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Perceived sanction risk, individual propensity and adolescent offending: Assessing key findings from the deterrence literature in a Dutch sample

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Abstract

Deterrence studies have shown that perceived sanction risk is related to delinquent behaviour, independent of other variables, and that this relation may be conditioned by individual propensity towards crime. The principal goal of this study is to assess these findings with data from a sample of 843 Dutch adolescents. First, we analysed whether perceived sanction risk (perceived apprehension risk and perceived consequences if one is caught offending) has a relationship with offending, independent of one's morality and self-control. Second, we examined possible interactions between perceived sanction risk and self-control, and between perceived sanction risk and morality. We also explored associations between specific offences (burglary, vandalism and assault), offence-specific measures of low morality (how right or wrong are burglary, vandalism and assault) and specific measures of perceived sanction risks. The findings demonstrate that perceived sanction risk is related to lower offending and that self-control is related to less offending, whereas low levels of morality are related to higher levels of offending. When offence-specific measures are used, the relation between perceived sanctions and offending seems to be dependent on one's level of morality. Our results suggest that the less a person morally supports specific types of offending, the more strongly that person is affected by perceived sanctions. The implications of these findings for future studies of deterrence are discussed.

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Introduction

Deterrence is a classic issue in criminology. Deterrence theory is a theory of crime and criminal behaviour that presumes that humans are rational enough to consider the consequences of their actions and to be influenced by expected consequences (Paternoster, 2010). The role of sanction threats in deterring people from offending derives from the utilitarian philosophy of the classical school of criminology and underlies deterrence theory. Rational choice theorists have built on this approach and argue that the decision to commit an offence is negatively related to the perceived costs of crime and positively related to the perceived rewards of crime.

Research on the general deterrent effects of punishment largely fall within two broad categories: (1) macro-level research using official crime statistics to assess the links between objective levels of punishment, such as the arrest rate or the length of prison sentences, and crime rates; and (2) individual-level research using survey methods to assess the links between perceptions of formal and informal sanctions (especially the certainty and severity of sanctions[1]) and self-reported criminal behaviour. The first broad category (the macro-level studies) assumes that increases in actual punishment levels cause increases in perceptions of the likelihood of punishment, which in turn cause reduced rates of criminal behaviour (Paternoster, 1987). The second broad category (the micro-level studies) typically uses individual-level survey research to assess directly the effect of perceptions of punishment on self-reported criminal behaviour.

Despite the number of studies conducted at the macro and micro levels, it is difficult to draw definitive conclusions about deterrence and its contribution to crime reduction (Nagin, 1998; Tonry, 2008). The empirical status of deterrence theory is still problematic and studies suffer from both theoretical and methodological shortcomings (Nagin, 1998; Paternoster, 2010; Pogarsky, 2007; Pratt et al, 2006; Tonry, 2008). Theoretical problems are related to the conceptualization of deterrence, while methodological problems are situated at the level of the measurement of dimensions of perceived sanction risks, and sampling and data collection issues (Pogarsky, 2007; Williams and Hawkins, 1986). Nevertheless, a number of conclusions can be drawn from previous deterrence studies. Measures of perceived apprehension risk and perceived severity of consequences if caught are usually negatively related to self-reported offending. Studies differ in the magnitude of the statistical associations that are reported, especially in multivariate analyses, but not in their direction (Paternoster, 2010).

Goals of the present study

This article builds on findings from previous studies at the individual level and investigates whether these findings can be replicated and further elaborated with Dutch data on self-reported offending behaviour and perceived sanction risk. In particular, we are

interested in the relationship between perceived sanction risk and offending, independently of two important variables derived from other theoretical frameworks, namely self-control and low morality (indicating individual propensity towards offending). Further, we investigate whether there are interaction effects between these variables and perceived sanction risk. Several scholars have argued that the magnitude of the effect of perceived sanctions is dependent on personality characteristics such as self-control (Wright et al., 2004), deviant beliefs or criminal motivation (Tittle and Botchkovar, 2005), or both (Wikström, 2007). However, the empirical findings on these interaction effects are mixed (see Paternoster, 2010). Lastly, we add to the literature by investigating the relation between perceived sanction risk and offending not only for an overall offending scale but also for three specific offences: burglary, vandalism and assault. This may offer more insight into the question of whether perceived sanction risks can be considered as a general mechanism that operates the same over different types of offending or not. Wikström (2007) argues that the importance of perceived sanction risks may depend on the types of offence in which adolescents are involved. It is also possible that rational arguments and risk calculations are more important for property offences than for violent offending. The present study allows for an offence-specific analysis. This extends earlier studies that have analysed offence-specific deterrence (e.g. Matsueda et al., 2006).

To summarize, the following research questions are addressed in the present study: (1) To what extent is perceived sanction risk negatively related to self-reported offending, independently of self-control and low morality? (2) Is the relationship between perceived sanction risk and offending conditional on one's level of self-control or conditional on one's criminal motivation (low levels of morality)? (3) Are the results invariant by type of self-reported offending and by specific measures of perceived sanction risks and moral attitudes favourable towards the commitment of particular offences?

Theoretical background

Deterrence theory is rooted in the analysis of human behaviour developed by early classical theorists, especially Jeremy Bentham. He argued that the severity, certainty and speed of punishment are three key aspects in understanding the process of deterrence (Pratt et al., 2006; Stafford and Warr, 1993, 2006). Deterrence theory postulates that individuals choose to obey or violate the law by making rational calculations about the potential costs and benefits of offending. The theory argues that, once legal sanctions are applied, individual offending will decrease or stop among those directly sanctioned ('specific deterrence') and among those who become aware of the sanctions imposed on others ('general deterrence'). Individuals will be deterred from committing crimes because they dislike the intrinsic or extrinsic consequences associated with the sanctions or because they fear the potential applications of these costly sanctions on their future misconduct (Maxwell, 1997; Maxwell and Gray, 2000).

Deterrence theory developed from being an aggregate-level theory of deterrent measures and crime levels to a social-psychological theory explaining how individuals

are deterred by their perceptions of (legal) sanction risks. These individual-level theories of perceived sanction risk (for example, the rational choice model of Paternoster and Simpson, 1996) are typically considered under the heading 'subjective utility theory'. They are by and large based on two assumptions: (1) the decisions to offend are made based on a balancing of the costs and the benefits of offending and (2) individuals are at least minimally rational. Before choosing to commit a crime, a potential offender evaluates the severity and the certainty of punishment, the value of the criminal enterprise and his or her immediate need for criminal gain (Siegel, 1992). People are expected to engage in offending when the expected benefits of offending outweigh the expected costs, including those that result from legal sanctioning (Pratt et al., 2006).

(Classical) deterrence theory does not address the role of personal characteristics that may relate to offending, such as low self-control and moral attitudes. Instead, it postulates that perceived deterrence has an independent negative effect on offending, regardless of individual propensities. Other criminological theories pay more attention to personal characteristics and attitudes such as norms or beliefs. For example, social control and learning theories stress the importance of deviant or conventional moral beliefs and definitions (Sutherland, 1947; Hirschi, 1969; Akers, 1973). Self-control theory (Gottfredson and Hirschi, 1990) postulates that low self-control accounts for stable differences between offenders and those complying with the law among situations and ages. The latter theory is of particular interest to the study of deterrence: self-control theory argues that persons engage in offending because they fail to consider the long-term costs of such behaviour. This implies that persons with low self-control also have difficulties anticipating 'sanction risk'. If that is the case, then the relation between perceived sanctions and offending would be spurious and explained by the relation between self-control and offending. Perceived sanction risk should be seen as merely a consequence of low self-control. This line of reasoning was supported by a study by Piquero and Tibbetts (1996), who found that self-control partially explains individual differences in perceived costs of offending and the risk of getting caught.

More recently, other scholars (for example, Scott and Grasmick, 1981; Wikström, 2006; Wikström et al., in this issue; Wright et al., 2004) have postulated that perceived sanction risk affects only those individuals with a high individual propensity to offend. Wright et al. (2004) argued that, because under-socialized and immoral individuals are more willing to commit crime, the calculation of its costs and benefits has greater salience, whereas among those who accept legal rules an attitude of calculation is lacking. Wikström (2007) further argued that people who do not consider offending as a behavioural alternative probably do not experience deterrent effects, simply because they are already law-abiding as a consequence of their own moral values and levels of self-control.

Empirical studies on the relation between perceived sanction risk and offending

The study of perceived sanction risk has benefited from studies that redefined the perceptual measures of deterrence (Nagin and Paternoster, 1994; Paternoster, 1987; Williams and Hawkins, 1986). These studies included not only the perceived severity

of the punishment, which refers to the extent of unpleasant consequences resulting from a criminal sanction, but also the celerity of punishment and the certainty of punishment. Perceived celerity refers to the speed with which a sanction is imposed following the commission of a crime (Clark, 1988), and perceived certainty refers to the probability that a punishment will ensue following commission of a crime (Zimring and Hawkins, 1973).

Studies of perceived sanction risk usually include measures of the perceived risk of getting caught (by the police or by others) and/or the perceived trouble people would get into when they are caught after committing a crime. Matsueda et al. (2006) showed that the relationship between perceived certainty of arrest and self-reported offending held for both self-reported theft and violent crime and that it was independent of other covariates of offending. This study is important because it was a longitudinal one, whereas most studies use cross-sectional data. Cross-sectional data of self-reported offending have been called problematic because these studies ask about previous offending and current levels of perceived sanction risk (Nagin and Paternoster, 1994; Paternoster, 2010; Wikström, 2007). As an alternative to longitudinal studies, scenario studies have been developed. These studies use projections of future behaviour as the dependent variable, therefore avoiding the problem of the temporal ordering (Wikström, 2007). Not all studies found clear independent effects of perceived sanction risk in multivariate analyses. In a study among Russian respondents it appeared that sanction fear was only modestly associated with offending, independently of self-control (Tittle and Botchkovar, 2005). Further, the effects of measures of perceived sanctions are usually lower than those of self-control and criminal motivation. In short, empirical studies on the relation between perceived sanctions and delinquency show very mixed results. In his recent and highly informative overview of studies of deterrence, Paternoster (2010) concludes that measures of perceived sanction risk at best have moderate independent effects on measures of self-reported offending.

Studies analysing the interaction between self-control and perceived sanctions also are somewhat contradictory (Paternoster, 2010). Most studies show little evidence of an interactive effect of self-control and perceived sanctions and, when such an interaction is observed, it is sometimes in the direction suggested by self-control theory and sometimes not (Paternoster, 2010; Tittle and Botchkovar, 2005). Two previous studies found that perceived sanction risk particularly affects crime-prone individuals (Wikström et al., in this issue; Wright et al., 2004); Wright et al. (2004) demonstrated that deterrent effects get stronger after a certain level of crime propensity has been achieved. Wikström et al. (in this issue) also found that the perceived risk of getting caught does not affect all adolescents equally. The perceived risk of getting caught did not affect individuals with a very low propensity (a combination of morality and self-control) at all.

Hypotheses

In the present study we address four hypotheses derived from the theoretical and empirical literature described above on deterrence and perceived sanction risk.

Hypothesis 1: Other things being equal, there should be an inverse relationship between perceived sanction risk and self-reported offending.

Hypothesis 2: We expect low morality (deviant moral beliefs) to be positively related to self-reported offending, and self-control to be negatively related to offending, regardless of perceived sanction risk.

Hypothesis 3: Perceived sanction risk will have a direct positive effect on offending, but the magnitude of its effect will depend on the level of self-control and morality.

Hypothesis 4: If perceived sanction risk is a robust predictor of offending, we expect to find identical results in offence-specific models of perceived sanction risk.

Data and method

The Study of Peers, Activities and Neighbourhoods (SPAN) conducted by the Netherlands Institute for the Study of Crime and Law Enforcement (NSCR) in the Netherlands investigated the associations between offending, individual characteristics, contextual influences and activity patterns. It is particularly designed to test the situational action theory (SAT) of Wikström (2005, 2006), but its content is rich enough to be useful for testing propositions derived from other theories of crime.

We approached 40 secondary schools in the city of The Hague and its suburbs to cooperate in our study; 10 of these schools (about one-quarter) responded affirmatively. Because we were interested in age differences, the study was conducted among secondary school 1st graders (mainly age 12 and 13) and 4th graders (age 15 and 16). Parents were informed about the study and could refuse participation (passive consent).

In total, 843 adolescents (55 percent boys and 45 percent girls) in the age range 11–18 years participated fully in the study. The sample includes a relative high proportion of ethnic minority adolescents (47 percent), who are often underrepresented in criminological and other surveys. Many adolescents come from lower forms of secondary education: 18.5 percent from schools for 'practical education' (the lowest level of secondary education), 53.3 percent from schools for lower vocational education (the most common form of secondary education), 9.6 percent from medium-level schools, and 18.6 percent from highest level of secondary education. As the sample was drawn from a non-random selection in schools in The Hague, it is not a representative sample of the youth living in The Hague, but it is highly diverse in terms of ethnicity and education, with a preponderance of lower-educated youths from a highly urbanized region of the Netherlands.

The study was carried out between October 2008 and April 2009 and included a survey among secondary school students. A questionnaire was administered in groups of four adolescents, supervised by one research assistant during a school hour of about 45–50 minutes. This relatively intensive procedure ensured that adolescents were closely monitored, supported and stimulated, and that any questions or concerns they had about the questionnaire were addressed immediately. After completion, respondents received a reward (a voucher for the movies, worth €5) for their participation. Interviewer variance between the research assistants was estimated by the frequency of self-reported crimes

and appeared to be almost zero (interviewer variance .253 with an error of 37.48). The questionnaire items had relatively low non-response and missing values (with a maximum of 2 percent). The questionnaire is based on the questionnaire of the PADS+ study (Peterborough Adolescent and Young Adult Development Study) of Wikström and colleagues (Wikström and Butterworth, 2006; Wikström et al., 2010). The items from this questionnaire were translated, extended with additional measurements and, when necessary, adjusted to the Dutch situation.

Measures

All measurements are summative scales of several items; most of them can be regarded as Likert-type scales. Although the item non-response was very low (at its highest 2 percent), missing values were replaced with estimated values using statistical imputation. This was done to avoid the loss of respondents owing to the deletion of adolescents who have missing data in multivariate analyses. Reliability analyses are based on the imputed variables (but results using non-imputed scores are virtually identical).

The *total delinquency* measurement is a general scale of adolescent offending that measures a combination of serious and common offences, several kinds of violent behaviour and selling of drugs. It is a general frequency scale based on the respondents' answers to 11 delinquency items that measure how often in the preceding school year they have: 'damaged or destroyed something not belonging to you (for example, smashed windows or street lights, scratched the paint of cars, sprayed graffiti on a wall, damaged a bicycle or something else)', 'set fire to something you were not supposed to set fire to (for example in a building, a house, a bus or car)', 'stolen something from a shop that was worth less than 5 euro, for example candy, a pen or something else', 'stolen something from a shop that was worth more than 5 euro, for example clothes, DVDs or something else', 'broken into a house to steal something', 'broken into a car to steal something', 'broken in somewhere else to steal something (for example in a shop, at school, in a company)', 'robbed someone', 'stolen anything from another person (for example, money, a mobile telephone, a bicycle, a wallet or a purse, a hand-bag, jewellery, a watch)', 'beaten up a stranger on the streets', and 'carried a knife or other weapon'. We used the following response options for each item: 0 times; 1 time; 2 times; 3–5 times; 6–10 times; more than 10 times. The scale score is calculated by summating the scores for each of the 11 delinquency items. Alpha for this scale is .82.

For the offence-specific analyses, we used the following delinquency items: 'damaged or destroyed something not belonging to you', 'broken into a house to steal something', 'hit or kicked someone on the streets'. These items were chosen because, for these offence types, specific measures of deviant moral beliefs and perceived sanctions were also available.

Morality measures the adolescent's attitudes towards rule-breaking. High scores indicate low levels of morality. The construct is an additive index of the respondent's evaluation of 16 situations of potential wrong-doing. Respondents were asked to indicate how wrong it is to 'ride a bike through a red light', 'skip doing homework for school', 'skip school or work without an excuse', 'lie, disobey or talk back to teachers', 'go

skateboarding in a place where skateboarding is not allowed', 'tease a classmate because of the way he or she dresses', 'smoke cigarettes', 'get drunk with friends on a Friday evening', 'hit another young person who makes a rude comment', 'steal a pencil from a classmate', 'paint graffiti on a house wall', 'smash a street light for fun', 'smoke cannabis', 'steal a CD from a shop', 'break into or try to break into a building to steal something', 'use a weapon or force to get money or things from another young person'. Response categories were: very wrong, wrong, slightly wrong, not at all wrong. Alpha is .91.

For the offence-specific analyses, we used the items that measured how wrong it is to: 'smash a street light for fun', 'break into or try to break into a building to steal something', and 'hit another young person who makes a rude comment'.

Self-control is summary construct of someone's level of self-control. The scale is an additive index based on the scale that was developed by Grasmick et al. (1993), but shortened in PADS+ to a more concise index. We reversed the scale so that high scores indicate high levels of self-control. The items are: 'I always say what I think, even if it is not nice or smart', 'If I want something, I do it immediately', 'When I have an argument with someone, I can talk calmly about it', 'I lose my temper easily', 'When I am really angry, other people better stay away from me', 'I sometimes find it exciting to do things that may be dangerous', 'I often try to avoid things that I know will be difficult', 'I get bored easily', 'I often do things without thinking of the consequences', and 'Sometimes I will take a risk just for the fun of it'. Response categories for the items of this scale ranged from totally agree to totally disagree (in the questionnaire this was further indicated by the words YES!, yes, yes/no, no, and NO!). Alpha is .75.

Perceived risk of apprehension is a dimension of perceived sanction risk (leading to deterrence) and measures the perceived risk of being caught when committing a crime (see PADS+ questionnaire). A high score means a high level of perceived risk of getting caught. This measurement is a summation of four items that measure the respondent's perception that there is a great risk of getting caught if they 'steal a CD in a shop', 'smash a street light', 'beat up a stranger', and 'break into a car to steal something'. Answering categories are: no risk, a small risk, rather large risk, very large risk. Alpha is .73.

Perceived trouble is another dimension of perceived sanction risk and measures the respondent's perception of the risk of getting in trouble if one were caught for committing an offence. A high score means a high perception of trouble (see PADS+ questionnaire). The four items of this scale ask whether respondents think that they would seriously get into trouble if they were caught 'stealing a CD in a shop', 'smashing a street light', 'beating up a stranger', and 'breaking into a car to steal something'. Response categories were: nothing will happen; no real trouble will occur; yes, some trouble; yes a lot of trouble. Alpha for this scale is .72.

Perceived sanction risk is a scale that summates the perceived apprehension of risk scale and the perceived trouble scale. Alpha is .81.

In addition to the general deterrence scale, offence-specific deterrence scales were created. This was possible for self-reported burglary, vandalism and assault. *Perceived sanction risk for vandalism* summates the perceived risk of getting caught in the case of vandalism and the perceived trouble when getting caught for vandalism. *Perceived sanction risk for burglary* summates the perceived risk of getting caught in the case of burglary and the perceived consequences for this offence. *Perceived sanction risk for*

assault sums the perceived risk of getting caught in the case of assaulting a stranger and the perceived trouble in the case of getting caught for it.

Analytical strategy

To test our hypotheses, we used Tobit regression and a square root transformation of the dependent variable instead of the common OLS regression analysis with untransformed variables. The highly skewed distribution of our dependent variable – total frequency of self-reported delinquency – violates key assumptions of OLS regression (Osgood et al., 2002a; Osgood et al., 2002b). OLS assumes that residual variance will be constant across all levels of explanatory variables and fitted values. It is almost certain, however, that fitted values will be less accurate for higher levels of offending, where cases are widely dispersed, than for fitted values near the lower limit of zero offences (Huizinga and Elliott, 1986; Osgood et al., 2002a; Osgood et al., 2002b). The resulting heterogeneity of residual variance can produce inaccurate estimates of standard errors and misleading significance tests (McClendon, 1994). To address the non-normality of the self-reported offending we applied the square root transformation, which results in a distribution that is much closer to normality with regard to the values above zero. Tobit regression was chosen as multivariate technique to account for the high number of zeroes in self-reported offending. Osgood et al. (2002a) and Osgood et al. (2002b) introduced Tobit regression (see also Long, 1997) as an alternative method for the analysis of self-reported offending measures. Osgood et al. (2002a: 327) advocated Tobit regression because it addresses the limiting floor value of self-reported offending, which cannot be altered by transforming the measure: Tobit regression is intended for measures with censored data.

In addition to these considerations, the degree to which a model fits empirical data was another criterion for the choice of Tobit regression. The Akaike Information Criterion (AIC) is a goodness-of-fit measure that can be used to select the most appropriate model – the model with the lowest AIC value – of a series of alternative models. We compared five different models: (1) OLS with an untransformed total offending scale, (2) OLS with a square root transformed total offending scale, (3) negative binomial (with an untransformed total offending scale, (4) Tobit with an untransformed total offending scale, and (5) Tobit with a square root transformed total offending scale. According to the AIC, the last model – Tobit with square root transformed total offending scale – was the preferred model with the lowest AIC value.

Multicollinearity diagnostic checks were routinely performed on each model in the Tobit regression analyses by calculating variance inflation factors (VIFs) (Belsley, 1991). In no model did any of the VIFs reach a value above 2, and the highest condition number was 2.82. These values are well below common ‘rules of thumb’, and we conclude that the models are not characterized by degrading multicollinearity. Tobit regression models were run for the general analyses that have the square root transformed offending scale as the dependent variable, and also for the offence-specific analyses. To compare the effects of the independent variables, we standardized all independent variables before entering them into the equation. This procedure facilitates comparison of the magnitude of the regression coefficients of self-control, low morality and perceived sanction risk on self-reported offending.[2]

Table 1. Tobit regression analysis of the main and interaction effects of self-control, low morality and perceived sanction risk on offending ($N = 843$)

Dependent variable: Square root transformed total delinquency scale	Regression coefficient (SE)
Self-control	–0.77 (0.06)***
Low morality	0.76 (0.07)***
Perceived sanction risk	–0.31 (0.07)***
Self-control * Perceived sanction risk	–0.01 (0.05) ns
Low morality * Perceived sanction risk	0.00 (0.05) ns
Constant	1.56***
Model fit	Pseudo R^2: .128
234 left-censored observations	LR χ^2: 408.88 ($p = .000$)
609 uncensored observations	

*** $p < .001$; ns = not statistically significant.

Results

Table 1 presents the results from a Tobit regression analysis of the main effects of self-control, low morality and perceived sanctions on self-reported offending, as well as the effects of interaction terms between perceived sanctions and self-control and between perceived sanctions and low morality.

Table 1 shows that self-control has a strong negative effect on offending, low morality has a strong positive effect on offending and perceived sanction risk has a less pronounced negative effect on offending. These main effects are statistically significant. Contrary to our expectations, the effects of both interaction terms do not significantly differ from zero. This means that the effect of perceived sanction risk does not depend on one's level of self-control and low morality. The information about model fit (in the bottom panel of the table) shows that the data fit the model well.[3] In Table 2, the results for the three offence-specific multivariate analyses that were conducted (for burglary, vandalism and assault) are presented.

Model 1 in Table 2 describes the findings with regard to self-reported burglary. Self-control has a strong negative effect, offence-specific low morality has a strong positive effect, and perceived sanction risk with regard to burglary has a strong negative effect on self-reported burglary. The magnitude of the effect of perceived sanction risk is very similar in this model to the effect of low morality. The interaction terms were not statistically significant.

Model 2 in Table 2 describes the findings of the offence-specific regression analysis of self-reported vandalism. Self-control has a strong negative coefficient, offence-specific low morality has a strong positive coefficient and perceived sanction risk with regard to vandalism has a relatively modest negative coefficient on self-reported burglary. The interaction term between self-control and perceived sanction risk is again not significant but the interaction term between offence-specific low morality and perceived sanction risk is significant. The direction is positive, which is contrary to the interaction effect that was reported in the studies by Scott and Grasmick (1981), Wright

Table 2. Offence-specific Tobit regression analyses

Offence-specific independent variables	Model 1	Model 2	Model 3
	Square root transformed self-reported burglary Regression coefficient (SE)	Square root transformed self-reported vandalism Regression coefficient (SE)	Square root transformed self-reported assault Regression coefficient (SE)
Self-control	−1.15 (0.37)**	−0.51 (0.06)***	−0.46 (0.07)***
Offence-specific low morality	0.89 (0.22)***	0.53 (0.06)***	0.34 (0.07)***
Offence-specific perceived sanction risk	−0.82 (0.29)**	−0.29 (0.06)***	−0.51 (0.07)***
Self-control * Perceived sanction risk	−0.12 (0.16)ns	−0.01 (0.05)ns	−0.05 (0.06)ns
Offence-specific low morality * Perceived sanction risk	0.13 (0.08)ns	0.14 (0.05)**	0.14 (0.06) *
Constant	−5.77 (1.17)***	−0.50 (0.08)***	−0.58 (0.09)***
Model fit	Pseudo R^2: .35 LR χ^2: 94.00 (p = .000)	Pseudo R^2: .14 LR χ^2: 242.14 (p = .000)	Pseudo R^2: .10 LR χ^2: 180.61 (p = .000)
Number of left-censored observations	818	562	562
Number of uncensored observations	23	281	281

*** $p < .001$; ** $p < .01$; * $p < .05$; ns = not statistically significant.

et al. (2004) and Wikström et al. (in this issue). The positive direction of the interaction effect implies that perceived sanctions have a more pronounced negative effect for those respondents that morally disapprove of vandalism.

Model 3 in Table 2 shows that the regression coefficient of tolerance towards assault on self-reported assault is strong and positive, that the coefficient of self-control is strong and negative and that the coefficient of perceived sanction risk with regard to assault is also strong and negative. The interaction term of self-control and perceived sanction risk is again not significant. The interaction term between offence-specific low morality and perceived sanction risk with regard to assault is significant and positive, again contrary to the interaction effect reported in the aforementioned studies. This means that those with relatively high levels of morality (those who disapprove of assault) are more deterred by the thought of being sanctioned.

Conclusions

Empirical studies have shown that measures of perceived sanction risk are negatively related to offending, but that the magnitude of the regression coefficient differs somewhat

in multivariate analyses, especially when measures of criminal propensity are taken into account. Scholars have also discussed the existence of interaction effects between measures of perceived sanction risk and criminal propensity. The present study therefore examined the following research questions: (1) To what extent is perceived sanction risk negatively related to self-reported offending, independently of self-control and low morality? (2) Is the relationship between perceived sanction risk and offending conditional on one's level of self-control or conditional on one's criminal motivation (low morality)? (3) Are the results invariant by type of self-reported offending and by specific measures of perceived sanction risks and offence-specific measures of low morality?

The current inquiry enabled us to assess the magnitude of the regression coefficient for the relation between perceived sanction risk and offending, controlling for self-control and low morality. Additionally, the interaction terms between perceived sanction risk and self-control and between perceived sanction risk and low morality were studied. We also were able to conduct offence-specific analyses on burglary, vandalism and assault. For these three types of offending, offence-specific measures of self-reported offending, perceived sanction risk and low morality were available in the questionnaire.

Our empirical analyses on the general level of delinquency revealed that perceived sanctions are negatively related to self-reported offending frequency, regardless of the level of morality or self-control. This is the answer to the first research question. However, the independent associations of delinquency tolerance and self-control with offending were larger. This is consistent with most of the previous studies that incorporated variables additional to perceived sanctions (Paternoster, 2010). In the overall analysis, we did not find support for the idea that the strength of the association between perceived deterrence and general offending is dependent on self-control and low morality. Thus, for overall offending, we did not reproduce the interaction effect between perceived deterrence and propensity to offend that has been reported in both earlier and more recent studies (Scott and Grasmick, 1981; Wikström et al., in this issue; Wright et al., 2004). This is the answer to the second research question.

The offence-specific analyses confirmed the principal finding that perceived sanctions have an independent and negative effect on offending, regardless of one's level of morality and self-control. The magnitude of the main effect of perceived sanctions differs by offence type, but was significant in all three models. Unlike in the overall analysis, we did find an interaction effect between low morality and perceived sanctions in the case of vandalism and assault. However, the direction of the interaction effect was positive, in contrast to the negative interaction effects reported earlier. This should be interpreted as follows: adolescents who morally disapprove of assault and vandalism appear to be more strongly affected by the perceived severity of sanctions. This is the answer to the third research question. One reason may be, as suggested by Nagin and Paternoster (1994), that respondents who morally disapprove of assault and vandalism are able to see the long-term costs of crime. Although this argument sounds reasonable, it is contradicted by the finding that self-control does not interact at all with perceived sanctions – either in the general analysis or in the offence-specific analyses. One could argue that low morality is a more direct measure of the 'estimation of the moral consequences of committing crime' (an important element in the utilitarian calculus when committing acts of crime) and therefore produces the positive interaction effect. In other

words, it may be possible that adolescents who have high levels of morality are more deterred because they would feel guilt or shame if they were caught.

This study has two important limitations that need to be mentioned. First, although we argue that offence-specific measures may measure low morality and perceived sanctions more precisely, there is also a downside. In the offence-specific analyses we use fewer indicators per offence, which may have affected the stability of the results. Second, the current study is, like many studies in this area, cross-sectional in nature: perceived sanctions are measured at one point in time, whereas offending is measured using questions that refer to past behaviour. We do not rule out the possibility that the relation between offending and perceived sanction risk is reciprocal: the evaluation of perceived sanction risk may be adapted after someone has committed an offence without being caught. Third, the present study assessed the effect of the perceived costs of offending but did not look at the perceived benefits of criminal achievements (Morselli and Tremblay, 2006). Future studies can take these criticisms into account.

Despite these limitations, the current study has shown that the association between perceived sanctions and offending is still a fruitful area of research. Our results suggest that criminological theories of offending should include variations in perceptions of (legal) sanction risks as well as stable individual differences in propensity. Just as Nagin and Paternoster (1993) argue, we do not believe that the two research traditions (deterrence research and aetiological studies) should be viewed as being in competition. Further, the use of offence-specific measures in the study of perceived sanctions proved to be interesting because it offers insight into the stability of the general findings.

Our findings suggest that it may be worthwhile in future studies to distinguish even further between offences if we want to increase our knowledge about the association between perceived sanction risk and offending. Such future studies should preferably be panel studies. Panel studies allow for a more thorough evaluation of different kinds of question on causal ordering, such as whether perceptions of the probability of getting caught may change as a consequence of experiences with offending or contacts with the justice system.

Notes

1. A third aspect, the celerity of sanctions, seems to be forgotten in most empirical studies; see Paternoster (2010).
2. The square root transformation of the dependent variable may affect the strength of the interaction effects that are found in empirical studies. Therefore we additionally ran Tobit analyses on the untransformed dependent variable and OLS regression models. The results were very similar.
3. The pseudo-R^2 is 12.8 percent. It should be noted that this statistic is not directly comparable with the R statistic that is reported in OLS regressions. Tobit regression analysis employs a threshold of 0, and predictions below that figure are treated differently from predictions with a positive value, which has implications for calculating values for explained variance.

References

Akers RL (1973) *Deviant behavior: a social learning approach*. Belmont CA: Wadsworth.

Belsley DA (1991) *Conditioning diagnostics – Collinearity and weak data in regression*. New York: Wiley.

Clark R (1988) Celerity and specific deterrence: a look at the evidence. *Canadian Journal of Criminology* 30: 109–120.
Gottfredson M and Hirschi T (1990) *A general theory of crime*. Stanford, CA: Stanford University Press.
Grasmick HG, Tittle CR, Bursik RJJ and Arneklev BJ (1993) Testing the core empirical implications of Gottfredson and Hirschi's General Theory of Crime. *Journal of Research in Crime and Delinquency* 30: 5–29.
Hirschi T (1969) *Causes of Delinquency*. Berkeley: University of California Press.
Huizinga D and Elliott D (1986) Reassessing the reliability and validity of self-report delinquency measures. *Journal of Quantitative Criminology* 2: 293–327.
Long J (1997) *Regression models for categorical and limited dependent variables*. Thousand Oaks, CA: Sage.
McClendon M (1994) *Multiple regression and causal analysis*. Itasca, IL: F.E. Peacock Publishers.
Matsueda R, Kreager DA and Huizinga D (2006) Deterring delinquents: a rational choice model of theft and violence. *American Sociological Review* 71: 95–122.
Maxwell C (1997) The specific deterrent effect of arrest on aggression between intimates and spouses. Dissertation, Rutgers University, Newark, NJ.
Maxwell SO and Gray MK (2000) Deterrence: Testing the effects of perceived sanction certainty on probation violations. *Sociological Inquiry* 70(2): 117–136.
Morselli C and Tremblay P (2006) Criminal achievement, offender networks and the benefits of low self-control. *Criminology* 42(3): 773–804.
Nagin DS (1998) Criminal deterrence research at the outset of the twenty-first century. In: Tonry M (ed.) *Crime and justice: a review of research*. Chicago: University of Chicago Press.
Nagin D and Paternoster R (1993) Enduring individual differences and rational choice theories of crime. *Law & Society Review* 27(3): 467–496.
Nagin D and Paternoster R (1994) Personal capital and social control: the deterrence implications of a theory of individual differences in criminal offending. *Criminology* 32(4): 581–606.
Osgood DW, Finken L and McMorris BJ (2002a) Analyzing multiple-item measures of crime and deviance II: Tobit regression analysis of transformed scores. *Journal of Quantitative Criminology* 18(4): 319–347.
Osgood DW, McMorris B and Potenza M (2002b) Analyzing multiple-item measures of crime and deviance I: Item response theory scaling. *Journal of Quantitative Criminology* 18: 267–296.
Paternoster R (1987) The deterrent effect of the perceived certainty and severity of punishment: a review of the evidence and issues. *Justice Quarterly* 4(2): 173–217.
Paternoster R (2010) How much do we really know about criminal deterrence? *Journal of Criminal Law and Criminology* 100: 765–824.
Paternoster R and Simpson S (1996) Sanction threats and appeals to morality: Testing a rational choice model of corporate crime. *Law & Society Review* 30(3): 549–583.
Piquero A and Tibbetts S (1996) Specifying the direct and indirect effects of low self-control and situational factors in offenders' decision making: Toward a more complete model of rational offending. *Justice Quarterly* 13: 481–510.
Pogarsky G (2007) Deterrence and individual differences among convicted offenders. *Journal of Quantitative Criminology* 23: 59–74.
Pratt T et al. (2006) The empirical status of deterrence theory: a meta-analysis. In: Cullen FC et al. (eds) *Taking stock: the status of criminological theory*. New Brunswick, NJ: Transaction.
Scott W and Grasmick HG (1981) Deterrence and income tax cheating: Testing interaction hypotheses in utilitarian theories. *Journal of Applied Behavioural Science* 17: 395–408.
Siegel L (1992) *Criminology*, 4th edn. St. Paul, MN: West Publishing.

Stafford MC and Warr M (1993) Reconceptualization of general and specific deterrence. *Journal of Research in Crime and Delinquency* 30: 123–135.

Stafford MC and Warr M (2006) Reconceptualising deterrence theory. In: Cullen FT and Agnew R (eds) *Criminological theory: Past to present*. California: Roxbury Publishing.

Sutherland E (1947) *Principles of criminology*. New York: Harper & Row.

Tittle CR and Botchkovar EV (2005) Self-control, criminal motivation and deterrence: an investigation using Russian respondents. *Criminology* 45(2): 307–353.

Tonry M (2008) Learning from the limitations of deterrence research. *Crime and Justice* 37: 79–311.

Wikström P-OH (2005) The social origins of pathways in crime. Towards a developmental ecological action theory of crime involvement and its changes. In: Farrington D (ed.) *Integrated developmental and life-course theories of offending. Advances in Criminological Theory*, *Volume 14*. New Brunswick, NJ: Transaction, 211–246.

Wikström P-OH (2006) Individuals, settings and acts of crime. Situational mechanisms and the explanation of crime. In: Wikström P-O and Sampson R (eds) *The explanation of crime: Context, mechanisms and development*. Cambridge: Cambridge University Press, 61–107.

Wikström P-OH (2007) Deterrence and deterrence experiences: Preventing crime through the threat of punishment. In: Shoham S, Beck O and Kett M (eds) *International handbook of penology and criminal justice*. London: CRC Press, Taylor & Francis Group, 345–378.

Wikström P-OH and Butterworth D (2006) *Adolescent crime: Individual differences and lifestyles*. Cullompton: Willan Publishing.

Wikström P-OH, Ceccato V, Hardie B and Treiber K (2010) Activity fields and the dynamics of crime: Advancing knowledge about the role of the environment in crime causation. *Journal of Quantitative Criminology* 26(1): 55–87.

Williams K and Hawkins R (1986) Perceptual research on general deterrence: a critical review. *Law and Society Review* 20: 544–572.

Wright BRE, Caspi A, Moffit TE and Paternoster R (2004) Does the perceived risk of punishment deter criminally prone individuals? Rational choice, self-control, and crime. *Journal of Research in Crime and Delinquency* 41:180–213.

Zimring FE and Hawkins GJ (1973) *Deterrence: the legal threat in crime control*. Chicago: University of Chicago Press.