

[Jonathan Jackson](#)

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Cognitive Closure and Risk Sensitivity in the Fear of Crime

Jonathan Jackson, Department of Methodology and Mannheim Centre for Criminology, LSE

Abstract

Purpose. This study was designed to answer two questions. First, does the risk sensitivity model of worry about crime replicate in three European countries? Second, can the model be extended to include need for cognitive closure?

Method. A national probability survey in Italy, Bulgaria and Lithuania measured worry about criminal victimisation, risk perception, and need for cognitive closure. Additive and interactive relationships between latent constructs were tested using latent moderated structural equation modelling.

Results. First, perceived likelihood, control and consequence were statistically significant additive predictors of worry about crime. Second, the association between subjective probability judgments and worry about crime was stronger among people who associated the uncertain event with serious personal consequences and among people who had a high need for cognitive closure. Third, need for cognitive closure was associated with greater perceived consequences of victimisation, but not with different perceptions of the likelihood and controllability of personal victimisation.

Conclusions. This study provides empirical support for an extended risk sensitivity model in three European countries. Findings suggest that risk perception involves multiple – and interacting – dimensions that constitute sensitivity to risk, as well as individual differences in knowledge construction, information judgement and processing. Future work should address (a) whether probability judgements shift psychological distance to uncertain future outcomes, and (b) whether the effect of psychological distance on worry about crime is greater among people who construe the outcome to be severe in consequence and who desire definite knowledge and dislike uncertainty in their lives.

Key words: fear of crime; risk perception; need for cognitive closure; psychological proximity; sensitivity to risk; affect; worry.

Why do people worry about becoming a victim of crime? A good deal of research has explored people's anxieties, worries and fears about criminal victimisation. Generating a rich and interdisciplinary literature (for reviews see Hale, 1996, Farrall *et al.*, 2009, and Lorenc *et al.*, 2013), this work has addressed *inter alia* personal experience of criminal victimisation (e.g. Winkel, 1998), neighbourhood context and geography (e.g. Brunton-Smith & Sturgis, 2011), individual assessments of neighbourhood disorder and control (e.g. Perkins & Taylor, 1996), issues of gender and age (Bromley & Stacey, 2012; Kappes *et al.*, 2013; Lane & Fox, 2013), underlying social attitudes and anxieties (e.g. Girling *et al.*, 2000; Wickes *et al.*, 2013), the role of the mass media (e.g. Nellis & Savage, 2012), and the nature and impact of perceived risk (e.g. Ferraro, 1995).

All these factors seem to be important in 'fear of crime,' but risk perception seems to be the most proximate to emotional response (Warr & Stafford, 1983; Killias, 1990; Killias & Clerici, 2000). Constituting not only subjective probability judgements ('what is the chance that I will fall victim over the next year?') but also one's sense of the consequences of crime ('what impact would falling victim have on my life?') and one's felt ability to control whether or not they become a victim ('can I control whether or not I become a victim?'), risk perception has explained a good deal of variance in emotional response to risk in a number of studies (e.g. Jackson, 2009, 2011; Ireland, 2011). For instance, Custers & Van den Bulck (2012) found that women who experienced high levels of fear of sexual violence also tended to feel unable to defend themselves from sexual violence, tended to believe that the consequences of sexual violence are severe, and tended to believe that it is likely that they will personally become a victim of sexual violence.

The objective of this paper is to contribute to a growing literature on risk perception and risk sensitivity in the fear of crime. Risk sensitivity is the idea that people's emotional response to a sense of proximate (e.g. seemingly probable) threat is heightened under certain conditions – specifically when the perceived cost of the outcome is high (Warr, 1987) and when one's personal sense of control is low (Jackson, 2011). Prior survey research, which has been conducted using city or neighbourhood level surveys (Warr, 1987; Jackson, 2011; although see Custers & Van den Bulck, 2012), has found that the observed association between subjective probability judgments and worry about victimization is stronger when people believe that a given crime is difficult to control and would have severe personal consequences. Subjective probabilities seem to combine with the construal of the outcome (consequence and controllability) to generate affective response.

This study has two objectives. The first is to assess whether the risk sensitivity model replicates in three European countries (Italy, Bulgaria and Lithuania) using much larger survey samples than have been employed hitherto. The second is to explore whether need for cognitive closure can extend the framework in a theoretically novel way. Need for cognitive closure is a cognitive style – a way of processing the world. People with a high need for cognitive closure have a preference for predictability, an aversion to uncertainty, and an inclination for order and structure in an uncertain world (Kruglanski & Webster, 1996). But need for cognitive closure is also situationally determined – it becomes activated when one's immediate environment is ambiguous and unpredictable. In such situations, people with a high need for cognitive closure rush to answers and definition, form judgments quickly and strongly, and prefer not to alter their swiftly formed beliefs in the wake of alternative or supplement evidence.

The present study examines whether people with a high need for cognitive closure experience a significant sense of risk as more emotionally unsettling, thereby strengthening the observed correlation between perceived likelihood and experienced worry. According to Kruglanski & Webster (1996: 264), need for cognitive closure may 'induce negative affect when closure is threatened or undermined and positive affect when it is facilitated or attained.' The current study thus assesses whether need for cognitive closure interacts with

subjective probability judgements to predict levels of worry about crime. The study also explores whether people with a high need for cognitive closure perceive different levels of criminal threat around them. On the one hand they may be motivated not to see uncertain threat around them because this brings uncertainty and ambiguity into their lives. On the other hand they may tend to 'seize' and 'freeze' on circulating representations of crime that are biased towards the dramatic and sensational. In this regard the current study is exploratory, in that it provides the first correlational assessment of the links between need for cognitive closure, risk perception and fear of crime.

The next section reviews the risk sensitivity model. The theoretical framework is then extended to include need for cognitive closure. After documenting the method and results, the paper closes with the strengths, limitations and implications of the study.

REPLICATING THE RISK SENSITIVITY MODEL

The risk sensitivity model was first developed by Mark Warr (1987). Conducting a city-wide survey of residents of Seattle, Warr found that when people judged crime to be especially serious in its effect, a lower level of perceived likelihood was needed to stimulate some level of personal fear. Individuals were thus more 'sensitive' to a given level of perceived risk when they viewed the consequences of victimization to be especially serious. The model was then developed in a London-based study. Jackson (2011) found that a sense of personal consequence *and* a sense of control moderated the observed statistical effect of perceived likelihood on emotional response. When people associated criminal victimisation with strong personal consequences and believed these events were difficult to control, then fitted levels of worry were relatively high even the perceived likelihood of victimisation was low.

Why might perceived likelihood interact with perceived consequence and perceived control to predict worry? One possibility centres around the link between perceived likelihood and psychological distance. In the words of Trope and Liberman (2010: 442): 'Psychological distance refers to the perception of *when* an event occurs, *where* it occurs, to *whom* it occurs, and *whether* it occurs.' Something is close (i.e. psychologically proximate) or far (i.e. psychologically distant) according to distance dimensions of time (*when*), space (*where*), social distance (to *whom*) and hypothetical (*whether*). If probability judgements reflect the psychological proximity or distance of victimisation threat (cf. Bar-Anan, Liberman, and Trope, 2006; Wakslak and Trope, 2009), then believing that one is likely to fall victim of crime (over the following twelve months, say) is to represent that event as psychologically proximate on a number of different distance dimensions. To believe that there is a high probability of falling victim of crime is to perceive the future uncertain event as psychologically proximate: it seems *real* (so not hypothetical), *closer in space* (so likely to happen in the areas one frequents), *closer in time* (saying something is likely to happen over the next twelve months brings it closer in time), and *relevant to oneself* (it is likely to happen to oneself, not just to other people).

Viewed through the lens of psychological distance, judgements about the probability of victimisation move the hypothetical event to be more or less psychologically proximate. According to Todorov *et al.* (2007) subjective probabilities reflect psychological distance with respect to *distance to the outcome*. Studies of risk sensitivity suggest that perceptions of the consequence of the outcome (Warr, 1987) and controllability of the event (Jackson, 2011) alter the strength of association between psychological proximity (represented by probability judgements) and emotion. Psychological distance thus seems to interact with a sense of the seriousness of the outcome (as well as feelings of control over the event itself) to stimulate affective response.¹

¹ Imagine a dial that determines the level of everyone's sense of likelihood. When turned up or down, everyone's perceived likelihood moves up or down together, shifting the psychological distance closer

This study first assesses whether the risk sensitivity model replicates beyond Seattle and London. Figure 1 summarises the model and its constituent hypotheses (focus on the non-dashed lines that correspond to hypotheses 1 to 7 – the dashed lines corresponding to hypotheses 8 to 12 represent the extension of the model that is discussed below. Also note that all the constructs refer to the risk of criminal victimisation, in this case being burgled and being physically attacked in the street by a stranger). To worry about becoming a victim of crime one needs to judge some sort of personal threat (cf. Berenbaum, 2010). In the current framework, people's perceptions of threat are constituted by their sense of likelihood, consequence and control.

H1, H2 and H3: perceived likelihood (H1), perceived control (H2) and perceived consequence (H3) each predict worry about crime, with likelihood and consequence to be positively associated with worry, and control to be negatively associated with worry.

These hypotheses refer to additive statistical effects; if all three hypotheses are confirmed, then perceived likelihood, perceived control and perceived consequence have combined statistical effects on worry about crime (in the sense that they are additive predictors of expressed worry about crime).

INSERT FIGURE 1 ABOUT HERE

As noted above, the risk sensitivity model also posits two moderating relationships between (a) likelihood and consequence and (b) likelihood and control.

H4: the higher the perceived consequence the stronger the association between perceived likelihood and worry about crime (and vice versa: the higher the perceived likelihood the stronger the association between perceived consequence and worry).

H5: the lower the perceived control the stronger the association between perceived likelihood and worry about crime (and vice versa: the higher the perceived likelihood the stronger the association between perceived control and worry).

Finally, judgements about the probability of victimisation are expected to covary with judgements about personal consequence and perceived controllability (replicating Jackson, 2011). People who construe a given crime as serious in its personal consequences and personally uncontrollable are expected to perceive the likelihood of it happening to be relatively high, because it is easier to imagine being victimised when one represents the criminal event in vivid and emotionally interesting ways. Vivid events are more often seen as high probability compared to pallid events – a finding often attributed to the availability heuristic (Tversky & Kahneman, 1973). But, according to Wakslak & Trope (2009), this could be to do with psychologically proximate events being typically construed using less abstract and more concrete attributes. Representing crime as serious in its outcome and difficult to control may mean that the event is construed as dramatic and is easy to imagine (because of mass media bias towards sensational crimes). More concrete processing is also associated with more psychological proximate construal (Trope & Liberman, 2003).

to or further away from the uncertain future outcome. According to the risk sensitivity model, turning the dial up would result in higher expected levels of worry or fear among people who represent the crime as serious in its personal consequence and as difficult to control.

H6 and H7: perceived consequence (H6) and perceived control (H7) each predict perceived likelihood (consequence is expected to be positively associated with likelihood, while control is expected to be negatively associated with likelihood).

EXTENDING THE RISK SENSITIVITY MODEL TO INCLUDE NEED FOR COGNITIVE CLOSURE

Need for cognitive closure is defined by Kruglanski and Webster (1996: 278) as:

‘...a desire for definite knowledge on some issue and the eschewal of confusion and ambiguity ... need for closure is presumed to exert its effects via two general tendencies: the urgency tendency, reflecting the inclination to attain closure as quickly as possible, and the permanence tendency, reflecting the tendency to maintain it for as long as possible.’

First, people with high need for cognitive closure are expected to respond in stronger ways to the perceived likelihood of criminal victimisation (see the dashed lines in Figure 1). Need for cognitive closure involves a preference for predictability and decisiveness, a discomfort with ambiguity, a closed mindedness, and an inclination for order and structure. Applied to the risk sensitivity model, need for cognitive closure may mean that people with a high need for cognitive closure experience a high probability (i.e. psychologically proximate) uncertain event as more unsettling and more difficult to resolve. Conversely, people with a high need for cognitive closure may experience a low probability (psychologically distant) uncertain event as less troubling and less worrying.

In keeping with the risk sensitivity model, this may involve not only an additive statistical effect of need for cognitive closure (on top of the effects of perceived likelihood, control and consequence), but also a multiplicative statistical effect of cognitive closure and perceived likelihood on worry. People may worry more frequently about a psychologically proximate event occurring when they have an aversion to uncertainty and a need for certain knowledge. Low psychological distance to the outcome (i.e. crime) brings uncertainty into one’s life, and people with a high need for cognitive closure may find this especially troubling. Conversely, people with a high need for cognitive closure may worry less frequently about a psychologically distant event – psychological distance plausibly creates a sense of predictability and a lack of ambiguity that induces positive affect.

H8 and H9: need for cognitive closure predicts worry (H8) and moderates (H9) the effect of perceived likelihood on worry about crime (and vice versa: perceived likelihood moderates the effect of need for cognitive closure on worry about crime).

Second, cognitive closure is expected to be associated with perceived likelihood, control and consequence. While there is no prior evidence on the links between cognitive closure and risk perception, there are reasons to expect an association. On the one hand Kruglanski & Webster’s (1996) theory predicts that people with a high need for cognitive will be motivated not to see uncertain threat around them. To see uncertain but psychologically proximate threat is to bring ambiguity and uncertainty into their lives. As Berenbaum (2010: 968) speculates: ‘Individuals with strong desires for certainty are likely to have difficulty accepting the prospect of threatening outcomes not only because they fear the outcomes but also because of their disinclination to accept any form of uncertainty (which is inherent in any uncertain future threat).’ Thus, people with a high need for cognitive closure may be motivated to see crime as a low-probability event that is easy to control and does not have strong personal consequences.

On the other hand, people with a high need for cognitive closure may also tend to see crime as high probability, as difficult to control, and as serious in its personal consequences. Mass media tend to report not the common (relatively high probability) crimes that typically have less personal consequences for the victim, but the rare crimes that have severe personal consequences. When seeking out and/or processing information about crime – whether from the mass media or from interpersonal communication – people with a high need for cognitive closure may use less complex information-seeking strategies, employ more basic heuristics, and more readily ‘seize’ on media representations of crime and ‘freeze’ on the sense of risk and harm (cf. Kruglanski and Webster, 1996). They are expected to process less information before committing to a judgment; to base judgments on early cues; to rely on stereotypes rather than de-individualizing information; and to be motivated to keep close to initial impressions rather than correct them in light of subsequent evidence.

It is not that people with a high need for cognitive closure are expected *to more actively seek out* information about crime and risk (in fact they may be motivated not to seek out such information). But when individuals *do come across* crime reports (or information about crime more generally), those with a high need for cognitive closure may be more likely to rely upon these instances of crime when forming their personal sense of risk and possibility. Given that the most eye-catching and available images of crime are the most vivid events (those that the mass media tend to focus upon, e.g. Gekoksi *et al.*, 2012), people with high need for cognitive closure may construct their personal risk of crime as more consequential, less controllable and more likely.

In keeping with these expectations, which go both ways, the final set of hypotheses state only expected associations not expected direction of associations.

H10, H11 and H12: need for cognitive closure predicts perceived likelihood (H10), perceived consequence (H11) and perceived control (H12).

METHOD

Sample

A nationally representative survey of adults in Italy, Bulgaria and Lithuania was fielded in 2009, with data collected via computer-assisted personal interviewing. The surveys were conducted by different organisations in different countries (although they were centrally coordinated by the EuroJustis team, see Hough & Sato, 2011). The survey in Italy was done by GfK Austria, with individuals aged 16 years old and over selected using stratified random sampling for the following quotas: regions and city sizes (interlocked), gender and age (interlocked), level of education and occupation. In each quota, the sampling points were selected randomly. The achieved sample in Italy was 522, with a response rate of 28%. The survey in Bulgaria was conducted by Vistosha Research. The sampling method was two-stage random route cluster sampling, producing a sample representative of the Bulgarian population aged 18 and over, designed to reproduce the basic socio-demographic parameters of the population aged 18+ as of the data from the last Parliamentary elections (July 2009). The total number completed interviews in Bulgaria was 1,008, with a response rate of 63%. The survey in Lithuania was conducted by Vilmorus. Multi-stage random sampling was used to produce a probability sample, covering 18 towns and 54 villages. The sample consisted of 1,021 respondents, comprised of Lithuanian inhabitants aged 16 and over, with a response rate of 37%.

Table 1 shows the demographic composition of the three samples. Just over half of the individuals in each sample were female. The mean age was around 50 years old in all three countries. Most people lived in a big city, a town or small city, or in a country village.

INSERT TABLE ONE

Measures

European Social Survey measures of worry about crime were used (see: Jackson & Kuha, 2013). Respondents were asked: 'During the last 12 months have you ever felt worried about being physically attacked in the street by a stranger?'. If they said yes they were then asked 'How many times have you felt like this in the past 12 months?'. Options were: 'all or most of the time', 'some of the time', 'just occasionally' and 'never'. The same two questions were also asked about 'having your home broken into and something stolen.' Respondents were also asked: 'Does this worry about being physically attacked in the street have a ...' with the options being '...serious effect on the quality of your life', '...some effect' and '...no real effect on the quality of your life?'. A comparable set of questions were also asked about 'having your home broken into and something stolen.'²

Risk perception was measured using three sets of questions. The first set focused on the perception of the likelihood of being criminally victimized, with respondents asked: 'How likely do you think it is that you will fall victim of each of the following crimes during the next twelve months?' (as for the measures of worry, the crimes specified were physical attack in the street by a stranger and having one's home broken into and something stolen). The scale ranged from 1 'definitely not going to happen' to 5 'certain to happen.' The second set was perceived control, with respondents asked: 'To what extent do you feel personally able to control whether or you will fall victim of each of the following crimes during the next twelve months?' The scale ranged from 1 'Not at all able' to 5 'To a very great extent.' The third set was perceived consequence, with respondents asked: 'To what extent do you think your life would be affected if you become a victim of each of the following crimes?'. The scale ranged from 1 'Not affected much at all' to 5 'Affected to a very great extent.'³

Need for cognitive closure was measured using five items. Each item was drawn from 5 sub-facets of a longer scale (Kruglanski *et al.*, 1993). Respondents were asked to agree to disagree with the statements (five point scale from 'agree strongly' to 'disagree strongly'): 'I enjoy having a clear and structured mode of life' (preference for order and structure); 'I don't like to go into a situation without knowing what I can expect from it' ('preference for predictability'); 'I usually make important decisions quickly and confidently' ('decisiveness'); 'I don't like situations that are uncertain' ('discomfort with ambiguity'); and 'I dislike questions which could be answered in many different ways' ('closed mindedness'). Confirmatory factor analysis using pooled data indicated that item 3 (decisiveness) did not load well on the latent variable, which is consistent with Mannetti *et al.*'s (2002) comparison of the factor structure of the scale in the US and three European samples (Croatia, Italy and Netherlands). Mannetti and colleagues found that the four-facet version of need for cognitive

² Confirmatory factor analysis of the four indicators of worry about crime indicated that a one-factor solution fitted the data well when applied to the pooled sample, but only when an error covariance was allowed between the two violence indicators or the two burglary indicators or both covariances (each model produces identical fit statistics: $\chi^2=20$, $df=1$, $p<.01$; CFI 0.99; TLI 0.97; RMSEA 0.09, 90%CI .06, .12). Because there was no *a priori* reason to prefer one covariance or the other, subsequent models in the study freed up both error covariances. Importantly, sensitivity analyses (available upon request) confirmed that removing error covariances did not significantly affect the pattern of results.

³ Three measurement models for risk perception were fitted using confirmatory factor analysis (using MPlus). The first was a single-factor model. The fit was poor ($\chi^2=5,046$, $df=9$, $p<.01$; CFI 0.30, TLI -0.16, RMSEA 0.47, 90%CI 0.46, 0.48). The second model specified one latent variable for perceived likelihood and another for perceived control and consequence. Again the fit was unsatisfactory ($\chi^2=3,452$, $df=8$, $p<.01$; CFI 0.52, TLI 0.11, RMSEA 0.41, 90%CI 0.40, 0.42). The third model specified one latent variable for each of perceived likelihood, control and consequence; this time the fit of the model was good ($\chi^2=45$, $df=6$, $p<.01$; CFI 0.99, TLI 0.99, RMSEA 0.05, 90%CI 0.04, 0.07).

closure was a reliable uni-dimensional scale (and that further work needed to be done to operationalize ‘the need to decide quickly’). In the current study the third item was dropped.⁴

Table 2 shows correlations between latent constructs from a five-factor confirmatory factor analysis model where the latent variables were allowed to covary.⁵ Note that the strongest associations were between (a) worry and perceived consequence, (b) worry and perceived likelihood, and (c) perceived likelihood and perceived consequence.

INSERT TABLE TWO

Control variables in all the proceeding analyses were gender, age and country (two dummy variables denoting Italy and Bulgaria, with Lithuania as the reference category). On the one hand, gender and age have been shown to be consistent predictors of both risk perception (Jackson, 2009) and worry about crime (Brunton-Smith & Sturgis, 2011). On the other hand, country of residence has been shown to be a consistent predictor of perceived safety of the streets after dark in a number of cross-national studies (Hummelsheim *et al.*, 2011; Semyonov *et al.*, 2012; Visser *et al.*, 2013) and may also predict perceived risk. It is important to adjust for these three factors, because controlling for these covariates reduces the possibility that the associations are inflated because they are all influenced by gender, age and country of residence.⁶

Analytical strategy

In order to estimate measurement models and relationships between latent variables, structural equation modeling (SEM) was employed on the pooled sample (using MPlus 5.2). SEM allows one to model directed paths from one latent variable to another. Latent moderated structural equations (Klein and Moosbrugger, 2000) were estimated in order to test interaction effects, taking into account the nonnormality caused by the latent nonlinear terms. Full information maximum likelihood estimation was also used, meaning that all of each respondent’s answers were included in the likelihood function of each fitted model, even when these answers did not form a full set of responses. With this approach, maximum likelihood estimation of the model produces valid estimates under the assumption that the missing data were Missing at Random (MAR, in the sense of Rubin, 1976). The number of missing values for the individual indicators ranged from 1 to 125, with no respondent having missing values on all manifest variables.

A further note on the analytical strategy is necessary. Including all three countries in the study permits generalisation to the general adult population all three countries (with fixed effects included in all analyses to adjust for country membership). The focus of the study is

⁴ Fit statistics for a confirmatory factor analysis of the four indicators of need for cognitive closure (with an error covariance between the first two indicators) indicate a good fit: $\chi^2=0.5$, $df=1$, $p<.01$; CFI 1.00; TLI 1.00; RMSEA 0.00, 90%CI .00, .05.

⁵ Multi-group confirmatory factor analysis was conducted to test measurement equivalence for each construct separately. The fit of the measurement model that assumed measurement equivalence was compared to the fit of a number of measurement models, each of which allowed the error variance, intercept and factor loading to differ between countries in all but one of the indicators of each construct (separately). Likelihood ratio tests indicated a lack of measurement equivalence, but the factor loadings (for example) did not differ very much (details available upon request). Moreover, a recent statistical investigation of measurement equivalence in cross-national survey research concluded that ignoring nonequivalence can have a big effect on mean comparisons but less of an effect on correlations between latent variables (Kuha, 2012). The lack of measurement equivalence was subsequently ignored in the main analysis of the current study.

⁶ All models (see Figures 2, 3 and 4) were fitted without these control variables, with little change to the estimates (details available on request).

on the psychological links between need for cognitive closure, risk perception and worry about crime, which were assumed to be relatively independent to country setting. While country differences in perceived safety of the streets after dark have been shown (e.g. Hummelsheim *et al.*, 2011; Semyonov *et al.*, 2012), saying that levels of worry about crime vary between countries is not the same thing as saying that the association between perceived likelihood and worry about crime (for example) varies between countries. However, interactive effects of country on such associations were tested in the present study in order to probe the robustness of the findings (for the sake of simplicity, these interaction effects were estimated for model 2 and reported below).

RESULTS

The first stage in the modeling replicated the risk sensitivity model of worry about crime. Paths were estimated from perceived control to perceived likelihood and from perceived consequence to perceived likelihood. Two latent interaction effects were also estimated. First, the relationship between perceived likelihood and worry about crime was estimated to be moderated by perceptions of control. Second, the relationship between perceived likelihood and worry about crime was estimated to be moderated by perceptions of consequence.

INSERT FIGURE 2 ABOUT HERE

Starting with worry about crime (Figure 2), a significant amount of variation in worry was explained by main and interactive effects of the aspects of risk perception (plus gender, age and country). Conditioning on gender ($b=.12, p<.01$), age ($b=.002, p=.04$), the Italy dummy variable ($b=.01, p=.80$) and the Bulgaria dummy variable ($b=.09, p=.02$), there was one statistically significant interaction effect (involving perceived likelihood and perceived consequence). Here, the fitted slope of perceived likelihood increased as levels of perceived consequence increased. Among individuals who saw the personal consequences of victimization to be especially high, a lower level of perceived likelihood was needed in order to predict relatively frequent worry about crime. The fitted slope of perceived likelihood also decreased slightly as levels of perceived control increased, but this was not statistically significant. Thus we have evidence supporting hypotheses one, two, three and six. By contrast, we have little evidence supporting hypothesis seven.

Note, in Figure 2, that no fit statistics are given. This is because latent moderated structural equation modeling was used, and fit statistics for this complex modeling strategy have not yet been developed. However likelihood ratio tests indicated that the interaction effect involving likelihood and consequence increased the fit of the model at the 5% significance level (the p -level for the interaction effect involving likelihood and control was just above 0.05). On advice from an anonymous reviewer, an unconstrained approach to latent interactions was used (see Marsh *et al.*, 2004). Suppose the two latent variables in the interaction are x_1 with indicators z_1, \dots, z_3 , and x_2 with indicators y_1, \dots, y_3 . A new latent variable is estimated, treating the nine products z_1*y_1, \dots, z_3*y_3 as nine indicators. The fit of the model was poor, but the substantive results were similar to the latent moderated structural equations approach implemented in MPlus.

Moving next to risk perception, variation in perceived likelihood was accounted for by levels of perceived consequence ($b=.20, p<.01$) but not by perceived control ($b=.03, p=.10$), conditioning on gender ($b=.07, p=.05$), age ($b=.002, p=.04$), Italy dummy variable ($b=-.36, p<.01$) and Bulgaria dummy variable ($b=-.17, p<.01$). Thus, we have evidence supporting hypothesis four but not for hypothesis five.

The second stage of modelling (Figure 3) added need for cognitive closure to the framework (although to simplify the model slightly the two interaction effects outlined above were dropped). There was a good fit of the model according to the approximate fit statistics,

but not according to the exact fit statistics. The only statistically significant association between need for cognitive closure and the three different elements of risk perception related to perceived consequence: people with high need for cognitive closure tended to believe that the consequences of victimization would be higher. This supported hypothesis eleven but not hypotheses ten and twelve. Hypothesis eight was not supported; there was no additive effect of need for cognitive closure on worry about crime;

INSERT FIGURE 3 ABOUT HERE

The model presented in Figure 3 was also re-estimated to include interaction effects between country and each of the structural paths. While most of the interaction effects were not statistically significant, there were three exceptions. First, the estimated effect of cognitive closure on consequence was larger in Italy and Bulgaria than it was in Lithuania, although the pattern that emerged did not deviate from the general conclusions. Specifically, need for cognitive closure was positively associated with perceived consequence of criminal victimization – it was just more strongly associated in Italy and Bulgaria. Second, the estimated effect of likelihood on worry was larger in Bulgaria than it was in Italy and Lithuania, although again the pattern that emerged did not deviate from the general conclusions (perceived likelihood was positively associated with worry about crime, it was just more strongly associated in Bulgaria). Third, the estimated effect of perceived consequence on perceived likelihood was more complex. The effect was positive in Italy, there was no effect in Lithuania, and the effect was negative in Bulgaria. But given that perceived consequence seems to play a less important part in the current model than perceived likelihood, this was not deemed to be particularly troublesome to the present investigation – although it is clearly a puzzle (and something to be investigated in future research).

INSERT FIGURE 4 ABOUT HERE

The final stage in the modeling added an interaction effect between need for closure and perceived likelihood (Figure 4).⁷ Support was found for hypothesis nine: the stronger the need for cognitive closure, the stronger the conditional correlation between worry about crime and perceived likelihood. A likelihood ratio test indicated that the interaction effect involving likelihood and cognitive closure increased the fit of the model at the 5% significance level. Among individuals who perceived the probability of falling victim in the next twelve months to be low, people with a high need for cognitive closure worried less than people with a low need for cognitive closure. Worry about crime was especially low among people with a high need for cognitive closure who also believed that the probability of victimization was low. (Please note: a graphic visualization of the two interaction effects can be found in the online supplementary material.)

Kruglanski & colleagues (e.g. Kruglanski & Webster, 1996: 263) talk about need for cognitive closure being a ‘motivated closing of the mind’ and a ‘desire for certain knowledge on some issue.’ The current study did not find a direct link between need for cognitive closure and subjective probabilities; one might posit that people who have a ‘desire to achieve a firm answer to a question and an aversion toward ambiguity’ (*ibid*: 264) will also be motivated to represent crime is something unlikely to happen to them. But what about the interaction effect between perceived likelihood and need for cognitive closure?

If one conceives of perceived likelihood as psychological distance, then this may help us understand the interaction between need for cognitive closure and perceived likelihood.

⁷ For robustness checks, each latent interaction effect was estimated separately, with almost identical results to Figure 4 (details available on request).

Imagine a group of people who all construe victimisation as psychologically distant. They represent the potential victimisation event as distant over space, time and social distance, in that it is something that they believe is unlikely to happen in the areas they frequent, unlikely to happen in the immediate future, and unlikely to happen to themselves. The current findings suggest that people with a high need for cognitive closure will worry less than people with a low need for cognitive closure because certainty and closure brings with it a sense of positive affect, which helps to reduce worry (see the graphical visualisation in the online supplementary material). The current findings also suggest that when victimisation is psychologically proximate, then uncertainty and the lack of closure will bring with it a sense of negative affect that makes worry more frequent.

CONCLUSIONS

This study found that adults in Italy, Bulgaria and Lithuania tended to worry about falling victim of crime when they represented the criminal event as being (a) likely to occur to them, (b) highly consequential if the event were to transpire, and (c) difficult to control in its nature and occurrence. Of note was that perceived probability seemed to ‘multiply’ – in the sense of a statistical interaction – with perceived outcome to predict expressed emotion. Findings thus generally corroborate and extend the risk sensitivity model of worry about crime, which was previously only tested in a city-wide sample in Seattle and a study of two London neighbourhoods (Warr, 1987; Jackson, 2011). One exception was the relative unimportance of perceived control in the current study: perceived control did not predict perceived likelihood, nor did it interact with perceived likelihood to predict worry about crime. It is for future research to drill into the issue, perhaps by widening the scope of people’s sense of efficacy and control.

Two theoretically novel findings were of note. The first was that subjective probability judgments interacted not only with perceived consequence, but also with people’s aversion to uncertainty and need for certainty. This suggests a new direction for risk sensitivity research (Warr, 1987; Jackson, 2011). People may worry about falling victim (even when they view the probability of victimization to be relatively low) not only because they see the personal consequences to be especially high, but also because they feel uncomfortable with uncertainty, desire predictability and like order and structure in their lives. If they are averse to psychologically proximate threat – largely constituted by the belief that the likelihood of victimization is high – we might call them ‘sensitive to risk.’ Risk sensitivity may thus be not only about representations of the outcome of a given personal threat, but also about the individual differences in need for order, certainty, predictability and decisiveness that shape affective response to risk.

The second theoretically new finding was that people with a high need for cognitive closure tended to believe that the personal consequences of crime were more severe. At this juncture one can only speculate. But the effect may reflect a stronger inclination among individuals with a high need for closure to ‘seize’ and ‘freeze’ on the vivid and sensational criminal events that the media tend to report, thereby shaping their perceptions of the consequences (i.e. nature) of criminal victimization. If this is true, however, the fact that need for cognitive closure did not predict perceived control or perceived likelihood is puzzling; presumably these same dramatic and vivid crimes often seem both highly consequential, highly difficult to control, and sensational. Perhaps people with a high need for cognitive closure also tend to be motivated to believe that they have control over their lives and are motivated to see less threat around them? This general tendency may work in the opposite direction to an effect of ‘seizing’ and ‘freezing’ on media images, thus cancelling out the effect in the other direction. This is an issue for future research.

Naturally, some limitations of the study should not go without comment. The empirical work presented in this paper operates within the dominant paradigm in

criminological inquiry into fear of crime. This is a strength – in that the findings slot neatly into an established literature. Observational data of the kind produced in the present work allows one to model conditional correlations using national probability samples. Good quality samples are powerful – in that they allow one to make inferences to a broader population. But the methodology is also a weakness. Surveys like these do not allow one to make causal claims. First, there may be any number of confounding variables in the conditional associations reported in this study. Second, it is likely that the arrow of causality between risk perception and emotion goes both ways (Loewenstein *et al.*, 2001; Kuppens *et al.*, 2012).⁸ Third, the time ordering may not be so clear. In particular the study assumes stability in risk perception and need for cognitive closure. The measure of worry about crime focused on past episodes, whereas the measures of risk perception and need for cognitive closure focused on the present. Linking current assessments of the likelihood of criminal victimisation to past worry about crime (over the past twelve months) thus assumes that the assessment of likelihood has remained relatively stable over the past twelve months.

Finally, the current study has only scratched the surface of the links between need for cognitive closure and risk perception. The assumption has been that people with a high need for cognitive closure were more likely to be influenced by frightening mass media representations of crime that are biased towards the dramatic and sensational. Yet, there may be any number of competing accounts and related hypotheses regarding the links between cognitive closure and risk perception.

Final words

It is hoped, in closing, that the replication and theoretical novelty of this study helps to mitigate certain methodological weaknesses. The central contribution has been to underline the importance of Warr's (1987) notion of risk sensitivity, as well as the potential significance of need for cognitive closure (Kruglanski & Webster, 1996). Studies into fear of crime often treat risk perception as an important mediating factor, linking perceived disorder (for example) to perceived likelihood, and perceived likelihood in turn to emotional response (Ferraro, 1995; Farrall *et al.*, 2009). Yet, such studies also tend to define risk perception in a rather narrow fashion, typically focusing only on perceived likelihood.

One way forward is to examine not only additive and interactive effects of perceived likelihood, control and consequence, but also individual differences in information judgement and processing. Why do victimisation experience, neighbourhood context, perceived disorder and media consumption shape expressed emotions about becoming a victim of crime? It may be that these factors shape not just perceived likelihood, but also perceived control and perceived consequence. For instance, seeing disorder in one's neighbourhood may lower one's sense of control over potential victimisation. These dimensions of perceived risk may then interact to shape expressed emotion.

Need for cognitive closure may also play an important role in the inferences that people make from their environment, their personal victimisation experience, and from hearing about crime. For example, people with a high need for cognitive closure may more readily 'seize' and 'freeze' on personal victimisation experience, thereby drawing especially strong inferences about personal risk and threat. People with a high need for cognitive closure may also tend to draw quick and strong inferences from ambiguous social and physical cues (cf Wickes *et al.*, 2013); they may be more likely to conclude that neighbourhood disorder is present in their environment and draw subsequently strong inferences about significant personal threat.

⁸ For example, worry can exacerbate rather than solve problems (Berenbaum, 2010; cf. Jackson & Gray, 2010). Pathological worrying can lead to a given danger being constantly rehearsed, leading to the 'catastrophising' of a problem or event.

Insights into the psychology of risk may thus enrich our understanding of an important social and political phenomenon. This study has highlighted the complex nature of people's judgments of risk, as well as their varying strategies of information judgment and processing centre-stage. Alloyed with insights into cognitive closure and aversion to uncertainty, the risk sensitivity model may stimulate future research, helping to push the literature forward in new and fruitful directions.

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Table 1

Demographic composition of the three samples

	Gender		Age		Location				
	Male %	Female %	Mean	SD	Big city %	Suburbs or outskirts of a big city %	Town or small city %	Country village %	Farm or home in the country %
Italy	51%	49%	48	18	15%	10%	28%	45%	1%
Bulgaria	57%	43%	52	18	37%	6%	26%	31%	0%
Lithuania	57%	43%	51	18	43%	0%	22%	33%	1%

Table 2

Correlations between latent variables

	Cognitive closure	Perceived likelihood	Perceived control	Perceived consequence	Worry about crime
Cognitive closure	1				
Perceived likelihood	.01	1			
Perceived control	.00	.05***	1		
Perceived consequence	.09***	.24***	.05*	1	
Worry about crime	.05***	.25***	-.05*	.24***	1

Note. Correlations from a five-factor confirmatory factor analysis model.

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

Figure 1. A schematic representation of the risk sensitivity model (note that hypotheses 8-12 represent an extension to the model, hence the dotted lines)

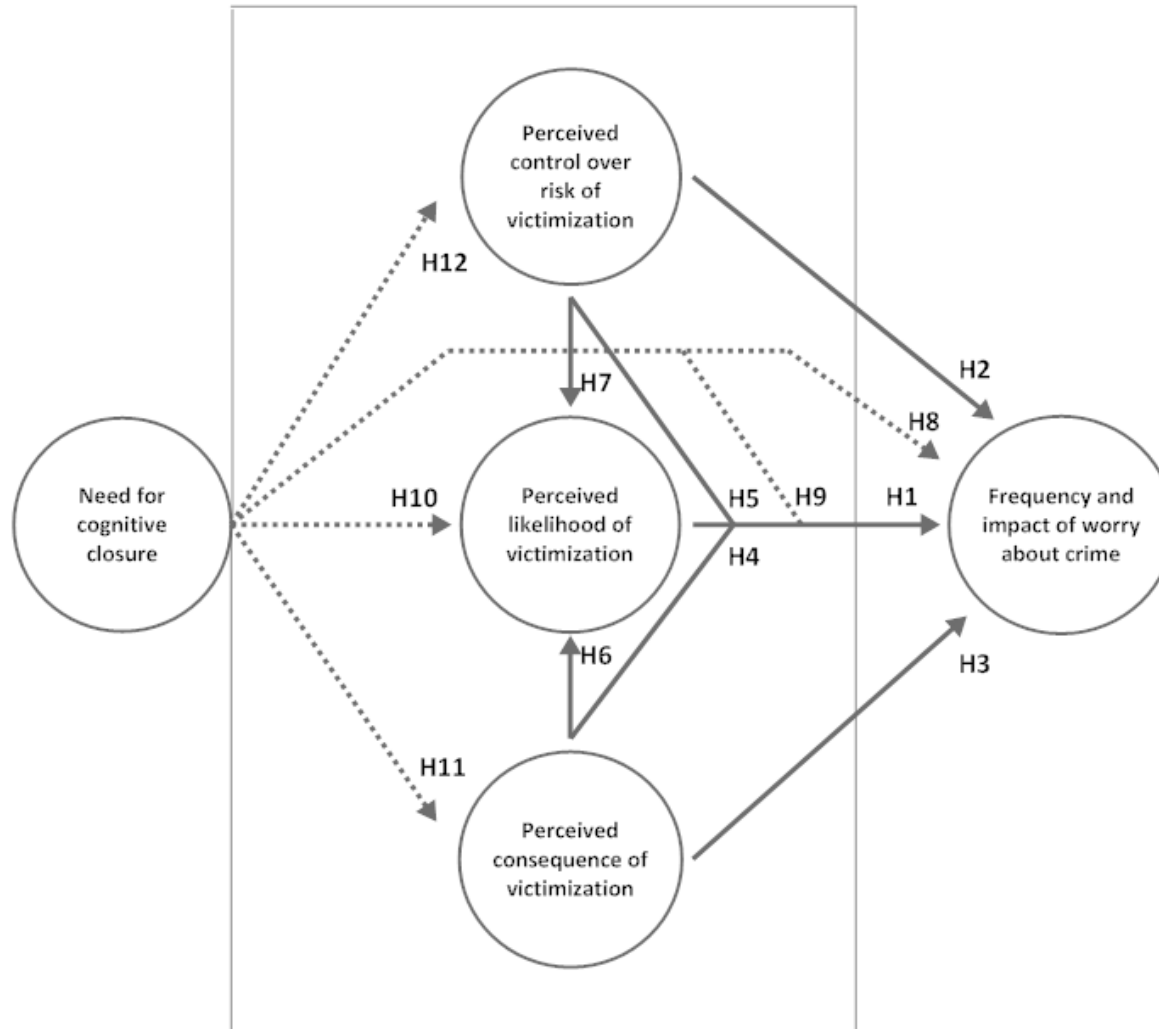


Figure 2. Risk sensitivity and worry about crime

Structural equation modeling with interaction effects using Mplus 5.2.

Unstandardised coefficients with 95% CI in parentheses.

Gender, age and country controls included.

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

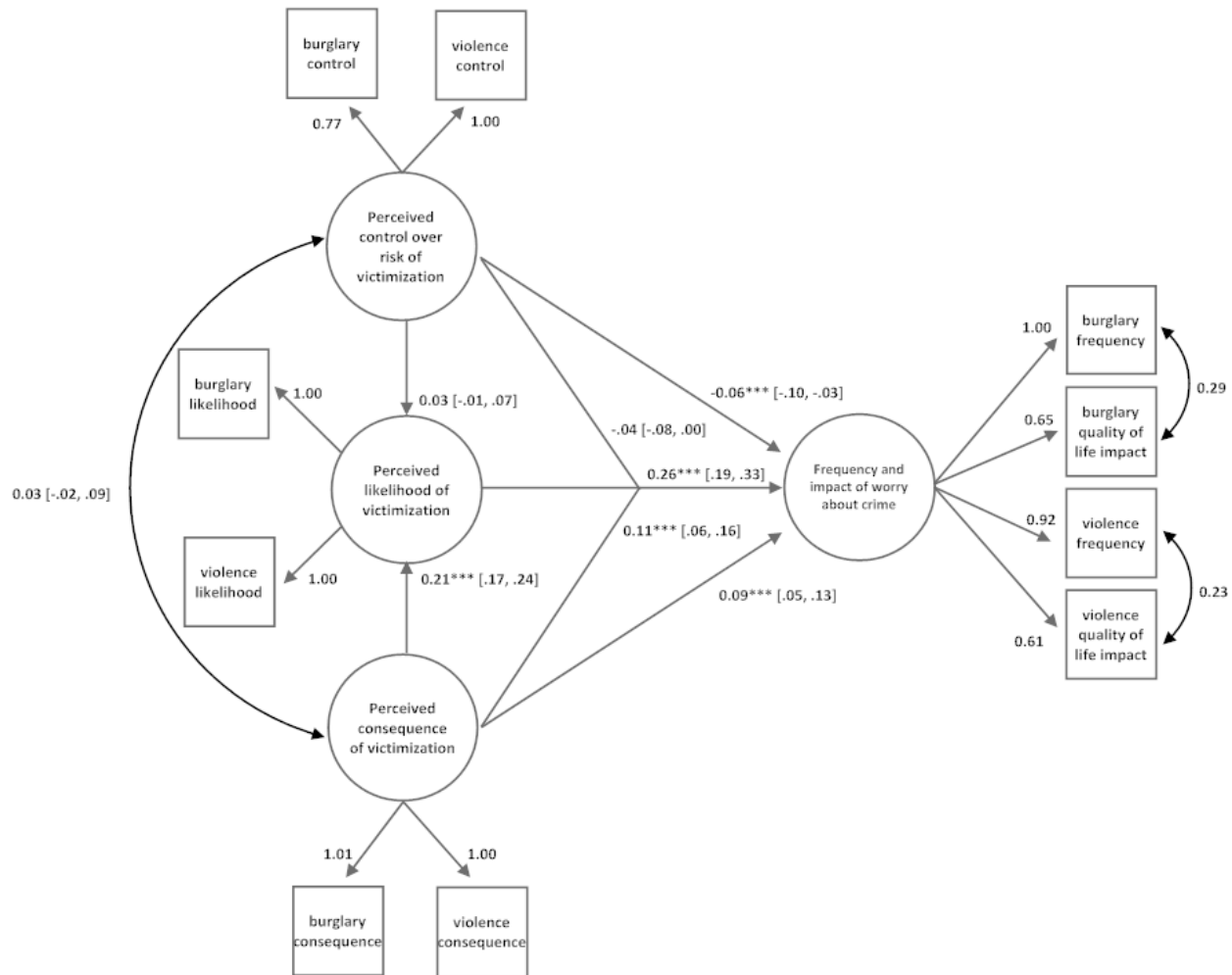


Figure 3. Need for cognitive closure, risk perception and worry about crime

Structural equation modeling using Mplus 5.2.
 Unstandardised coefficients with 95% CI in parentheses.
 Gender, age and country controls included.
 Chi-square 599, df 99, $p < .0005$. CFI 0.97; TLI 0.95; RMSEA 0.045 (90% CI .041, .048).
 * $p < .05$. ** $p < .01$. *** $p < .001$.

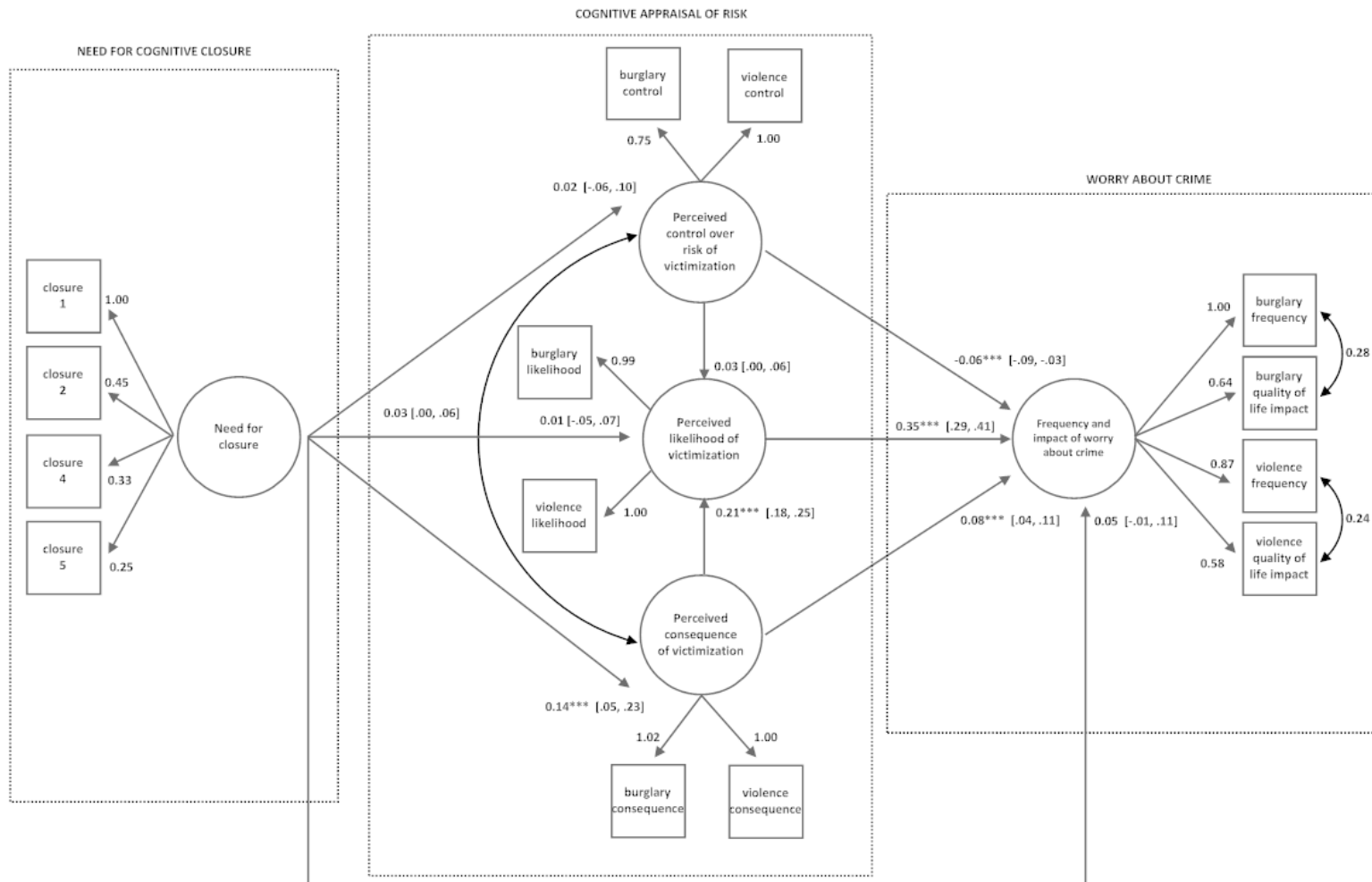


Figure 4. Need for cognitive closure, risk sensitivity and worry about crime

Structural equation modeling with interaction effects using Mplus 5.2.

Measurement models not presented for visual ease.

Unstandardised coefficients with 95% CI in parentheses.

Gender, age and country controls included.

Perceived control and perceived consequences allowed to covary ($p=0.32$).

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

