06	-.10	**-.14**	-.08	.02	**-.13**	.07
TR	**.23**	-.01	**.22**	**.18**	**.38**	**.19**	**.10**	**.20**	.05
CO	-.01	-.04	.01	.01	.01	.01	-.01	-.02	-.00
SE	**.26**	**.19**	**.26**	**.35**	**.19**	**.13**	**.23**	**.22**	**.27**
Age	-.02	.11	.08	-.09	.05	-.03	-.03	-.07	.05
Gender	**.17**	**.25**	**.13**	**.34**	-.08	.04	**.21**	**.16**	**.29**
Educ.	**-.27**	**-.11**	**-.15**	**-.22**	**-.18**	**-.25**	**-.18**	**-.26**	**-.15**

5. Discussion

It has been shown that it is worthwhile to study FoC together with worries about seemingly unrelated threats. All such worries are positively related to each other. Moreover, worries can be conceptually categorized into different types, depending on the content of the threats. The conceptual worry types are mirrored in the regions of a radex that represents the observed intercorrelations of worry items. It can also be demonstrated that people's personal values are related to their overall worry level and to the specific personal value that is at risk.

The correlations of the ten basic values of the Schwartz value theory with people's worries in the different life-areas and different social environments are similar in both samples. Overall, one can conclude that individuals

who worry relatively much have an ideal point that is located in the "Southern" region of the value space in Figure 3 (for the ideal-point model, see Borg, Bardi, & Schwartz, 2017). Individuals in this region are attracted, in particular, by conservation values (see the "Con" cluster) and also, to some extent, by self-enhancement values. They are also pushed away from self-transcendence values and openness-to-change values.

One can criticize that the modality facet has not been expressed systematically in our items. In principle, each particular undesirable event or condition could be assessed by the respondents in terms of the extent to which they are (1) aware of it, (2) care about it, (3) are afraid of it, and (4) take actions to avoid, prevent, or mitigate it. One would expect that taking action most often implies the other types of responding to the threat, but taking action without being afraid is also conceivable. Gabriel and Greve (2003, p. 650) argue, however, that this case should not be subsumed under the notion of "fear" because the individual "keeps cool". They also discuss various other combinations and conclude that "affect, cognition, and motive [to act are] … necessary conditions for a state labelled as 'fear'. If this state is correctly diagnosed, all three components have to be given, i.e., exceed a threshold value." Such theoretical considerations are useful for conceptual clarity, but applied to a given practical case, one would typically find that the various categories are rather fuzzy criteria. That is, in real life, most worries would come as a mixed bag of these modalities.

Using the facets of an MS to classify empirical observations is rarely straightforward and obvious. Consider, for example, the life-area facet. This facet has been used previously in content-based worry questionnaires. Tallis, Eysenck, and Mathews (1992) hoped that statistical analyses of data on "common worries" about "relevant topics" would help them to define meaningful life-area categories. They note, however, that "the clustering procedure failed to group most of the original items in a meaningful way" (p. 165). This approach shows, in principle, that facets and their elements must not only be conceptually convincing (i.e., clear, reliable, useful for constructing items) but also empirically efficient. Efficient means that the data collected in this framework exhibit statistical classes (e.g., clusters, dimensions, regions, partitions) that correspond to the conceptual item classes. In our case, the life-area categories of the MS in Figure 1 correspond to axial regions of the radex, as predicted. This correspondence is testable and, therefore, not trivial.

The mapping sentence in Figure 1 is similar to mapping sentences proposed by Bilsky and Wetzels (1994) and Bilsky (2003) for "feelings" about "threats" or "stressors" of "personal safety," which, in turn, builds on a mapping sentence of Levy and Guttman (1989) for "adjustive behavior". Our mapping sentence, with its focus on worries in general, specifies a domain of behavior with a much wider range than feelings about safety, but not as wide as the Levy-Guttman domain of adjustive behavior. Moreover, our mapping sentence is unique in explicating various facets of the respondent (demographics and personality variables). These specifications are discussed theoretically and tested empirically for their statistical effects regarding worries distinguished by the object facets of the MS. The validity of the object facets is also supported by the observed differences in the degree of worrying, not just in terms of the structure of their intercorrelations (which is typically the focus of FT-based research).

Constructing meaningful items requires limiting the universe of items to those that are "relevant" for a "common" issue, as, e.g., in the case of the Student Worry Scale, which deals with "major area[s] of concern or worry expressed by students" (Davey, 1993). When assessing worries in general, such a limiting context could be described as the person's "general well-being". One method for generating life-area categories in this context is to interview individuals about their worries and observe the mental file drawers they use when discussing their worries.

Additional facets are easily conceivable to further refine the MS in Figure 1. For example, the element "crime" of the life-area facet suggests additional differentiations such as [type of harm done by crime] = {petty, property, physical, other}. Another possibility was considered by Bilsky (2003) in the context of FoC items: He distinguished financial, physical, and emotional "injuries" of the threats. Similarly, Bilsky and Wetzels (1994) sorted their victimization items into material, physical, or psychological injuries. Such differentiations of the type of harm related to the threat can be extended across other life areas. One could also relate worry items more clearly to the specific personal values that they threaten to harm.

Further differentiations are also possible within the facets. For example, the "actions" element in the modality facet could be split into actions meant to avoid and those that attempt to mitigate or even eliminate a threat. Similarly, for the person facets, previous research also suggests facets such as [previous victimization] = {none, self, family member, in neighborhood}, or further demographic facets such as personal income. Another possible refinement results from a remark by Farall, Jackson, and Gray (2009: 25): "Survey respondents are typically asked whether they are 'very', 'fairly', 'not very', or 'not at all' worried (or afraid) about becoming a crime victim. Survey respondents are not asked *how often* they worry, nor *when* they worry, nor *what effects* these worries have on their everyday lives. As a consequence, instead of data on the patterning and ecology of events of fear, we are left with only vague 'global' summaries of intensity of worry or feelings of unsafety. So, when people say they are 'very worried' about falling victim, should we assume that fear of crime is constantly present?" This suggests a

modifier of the modality facet and items that explicitly attend to these aspects of worry behavior.

Additional facets and modifiers demonstrate that mapping sentences can facilitate *cumulative* theory construction. They also demonstrate that any research study can only focus on parts of the theoretical framework. The MS in Figure 1 distinguishes a huge number of different types of responses to external threats, and with additional facets and more refined categories, this number grows dramatically. This makes clear that each research study can only focus on small sub-samples of the universe of items thus defined. However, explicating facets that are not used when constructing concrete items is not just a useless academic exercise. Rather, it introduces conceptual clarity and helps researchers construct items without noisy distractors. On the other hand, empirical research can also simplify the mapping sentence, as one may find that some conceptual facets are not detectable in the data. Consider, for example, the accountability facet in the MS in Figure 1. This facet is only a first conjecture that may not prove useful in empirical studies. If so, it could be simplified or even dropped completely. Thus, mapping sentences are but partners in a never-ending game of ping-pong between design and data.

This study did not explore the person facet and its demographic elements in detail. This issue raises complex questions, requiring detailed analyses and more space. Overall, we found essentially no gender-, age-, or education-related differences in the *structure* of worries, but for the *level* of worry about specific issues, one can expect marked gender, age, and gender-by-age differences—especially for topics of worry that disproportionately affect men and women at various stages of their lives (e.g., sex-related crimes). Demographic variables can also influence the relationship between personality variables and content-specific worries. It is known, for example, that men tend to value tradition more than women (Borg, 2019). Thus, the damage done to tradition-related values should matter more for men than for women. Indeed, our data show that the mean fear-of-crime worries are correlated with people's striving for tradition, with .25 for men but only .10 for women (compared to .13 for the total sample, see Table 1, Mannheim sample) and with .31 vs. .13 (compared to .18 in the total sample, Stuttgart sample). These findings suggest that future research employing a more multifaceted perspective on worries should also examine personality and demographic variables (and their interactions) more closely.

From an applied perspective, one can conclude that interventions to reduce FoC may be effective by reducing seemingly unrelated concerns about non-crime issues (e.g., worries about the economy or possible wars). When evaluating such interventions, one should always consider that FoC is also partly resulting from hard-to-change personality components. Some people tend to worry more, others less, about anything, including FoC.

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Notes

Note 1. The hypothesis is made for all types of responses, from “being aware” to “acting to prevent/mitigate”. In practice, items that ask about a person’s response to external threats hardly ever allow one to identify a particular response modality. We thus use the term “worry” in the following to mean any mixture of response modalities. The response modalities are, however, conceptually important.

Note 2. A radex is a geometric pattern in 2-dimensional space similar to a polar coordinate system. It looks like a dartboard with radial sectors and concentric bands. This pattern has been found repeatedly in intelligence and attitude research. If the intercorrelations of the items can be adequately represented as distances among points in 2-dimensional space, the configuration can often be partitioned such that the items’ qualitative differences are represented by different sectors of the dartboard-like pattern, while the concentric bands represent an ordered facet (see Borg, Groenen & Mair, 2018).

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