Contesting Effects on School Performance and Delinquency

A Comparative Analysis of the Informal Social Control Theory and the Self-Control Theory

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Abstract. This research re-examines the correlation of school performance and delinquency and its mechanism, using the self-control theory and the theory of informal social control. The authors of these two theories are entangled in an ongoing debate about which theory is better capable to explain delinquency. This research sheds a new light on this debate. It is expected that lower school performances leads to higher degrees of delinquency. For the contesting theories it is expected that according to the self-control theory, the relation of school performance and delinquency is spurious and that they both can be explained by low self-control. According to the theory of informal social control this relation is mediated by informal social control by schools, in which higher degrees of control lead to lower degrees of delinquency. Results show that the relation between school performance and delinquency can once again be confirmed, in the expected direction. However, self-control did not provide for a spurious relation and informal social control was only applicable to those with school performances above average. Nevertheless, these theories are still seen as very promising in explaining the mechanisms of delinquency.

Keywords. Delinquency • School performance • Self-control • Informal social control.

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Introduction

There has long been a consensus under academics that there is a correlation between schools and delinquency. The mechanisms underlying this correlation and the direction of the effect, however, are still up for debate (Gottfredson, 2001). School as a cause for delinquency may be considered a broad construct. There are different aspects to this construct, which, as evidence shows, can all account for the emergence of delinquent behaviour. One such aspect is educational attainment, for example school drop-out, truancy, or grade retention (Gottfredson, 2001). Furthermore, the neighbourhood in which the school is located and the composition or organisation of the school are also examples of these aspects (e.g. Gottfredson & Gottfredson, 1985). A last aspect of how the school environment can contribute to delinquency is (low) parental expectations and involvement (Jenkins, 1995).

This research examines one of the many aspects of the construct of school: school performance. Similar to the correlation of schools and delinquency, the correlation of school performance and delinquency is found to be very strong (Maguin & Loeber, 1996). As with the first, the latter correlation also has divergent opinions concerning the underlying mechanism explaining this effect. Psychological theories, biological theories, and a lot of integrated social theories, they all tend to explain the effect that school performance has on delinquency (Maguin & Loeber, 1996). As for this research, two theories which advocate different and opposing mechanisms are examined: the *self-control theory* by Gottfredson and Hirschi (1990), and the *theory of informal social control* by Sampson and Laub (1990). Broadly stated, the first theory proposes that an underlying trait or characteristic, namely (low) self-control, is key in explaining both outcomes: both school performance and delinquency are affected by self-control. This would mean that the relation between school performance and delinquency is spurious: everything is explained by low self-control. The latter proposes a mediation effect, in which (weak) social bonds to school account for the relationship between school performance and delinquency.

This research builds on the research Felson and Staff (2006) conducted. They too have examined what the underlying mechanism is for the correlation between school performances and delinquency. They tried to explain the mechanism with the use of two opposing theories; the self-control theory (Gottfredson & Hirschi, 1990) and the strain theory (Merton, 1957). The strain theory would explain a mediation effect, where negative evaluation which adolescents receive in the form of grades have an effect on their engagement in delinquency (Felson & Staff, 2006). Thus when someone's school performance is poor, negative evaluation in reaction

to these poor school performances will be received, which in turn will lead to the involvement in delinquent acts. However, Felson and Staff (2006) found evidence that the relationship between school performance and delinquency is spurious, confirming the self-control theory.

Felson and Staff (2006) name several limitations to their research. Take, for instance, the measurement of self-control. Felson and Staff measure this by 'effort' (in school), which might also be considered as a measure for social bonds rather than self-control. Furthermore, there is an ongoing debate on which theory is more fitting to explain delinquency: the self-control theory of Gottfredson and Hirschi (1990), or the theory of informal social control of Sampson and Laub (1990). Felson and Staff do not take the latter into account, but it is included in this research. For these reasons, it is of importance to take another look at the correlation of school performance and delinquency. One other reason for doing this research is the importance for both policymakers and schoolboards. It is important to know what the true underlying mechanism is in order to be able to possibly reduce delinquency among adolescents, as childhood delinquency is related to adulthood crimes (Sampson & Laub, 1990). This can be done, for example, with the implementation of school-based prevention programs.

This research seeks to expand on the Felson and Staff research by using one of the theories they used, the self-control theory, and one other theory, namely Sampson and Laub's theory of informal social control. Some of the limitations to the research of Felson and Staff were tried to be improved, for instance in the measuring of self-control, and new insights are given by introducing the theory of informal social control into the picture. This leads to the following research question: '*What is the effect of school performance on delinquency?*' This main question has got one sub question: '*What is the mechanism explaining this effect?*' This sub question consists of two more sub questions, integrating the two theories named above: '*To what extent does self-control explain the effect between school performance and delinquency?*' and '*To what extent does informal social control by schools explain the effect between school performance and delinquency?*'

In order to answer these question the International Self-Report Delinquency Survey-2 is used for analysis, which surveyed 12 to 15 year olds in 31 countries, including the Netherlands. The Netherlands is the country of examination. First, the two opposing theories are clarified and looked at critically in the theoretical framework. Hereafter, the data and methods for analysis are discussed, followed by the analysis and the results. Finally, this research is closed off with a conclusion and discussion, suggesting policy implications and matter for further research.

Theoretical framework

As mentioned in the introduction, this research builds on the research by Felson and Staff (2006) in order to explain the relation between school performance and delinquency. They used the *self-control theory* by Gottfredson and Hirschi (1990) as an explanation for this relation, stating that the relation between school performance and delinquency is a spurious one. This theory is retested within this research. Moreover, an opposing theory is introduced: the *theory of informal social control* by Sampson and Laub (1990). This theory puts the relation in a new perspective. In this chapter, a theoretical framework of both theories are discussed and applied to the subject of this research. First, an overview of previous research is given.

Previous research

School performance in relation to delinquency has been researched a notable amount of times before. Silberberg and Silberberg (1971) were one of the first to study the relation of school performance and delinquency. After that, many other studies followed (e.g. Katsiyannis et al., 2008; Brier, 1995; Algozzine et al., 2010). Maguin and Loeber (1996) have examined a considerable amount of these studies in their meta-analysis, including both cross-sectional and longitudinal studies. Their conclusion was that lower school performances trigger delinquent behaviour. With reference to multiple researches about the relation between school performance and delinquency, including that of Maguin and Loeber (1996), a hypothesis for the main research question – '*what is the effect of school performance on delinquency?*' – is drafted (H1): *There is a correlation between school performance and delinquency, in which lower school performances are correlated with higher degrees of delinquent behaviour.* There is no reason to believe that there are differences in this relation between various indicators of delinquency. Therefore, another hypothesis is drafted (H2): *There are no differences between indicators of delinquency in the effect between school performance and delinquency.*

A considerable amount of researches have been conducted to test the theories which are used as an explanation in this research. Both theories are well-supported within the literature. Pratt and Cullen (2000) conducted a meta-analysis of 21 empirical studies to test the self-control theory. They found a very strong correlation between self-control and criminal behaviour, with an effect size of over .20, which is considerably higher than other studies which examined other predictors of criminal behaviour. Many other studies have also found empirical support for the self-control theory (e.g. Unnever et al., 2003; Perrone et al., 2004).

The theory of informal social control has been comprehensively tested by Sampson and Laub themselves (e.g. 1990; 1995). They concluded that the results were "strong, consistent and robust over a wide variety of measures and analytical techniques" (Sampson & Laub, 1990: p. 625). Also, there is a lot of empirical support from other scholars for the different propositions Sampson and Laub make (Cullen et al., 2008). Thus, both theories receive a proper amount of support. Before testing which theory holds within this study, they first are elaborated on, starting with the overarching framework for both theories: the control theories.

Control theories

Both the self-control theory as the theory of informal social control descend from the overarching framework of control theories. Therefore, a short explanation of the classic control theory is given. The main idea of control theories, originally called the social bond theory, is that weak or broken bonds to society result in delinquent behaviour (Hirschi, 1969). The question for Hirschi (1969) was not why people commit delinquent acts, but rather why other people do not commit delinquent acts. Socialisation processes are key within determining whether someone will turn to delinquency or not. An effective socialisation will create a bond with someone's surroundings, based on loyalty, which prevents breakage of the law (Lanier & Stuart, 2010). Hirschi (1969) describes 4 elements which explain the extent to which the bond can be weak or strong to society: *attachment, commitment, involvement* and *belief.* First, attachment encompasses to what extent someone cares about what other people's opinions are. When someone does concern about what others think, then this concern could prevent them from committing a crime to avoid disappointment from a respected individual or group. Second, commitment essentially means that someone does not break the law due to fear for the consequences or punishment. Third, involvement concerns the time spent on ordinal, everyday activities. The more time spent to these type of activities, the less time there is left for committing delinquent acts. Fourth and last, belief is the extent to which someone regards the common value system within a culture.

Self-control theory

Now that the workings of control theories are clear, the *self-control theory* by Gottfredson and Hirschi (1990) is discussed, concluding with a hypothesis explaining the mechanism of school performance and delinquency, according to the self-control theory.

Gottfredson and Hirschi (1990) found the classic control theory not to be sufficient to explain all of the differences between offenders and non-offenders. Stable individual

differences in the tendency to commit criminal or delinquent acts were seemingly conspicuous, but other differences between offenders and non-offenders are not as pronounced as the classic control theory would expect. "These differences remain reasonably stable with change in the social location of individuals and change in their knowledge of the operation of sanction systems" (Gottfredson & Hirschi, 1990: p. 87). In their book 'A general theory of crime', Michael Gottfredson and Travis Hirschi (1990) introduce a new theory for the explanation of all crimes: the self-control theory. This theory includes an explanation for the stable differences in the occurrence of change in social location and knowledge of sanction systems, which the classic control theory fails to clarify.

The self-control theory states that someone's level of self-control is determinative for their actions. Self-control is the inclination to avoid long-term costs when these are bigger than the short-term rewards. Someone with good self-control is able to suppress urges and longings. On the other hand, a lack of self-control can cause impulsive behaviour and can be seen as an indicator of delinquency. Because individuals with low self-control are not able to avoid criminal acts, whatever the circumstances, differences remain fairly stable when the social location of these individuals' changes and when their knowledge of the operation of sanction systems changes (Gottfredson & Hirschi, 1990).

Traits of people who lack self-control are impulsiveness, insensitiveness, physically oriented instead of mentally, they are risk-taking, short-sighted and non-verbal (Gottfredson & Hirschi, 1990). Low self-control is not congenital, yet individual differences and these traits could have an impact on the potential for an effective socialisation process (effective socialisation is always possible).

According to the self-control theory, self-control can be learned. Socialisation occurs throughout life, yet it is generally learned in the early stages of life. Once self-control is learned, it is very hard to change (Akers, 1991). This explains the stability of deviant or criminal behaviour. As in the classic control theory, socialisation processes are key within determining one's self-control. An ineffective or incomplete socialisation leads to a low self-control. An absence of nurturance, discipline or training may results in a low self-control. Parents and child-rearing is one of the most important factors in the development of a child's self-control. In order to make sure a child will get a good sense of self-control, attached parents should watch carefully over their children and be able to recognise and intervene when the child shows signs of a lack of self-control. Children who commit delinquent acts should be punished, which will socialise them into self-control (Gottfredson & Hirschi, 1990).

School as an institution can, next to child-rearing by parents or caretakers, play an important role in determining someone's self-control. When the socialisation of children was not done effectively due to poor parental observation and correction, self-control can still be learned through the operation of other sanctioning systems or institutions, like school. There are several gains for schools in the role of the socialising agent in comparison with the parents. Behaviour of students is closely monitored by teachers, so deviant behaviour and behaviour which is not in line with the development of high self-control can accurately be recognised. Furthermore, schools have – perhaps in higher degrees than parents – the interest in maintaining order and discipline. Also, just like parents do, schools have the authority to punish a student when he or she shows signs of a low self-control (Gottfredson & Hirschi, 1990). Still, parental influence is considered to be more effective in the socialisation of their children and therefore there is controlled for parental attachment in the analysis. Yet, the net effect of school is still assumed to be positive (Gottfredson & Hirschi, 1990).

Gottfredson and Hirschi (1990) also point out that the level of self-control predicts a person's school performance. Traits constituting a low self-control obstruct educational achievement. Those with a low self-control will be more likely to have poor school performance, and will be more likely to show delinquent behaviour. On the contrary, those who have a good self-control will be more likely to do well in school, and are less likely to show delinquent behaviour. This means that low self-control induces both poor school performances and delinquent behaviour, and thus, the apparent relation between school performance and delinquency (see previous research) is non-existent. Therefore, the following hypothesis is drafted (H3): *The correlation between school performance and delinquency is a spurious relation, where low self-control explains both poor school performance and delinquency.* A visualisation of this hypothesis is shown in figure 1.

Figure 1. *The expected relation of school performance and delinquency according to the self-control theory.*
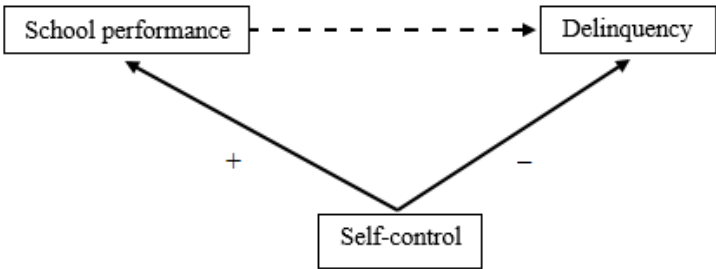
Informal social control theory

As the opposing theory within this research, the theory of *informal social control* by Sampson and Laub (1990) is discussed in order to explain the correlation between school performance and delinquency. In this theory, social bonds are most important in understanding delinquency. When someone's social bond to society is weak or broken one may turn to delinquency and crime (Sampson & Laub, 1990). This is in line with the classic control theory. However, Sampson and Laub (1990) go further in their reasoning using the *life course perspective* as an age-graded explanation for the relation between childhood and adulthood deviant or criminal behaviour, and how social bonds can change over the life course. It can explain the onset of criminal behaviour, why criminal behaviour can be stable over time, or why it could change over time. This perspective defines life course as "pathways through the age differentiated life span, where age differentiation is manifested in expectations and options that impinge on decision processes and the course of events that give shape to life stages, transitions and turning points" (Elder, 1985: p. 17). Two terms that are important in the understanding of the life course perspective are *trajectories* and *transitions*. A trajectory is a pathway during the life span. Think for instance of married life, work life, and also delinquent or criminal behaviour. Transitions are the events that can change the pathways; becoming a parent, getting married, etcetera (Elder, 1985). A transition during childhood can thus change one's trajectory during adulthood.

The model of Sampson and Laub focuses on three assumptions. First, structural contexts are mediated by controls by informal institutions, such as family, work and school, which in turn can explain delinquency behaviour in both childhood and adolescence. Descending from the classical control theory, when the bonds to an informal institution are strong, this will prevent someone from turning to delinquency. The other way around, when the bonds are weak, these bonds will not be an obstacle for someone to turn to delinquency. Second, there is strong continuity in deviant behaviour across different ages and life domains and it occurs independent of traditional background features, such as ethnicity and class. Third, it is assumed that social bonds to adult institutions of informal social control are of great importance to the development of delinquent or criminal behaviour over the life course, irrespective of their delinquent and antisocial background (Sampson & Laub, 1993).

Unlike most theories, the informal social control theory uses structural as well as process variables in its model in order to explain the onset of delinquent behaviour. An example of a structural variable is poverty. Examples of process variables are attachment to parents and school. The structural context influences the extent of informal social controls, which in turn explains possible delinquent behaviour (Cullen et al., 2008). The goal of the model is twofold.

First, to identify the transitions within the trajectories that relate to adult informal social control. Second, to argue that when the pathways during childhood deflect towards a delinquent trajectory, this can be remodelled over the life course by social bonds during adulthood. As stated before, social bonds are of great importance in understanding delinquency. However, unlike most life-course theories, the authors point out that the changes strengthening or weakening social bonds and the strength or quality of the social bonds are seen as more important than occurrence of the event (of the formation of a social bond). Therefore, the social investment in the relationship with the institution is that what dictates the importance of informal social control at the individual level (Sampson & Laub, 1990).

Informal social control by schools is the childhood institution of control that is examined in this research. Next to the family, schools are seen as an important socialising institution to control adolescents and to prevent them from turning to delinquency. Schools can provide control by showing attachment, attentiveness and involvement towards their students (Sampson & Laub, 1990). This theory would see the correlation between school performance and delinquency as a direct relationship, mediated by informal social control by the institution that is school. Informal social control can prevent individuals from turning to delinquency in the way the 4 elements of control by Hirschi (1969) explain. Note that the relation between school performance and informal social control by schools can go two ways: school performance can influence the informal social control by schools, and this informal social control can influence school performance (Cullen et al., 2008). However, since there is no longitudinal data available in this study, there is no possibility to establish a certain causal order. Thus, the mechanism of school performance and delinquency – including informal social control by schools – could be: the better the school performances, the stronger the informal social control and the bonds to school, the less delinquent behaviour is shown. Or, it could be the other way around: the weaker the informal social control and the bonds to school, the worse the school performances, the more delinquent behaviour is shown. Individuals with lower school performances are expected to have less informal social control by schools, and therefore are expected to be more involved in delinquent behaviour. Therefore, the following hypothesis is drafted (H4): *the correlation between school performance and delinquency is a direct relation, which is mediated by social informal control by schools, where higher levels of informal social control by schools lead to lower levels of delinquency.* A visualisation of this hypothesis is shown in figure 2.

Figure 2. *The expected relation between school performance and delinquency according to the theory of informal social control.*
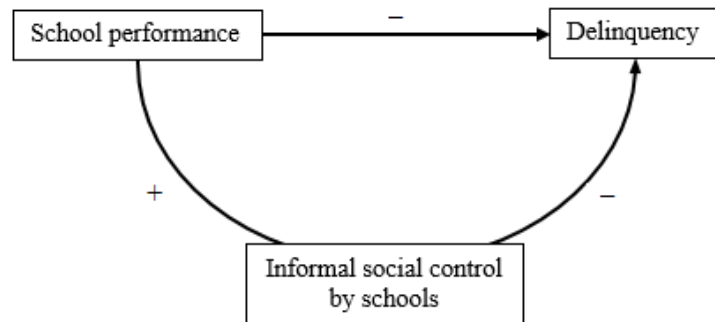
Debate between the authors

The contradicting ideas of the theories for the explanation of delinquent behaviour are cause for an intense and still ongoing debate between the authors. Cohen and Vila (1996) summarised the key points of this debate, of which a short overview is given here.

The authors both agree that social bonds to society are key in determining whether someone turns to delinquent behaviour or not. However, they vary in their opinion on several issues. As Cohen and Vila point out, the believes of the authors vary on "the nature of crime, the interpretation of certain basic facts on individual propensities to offend, the social consequences of crime, the proper research design with which to study crime, social policy, and the direction of future research in the discipline of criminology" (Cohen & Vila, 1996: p.126). Nevertheless, the debate centres on the degree to which the antisocial tendencies are stable and persistent throughout the life course (Cohen & Vila, 1996).

The main difference between the theories is that the self-control theory states that the correlation between social bonds and delinquency is spurious, and that they are both explained by self-control. On the contrary, the theory of informal social control states that social bonds (to informal institutions) do in fact influence one's level of delinquency. Furthermore, Gottfredson and Hirschi state that self-control is learned in the early stages of life and is consistent over time. This means that the level of delinquency of criminality is stable for the rest of the life span once self-control is learned (or not). Sampson and Laub do not agree with Gottfredson and Hirschi. They say that the level of delinquency or criminality is determined by specific life-events and the degree of social bonds to society or informal institutions. According to them, the level of self-control, as the level of delinquency or criminality, can vary during the life-course despite continuity in the individual differences (Cohen & Vila, 1996).

Sampson and Laub and Gottfredson and Hirschi keep on commenting on each other's theory and ideas in their articles. The debate seems endless, but this research seeks to shed a new light upon it.

Method

Data

The cross-sectional data used for the analysis is drawn from the Second International Self-Reported Delinquency Study (ISRD-2). This is a large international collaborative study of delinquency and victimization conducted in 31 countries. For this research only data from the Netherlands is used. Three representative city levels were selected during the sampling procedure: a metropolitan area, a few medium-sizes cities, and some small cities. First, the schools were randomly drawn at either national or city level. Second, the classrooms were randomly drawn. It was made sure that both large cities as well as small villages were included in the sample, and different types of schools (Junger-Tas et al., 2010). Unfortunately, the Netherlands had a very low school participation rate of 17.5%. This is mainly due to the timing of the study and oversaturation with requests for participation to the study (Marshall & Enzmann, 2012). Nevertheless, the study turned out to be representative for the different schools types in the Netherlands. Moreover, the response rate after the respondents were approached was tremendously high with 99.8% (Junger-Tas et al., 2010). Respondents are 12 to 15 year-old and are in seventh, eighth and ninth grade classrooms (in the Netherlands these are called first, second and third school classes of secondary school). The respondents were all approached at school and were asked to fill out a questionnaire under supervision of a researcher or sometimes a teacher, resulting in self-administered paper-and-pen data (Junger-Tas et al., 2010). A key advantage of the ISRD-2 dataset is the wide range of variables. It covers among other things social demographics, delinquent acts, attachment and commitment to a variety of persons or institutions, victimization, school context, and self-control. Therefore, this dataset is very well-suited for this study. Moreover, the number of respondents is very high, just like the response rates, which makes this dataset reliable for national generalisations. A disadvantage of this way of gathering data could be that because it is self-reported, reporting or social desirability biases could occur. However, self-reported questionnaires can certainly provide valid information and can reflect (deviant) behaviour accurately, notwithstanding the chances of bias (Farrington, 1973).

The total size of the study is N=73396. Yet only respondents from the Netherlands are selected (N=2330). Furthermore, respondents with missing values on any of the variables that have been used in the analysis were removed from the sample, leaving N=1431 respondents. After multivariate screening it was decided to exclude 3 outliers from the sample, resulting in a final sample size of N=1428.

Measures

Dependent variable

Delinquency. The dependent variable in this study is delinquency. Delinquent behaviour can vary from unconventional yet legal behaviour to illegal behaviour. Delinquency is defined here conform Gottfredson and Hirschi's definition of crime, which includes behaviour involving the use of force or fraud, acts of defiance and disobedience, and acts that deliberately cause harm to self or others (1990, in: Gottfredson, 2001). Felson and Staff (2006) operationalise delinquency with 4 aspects: the number of times someone consumed 5 or more alcoholic beverages in a row during the previous 2 weeks, the number of occasions someone used marijuana in the last 30 days, the number of times in the prior semester someone was in a physical fight either on or off school grounds, and the frequency of arrests. In this research this is done differently. Several dichotomous variables were made for key indicators of delinquency, coded as whether someone has ever in their lifetime been involved in that kind of behaviour (1) or not (0). This way variations in the effect of indicators of delinquent behaviour are checked. Also, a sum variable of these indicators is made. The dichotomous variables reflect the prevalence of the type of delinquency, the sum variable reflects the variety of delinquent behaviour youth have engaged in. The indicators of delinquent behaviour, chosen conform the definition of delinquency in this study, are: soft drug use, use of strong spirits, property damaging, burglary, and fighting. The questions from the questionnaire that go along with these indicators are: *'Did you ever use weed, marijuana or hash?'* (soft drug use)*; 'Did you ever drink strong spirits (gin, rum, vodka, whiskey)?'* (use of strong spirits)*; 'Did you ever damage on purpose something, such as a bus shelter, a window, a car or a seat in the bus or train or?'* (property damaging)*; 'Did you ever break into a building with the purpose to steal something?'* (burglary)*;* and *'Did you ever intentionally beat up someone, or hurt hum with a stick or knife, so bad that he had to see a doctor?'* (fighting). Every question is answered *'No' (0)* or *'Yes' (1)*. For the sum variable, these five indicators are added up, resulting in a continuous scale, ranging from 0 to 5. Figure 3 is a histogram of the sum variable of delinquency, which shows that the variable is strongly, positively skewed. This is logical, bearing in mind it is normal that

youths do not involve in delinquent behaviour. The skewed distribution is not ideal for the analysis, but the variable was not transformed. There was the possibility to make it into a dichotomous variable, with (0) meaning that the individual has never got involved in any kind of delinquent behaviour, and (1) meaning that the individual has ever got involved in some kind of delinquent behaviour. However, I believe it is not very meaningful to assign someone who has only drank strong spirits once as similar delinquent to someone who got involved in all 5 indicators of delinquency. Therefore, the delinquency variable was not transformed.

Figure 3. *The distribution of the delinquency sum variable.*
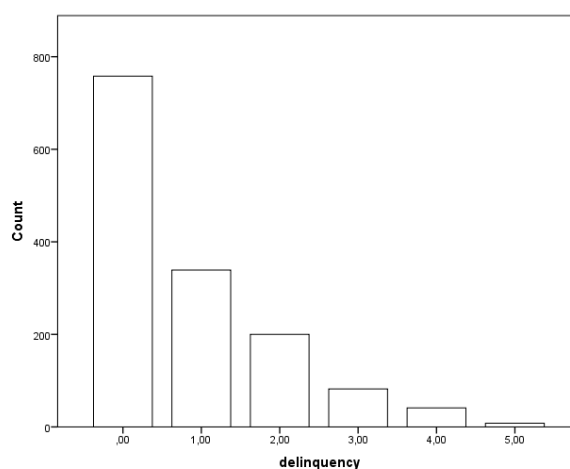
Explanatory variables

School performance. School performance is the independent variable in this study, like in the study by Felson and Staff (2006). Felson and Staff calculated for each student their Grade Point Average (GPA), a score continuously ranging from 0 to 4 which represents the average grade of all of the grades a student has received that year. However, this kind of data is not available in this research. What is available is the question: *'How well do you do in school compared to other students in your class?'* The answer categories are: *'I am doing better than most of my classmates'; 'I am an average student';* and *'I am not doing very well'.* This is a self-reported question which asks the respondents to compare themselves to others, which results in a subjective answer. This, however, does not have to be a disadvantage. Research shows that students who feel competent actually do perform better in school (Harter, 1981). If a student feels like he or she is doing better in school than their classmates, they act upon it, even though they were doing equally well in the beginning.

The fact that there are three answer categories makes school performance a categorical variable. Because regression models are used for the analysis three dummy variables were made for each answer category. The first dummy, above average, is coded as *not above average (0)*

and *above average (1)*. The second dummy, average, is coded as *not average (0)* and *average (1)*. The third dummy, below average, is coded as *not below average (0)* and *below average (1)*. The *above average* variable is the reference category in the regression models.

Self-control. The measure for self-control in this study differs from the way Felson and Staff (2006) measured self-control, because the measurement of this variable was named a limitation of their research. Felson and Staff measured the students' self-control using teacher-rated efforts in school. Felson and Staff only used three questions for the measurement, namely whether the student usually works hard in class, whether they complete their homework assignments often and how often the student is attentive in class. For the measurement of self-control in this study, 12 self-administered questions are used, based on the Grasmick self-control scale (Grasmick et al., 1993). This is a 24-item scale, based on the description of self-control of Gottfredson and Hirschi (1990). This way, 4 different aspects of self-control are covered: impulsivity, risk taking, self-centeredness, and temperament. These four aspects together were formed into POMP (Percentage Of Maximum Possible) scores to create the self-control variable, with a continuous scale ranging from 0 to 100. A POMP score is a percentage reflecting the position of an individual on the scale, in this case the scale of self-control, where low scores denote low self-control and high scores denote high self-control. This way of generating scores is considered very useful and meaningful, because both the magnitude and the impact of observed relationships can be expressed and the units become easier to comprehend (Cohen et al., 1999). The self-control variable and the POMP scores were already created for the ISRD-2 study. The questions used for the variable are statements, of which the students have to determine whether they fully agree or fully disagree on a 4-point scale. The statements are as follows: *'I act on the spur of the moment without stopping to think'; 'I do whatever brings me pleasure here and now, even at the cost of some distant goal'; 'I'm more concerned with what happens to me in the short run than in the long run'; 'I like to test myself every now and then by doing something a little risky'; 'Sometimes I will take a risk just for the fun of it'; 'Excitement and adventure are more important to me than security'; 'I try to look out for myself first, even if it means making things difficult for other people'; 'If things I do upset people, it's their problem not mine'; 'I will try to get the things I want even when I know it's causing problems for other people'; 'I lose my temper pretty easily'; 'When I'm really angry, other people better stay away from me';* and *'When I have a serious disagreement with someone, it's usually hard for me to talk calmly about it without getting upset'.* Cronbach's alpha for the 12-item self-control variable is .807, which is considered very good. This

measurement is, relative to that of Felson and Staff, ameliorated on the fact that more aspects of self-control are measured with the use of 12 questions. Not only in-class behaviour of self-control is measured, but also behaviour outside the grounds of schools.

Informal social control by schools. To test the theory of informal social control a variable was made to see what the effect is of informal social control by schools on the relation between school performance and delinquency. Four questions from the questionnaire about attachment to school are used to measure informal social control by schools: *'If I had to move I would miss my school'; 'Teachers do notice when I am doing well and let me know'; 'I like my school';* and *'There are other activities in school besides lessons (sports, music, theatre, discos)'.* These questions reflect different aspects of informal social control to school as explained by Sampson and Laub (1990). They also contain 2 of the 4 elements Hirschi (1969) describes in accordance to bond forming, namely attachment and involvement. This includes teachers watching over the students, so attachment and involvement of teachers to the students. It also includes attachment to the school in general and the school making an effort to make the students feel involved and attached to school by organising activities (by which they have less time to spend on delinquent activities). All questions are answered on a 4-point scale from *'I fully agree'* to *'I fully disagree'.* One variable combining these four questions was made to measure the informal social control by schools. Just like with self-control, POMP scores were calculated by the researchers of the ISRD-2 study, ranging from 0 to 100. Low scores mean that there is little informal social control by schools and high scores mean that there is a lot of informal social control. Cronbach's alpha for the 4-item informal social control variable was .609, which is fairly low.

Screening of this variable showed that the distribution of this variable is somehow negatively skewed (see figure 4, left histogram). Therefore, the variable had to be transformed using the natural log, which resulted in a new, more normally distributed variable (see figure 4, right histogram). Note that because the distribution was negatively skewed, the interpretation of the new variable for informal social control was reverse-coded: high values on informal social control mean that there is little control, and low values mean that there is high control. Also, the range of the variable changed from 0-100 to 2.3-4.7.

Figure 4. *The distribution of the informal social control by schools variable before (left) and after (right) transforming.*
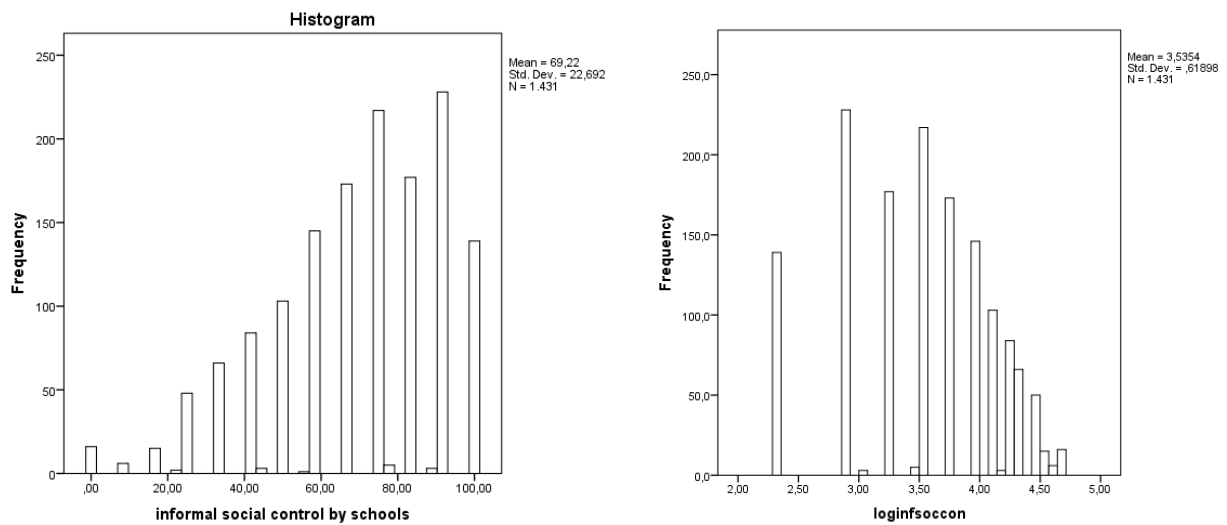
Control variables

Gender. There has been controlled for gender. Gender is considered a strong and consistent correlate with delinquency, indicating that women commit less delinquent acts than men (Hagan et al., 1985). When we look at criminality numbers from CBS (Centraal Bureau voor de Statistiek) for 'Halt-youths'[1], we see that in 2014 of a total of 16.590 youths 12.300 were male and 4.290 were female (CBS, 2015). Also, men tend to perform less well in school than girls (Legewie & DiPrete, 2012). For these reasons there is controlled for gender.

The gender of the respondent is measured with the question *'Are you male or female?'*, and correspondently has the answer categories *'male'* and *'female'*. The gender variable is a dichotomous variable coded as *female (0)* and *male (1)*.

Class. Sampson and Laub predict that deviant behaviour over time is stable and occurs independent of traditional background features, such as class (Sampson & Laub, 1990). Therefore, it was planned to control for class, operationalised as the occupation of the respondent's parents. However, after running analyses it turned out that there was very little variance in this variable (92.3%) and it was non-significant in every model. Therefore it was decided to remove class as a control variable from the analysis.

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[1] Halt-youths are Dutch youths who have been sent to Bureau Halt after having committed a minor criminal act.

Ethnicity. Similarly to class, ethnicity is a traditional background feature which should not have an effect on the stability of deviant behaviour over the life course, according to Sampson and Laub (1990). Therefore, ethnicity is controlled for in the analysis. Ethnicity is operationalised as whether one or both parents are born in another country. Two questions are used to measure ethnicity, namely *'In what country was your mother born?'* and *'In what country was your father born?'*. The answer categories for both questions are: *'(S)he was born in this country'; '(S)he was born in another country, namely …'; '(S)he was born in another country, but I don't know where';* and *'I don't know'*. Of these answer categories, the first is assigned as *native (0)* and the second and third is assigned as *not native (1)*. The answer category *'I don't know'* is assigned as missing. The ethnicity of the mother and of the father were then bound into one variable, whether one or both parents are not native *(1)* or whether they are both native *(0)*.

Parental attachment. Social bonds with one's parents are an important aspect within control theories. Self-control can be learned through school, but parents and child-rearing are the most important factors of the development of a child's self-control (Gottfredson & Hirschi, 1990). Therefore, it is only logical to control for parental attachment in this study. Felson and Staff (2006) also controlled for parental attachment, which they did based on four questions. They asked whether students feel their parents treat them fairly and whether they understand them. They also asked whether the students get along well with their parents and whether they like their parents very much. Within this study, the following four questions are used to measure parental attachment: *'How do you usually get along with the man you live with (father, stepfather…)?'; 'How do you usually get along with the woman you live with (your mother or stepmother)?'; 'How often do you and your parents (or the adults you live with) do something together, such as going to the movies, going for a walk or hike, visiting relatives, attending a sporting event, and things like that?';* and *'How many days a week do you usually eat the evening meal with (one of) your parents (or the adults you live with)?'*. The answer categories for the first two questions are equal: *'I get along just fine'; 'I get along rather well'; 'I don't get along so well'; 'I don't get along at all';* and *'There is no man/mother or other woman in the house'*. The answer categories for the third question are: *'More than once a week'; 'About once a week'; 'About once a month'; 'A few times a year'; 'About once a year';* and *'Almost never'*. The answer categories for the fourth question are: *'Never'; 'Once'; 'Twice'; 'Three times'; 'Four times'; 'Five times'; 'Six times';* and *'Daily'*.

These four questions were transformed into one variable for parental attachment. The questions were transformed into one POMP score, ranging from 0-100, created by the

researchers of the ISRD-2 study. Low scores mean low parental attachment and high scores mean high parental attachment. If more than 1/3 of the measures are missing the resulting score was assigned as missing. Cronbach's alpha based on standardized items for the 4-item parental attachment variable was .580, which is quite low.

Screening of this variable showed that the distribution of this variable is strongly negatively skewed (see figure 5, left histogram). Therefore, the variable was transformed using normal log, which resulted in a new, more normally distributed variable (apart from two peaks) (see figure 5, right histogram). Note that because the distribution was negatively skewed, the interpretation of the new variable for parental attachment was reverse-coded: high values on parental attachment mean that there is little attachment, and low values mean that there is high attachment. Also, the range of the variable changed from 0-100 to 2.3-4.7.

Figure 5. *The distribution of the parental attachment variable before (left) and after (right) transforming.*
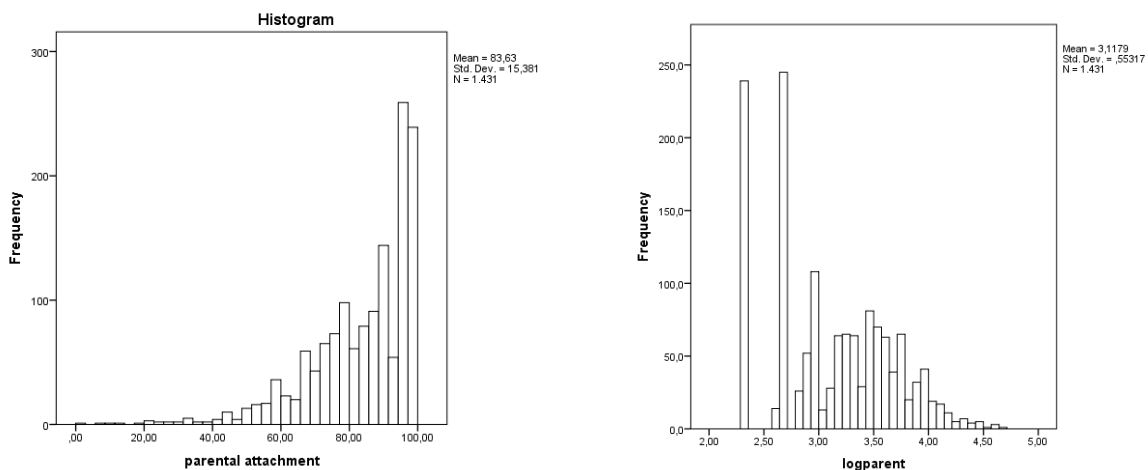
Delinquent peers. During adolescence friends are of great importance to an individual and can be of influence on one's behaviour. Lower self-control allows adolescents to migrate to a group of peers with similar low self-control, and vice versa (Cullen et al., 2008). The resemblance in delinquent behaviour between friends is considered one of the most consistent and strongest relationships within criminology (Haynie & Osgood, 2005). There has been controlled for delinquent peers in the analysis because this could be an indicator for the respondent's delinquent behaviour. The extent to which a respondent's peers are delinquent is measured with the question *'Do people in your group actually do illegal things (against the law) together?'*. The answer categories are *'No'* and *'Yes'*, which resulted in a dichotomous variable with *no delinquent peers (0)* and *delinquent peers (1)*.

Life-event. Sampson and Laub (1990) believe that certain life-events, or 'transitions', as they call it, can change the pathways of the life course. Depending on the nature of the life-event, the direction of the life course changes. A life course can change for the better, but also for the worse (e.g. turning to delinquency). Therefore, there has been controlled for life-events. One variable was made to see whether certain life-events have taken place in the lives of the respondents. The variable is a total of several profound life-events, including death and illness and family disruption. The respondent were asked to answer *'No' (0)* or *'Yes' (1)* on the following questions: *Have you ever experienced any of the following serious events?: 'Death of a brother/sister'; 'Death of your father or mother'; 'Death of somebody else you love'; 'Long or serious illness of yourself'; 'Long or serious illness of one of your parents or of someone else close to you'; 'Problems of one of your parents with alcohol or drugs'; 'Repeated serious conflicts or physical fights between your parents';* and *'Separation/divorce of your parents'*. The indicator 'parents' also includes step- and adoptive parents. The life-event variable is a mean score of these eight items, resulting in a continuous variable ranging from 0 to 1, where high scores mean the respondent experienced many profound life-events. If more than 1/3 of the measures are missing, the resulting score was assigned as missing.

Analytical strategy

After analysing the descriptive results, a series of regression models is conducted. School performance above average is the reference variable for all regression models. First, the main effect of school performance on the variety sum score of delinquency is conducted with the use of a multiple regression. This is done in 2 models, with in the first model solely the dependent and the independent variable, and in the second model also the control variables added. Subsequently, the main effect of school performance on the different indicators of delinquency are tested. This is done using two binomial logistic regression models for each indicator of delinquency, also both with and without control variables. In total 10 logistic regression models were conducted.

The effect self-control has on the relation between school performance and delinquency is tested in two models. The first model is similar to the first model, of the main effect of school performance on the sum variable of delinquency, and the second model also contains self-control. Following the self-control theory, it is expected that the relation between school performance and delinquency is spurious and that self-control accounts for both school performance and delinquency. Therefore, it is expected that when self-control is added to the

regression model the significant relation between school performance and delinquency disappears.

Because it is expected that informal social control will mediate the relation between school performance and delinquency, a path model was made which calculated and visualised the exact effect that informal social control has on the model. A path model consists of a direct effect from the independent variable (school performance) to the dependent variable (delinquency), and the indirect effect that runs through the mediation variable, from school performance, through informal social control by schools, to delinquency (see figure 6). If informal social control by schools indeed mediates the relation between school performance and delinquency, then the indirect effect should be statistically significant. This is analysed using the process function by Hayes (2013) in SPSS, which calculates the direct and indirect effect. In total 3 path models are made, one for each level of school performance.

Figure 6. *Path model for the mediation effect of informal social control by schools on the relation between school performance and delinquency.*
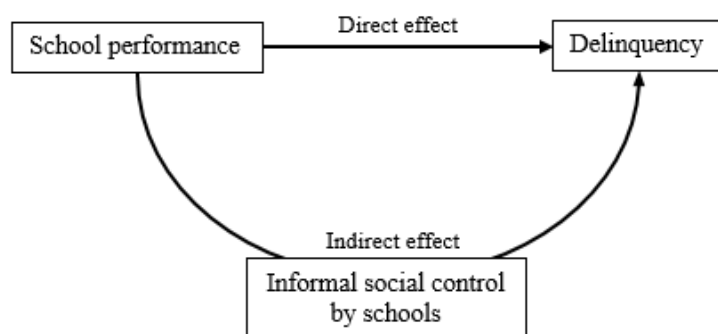
Results

Descriptive results

Table 1 shows the descriptive results of all of the variables that are used in the analyses. When looking at the descriptive results of delinquency you can see an indication of the skewed distribution of the sum variable, the mean being .833 on a scale ranging from 0 to 5. For the different indicators of delinquency you can see that strong spirit use is the most common of the five categories and burglary the least common.

Furthermore, it is interesting to look at the continuous variables, for these are different and less obvious in their interpretation than dichotomous variables. Take self-control. This

variable was transformed into a POMP scale, which encodes variables as percentages from 0 to 100. The mean self-control, then, is 61.5%, with a standard deviation of 18.9%. The maximum value is 100, which means at least one respondent has got the highest level self-control possible on this scale, and the minimum value is 0, which means at least one respondent has reported very low levels of self-control. The life-events variable was also transformed into a POMP scale. The maximum score here is 75, which indicates that there is no one who experienced all the life-events. The mean score is 19.1%, which means most respondents experienced about 1/5 of the life-events.

Informal social control by schools and parental attachment were initially encoded as POMP scores. However, due to skewness these variables were transformed using normal log, resulting in a scale ranging from 2.3 to 4.7. They were reverse-coded, thus high scores on informal social control or parental attachment now denote low control or attachment.

Table 1. *Descriptive statistics for key variables and control variables*

	N	Min	Max	Mean	SD
Dependent variables					
Delinquency	1428	0	5	.833	1.105
Soft drug use	1428	0	1	.186	.389
Strong spirits use	1428	0	1	.391	.488
Property damaging	1428	0	1	.158	.365
Burglary	1428	0	1	.023	.150
Fighting	1428	0	1	.076	.265
Explanatory variables					
School performance below average	1428	0	1	.098	.298
School performance about average	1428	0	1	.706	.456
School performance above average	1428	0	1	.196	.397
Self-control	1428	0	100	61.506	18.999
Low informal social control by schools [a]	1428	2.3	4.7	3.535	.618
Control variables					
Gender (male)	1428	0	1	.49	.500
Ethnicity (one or both parents born in another country)	1428	0	1	.347	.476
Low parental attachment [a]	1428	2.3	4.7	3.118	.553

Delinquent peers (respondent has delinquent peers)	1428	0	1	.287	.453
Life events	1428	0	75	19.076	14.341

[a] = For these variables high scores denote low values on the variable.

Multivariate results for the main effect of school performance on delinquency (sum variable)

Table 2 shows the multivariate results for the main effects of school performance on delinquency (the sum variable) in 2 models, without and with control variables. With these models the first hypothesis is tested, which states that there is a correlation between school performance and delinquency, in which lower school performances are correlated with higher degrees of delinquent behaviour (H1).

Assumptions for the multiple regression were checked. The residuals in the model were fairly normally distributed, apart from some outliers, but the mean (M=0) is good. Furthermore, three multivariate outliers were deleted from the data after computing the Mahalanobis distance, since there was reason to believe that the respondents of concern did not fill-in the questionnaire in a fair or reliable manner. No further assumptions were violated.

Results for the first model show that school performance (with *above average* as the reference category) accounted for a significant 3.7% of the variability in delinquent behaviour, R^2=.037, adjusted R^2=.036, $F(2, 1425)$=27.264, p<.001. Both school performance below average and school performance about average differ significantly on delinquency from school performance above average, with respectively p<.001 and p<.05. The change in delinquency goes up with β=.218 as a person changes from having school performances above average to having school performance below average, when school performance about average being held constant, SE=.112, p<.001.

When the control variables are added in the second model, results show that school performance accounted for a significant 29.5% of the variability in delinquent behaviour, R^2=.295, adjusted R^2=.292, $F(7, 1420)$=84.905, p<.001. The effect for school performance after adding the control variables did decline, where school performance below average still differed significantly from school performance above average, but with a lowered Beta value, β=.118, SE=.098, p<.001, and school performance about average did not differ significantly from school performance above average anymore, β=.036, SE=063, p=.170. Significant control

variables are gender, low parental attachment[2], delinquent peers and life-events. F change is significant for the second model (F change=104.019, p<.001).

Table 2. *Multivariate regression results, regarding the effects of school performance on delinquency, N=1428.*

	Model 1		Model 2	
	β	SE	β	SE
School performance				
Below average[a]	.218***	.112	.118***	.098
About average[a]	.071*	.073	.036	.063
Control variables				
Gender[b]			.063**	.051
Ethnicity[c]			-.032	.052
Low parental attachment			.158***	.046
Delinquent peers[d]			.412***	.058
Life-events			.109***	.002

[a] = Reference category is school performance above average
[b]= Reference category is female
[c]= Reference category is both parents being born in the Netherlands
[d]= Reference category is having no delinquent peers
*P<.05. **P<.01. ***P<.001.

Logistic results for the main effect of school performance on the delinquency indicators
The different indicators of delinquency have also been looked at, using binomial logistic regressions. The first model contained only school performance as predictors for the delinquency indicator (with *above average* as the reference category) and in the second model also the control variables added as predictors. A logistic regression ascertains the effect of school performance (and the control variables) on the likelihood that participants are involved in the concerned form of delinquency. With these models the second hypothesis is tested, which states that there is no difference in the effect of school performance and the different indicators of delinquency (H2). The results are shown in table 3. Only the most relevant findings from these results are discussed. The assumptions were checked and none were violated.

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[2] Remember that the encoding of parental attachment was reverse-coded to high values meaning low parental attachment. A positive B-value of .313 here means that with the increase of 1 delinquency unit, the respondent's parental attachment decreases with .313.

For every indicator of delinquency applies that in the first model, the difference between school performance below average and above average is significant. Herein, individuals with school performance below average are more involved in that particular form of delinquency than individuals with school performance above average. The difference between school performance about average and above average in the first model is only significant for soft drug use (Exp(B)=1.594, SE=.203, p=.022) and property damage (Exp(B)=1.794, SE=.220, p=.008). The second model, which includes the control variables, shows that some effects which were significant in the first model have disappeared. The differences for school performance below average and above average are still significant for the indicators of soft drug use (Exp(B)=2.936, SE=.286, p<.001), strong spirits use (Exp(B)=1.869, SE=.231, p=.007) and property damage (Exp(B)=2.069, SE=.310, p=.019).

Low parental attachment, having delinquent peers and having experienced certain life-events are good predictors for all of the indicators of delinquency. They are in almost every model significant.

Bivariate and multivariate results for the effect of self-control on the relation between school performance and delinquency

To test the third hypothesis, stating that the correlation between school performance and delinquency is spurious, where low self-control explains both poor school performance and delinquency (H3), two correlation tests were performed first. A bivariate correlation was performed for the correlations of school performance below average, delinquency, and self-control. Afterwards, a partial correlation was performed, controlling the correlation of school performance below average and delinquency for self-control.

Bivariate results show that the correlation between school performance below average and delinquency is positive and rather small, $r(1426)=.182$, $r^2=.033$, $p<.001$. The correlation between school performance below average and self-control is negative and small, $r(1426)=-.128$, $r^2=.016$, $p<.001$. The correlation between delinquency and self-control is negative and fairly large, $r(1426)=-.408$, $r^2=.166$, $p<.001$. Results for the partial correlation of school performance below average and delinquency, controlled for self-control, show that the correlation is still statistically significant, yet smaller with $r(1425)=.143$, $r^2=.021$, $p<.001$. After controlling for self-control, just 2.1% of the variability in delinquency could be accounted for by the variability in school performance (below average). Thus, the correlation that was observed between school performance and delinquency in the first place weakened when taking self-control into account.

Table 3. *Binomial logistic regression results, regarding the effects of school performance on the delinquency indicators, N=1428.*

	Soft drug use		Strong spirits use		Property damage		Burglary		Fighting	
	Exp(B)	SE	Exp(B)	SE	Exp(B)	SE	Exp(B)	SE	Exp(B)	SE
Model 1										
School performance										
Below average[a]	4.843***	.254	2.830***	.213	3.244***	.280	4.182*	.621	2.591**	.357
About average[a]	1.594*	.203	1.127	.141	1.794**	.220	1.468	.550	1.288	.285
Model 2										
School performance										
Below average[a]	2.936***	.286	1.869**	.231	2.069*	.310	2.076	.649	1.513	.385
About average[a]	1.358	.222	.980	.151	1.716*	.236	1.196	.565	1.160	.301
Control variables										
Gender[b]	.834	.165	.879	.123	2.773***	.177	3.495**	.480	2.582***	.240
Ethnicity[c]	.809	.165	.519***	.128	1.337	.167	1.446	.372	1.771**	.216
Low parental attachment	1.957***	.143	1.998***	.112	1.424*	.147	1.329	.327	1.587*	.194
Delinquent peers[d]	7.431***	.165	3.245***	.134	5.159***	.168	17.198***	.624	4.514***	.235
Life-events	1.013*	.005	1.011*	.004	1.019**	.006	1.013	.012	1.025**	.007

[a] = Reference category is school performance above average
[b] = Reference category is female
[c] = Reference category is both parents being born in the Netherlands
[d] = Reference category is having no delinquent peers
*P<.05. **P<.01. ***P<.001

Apart from calculating the correlations, two multivariate regression models were performed. The first includes delinquency as the dependent variable and school performance below and about average as the independent variables. The second model also contains self-control as an explanatory variable. The results are shown in table 4. The results of the first model are similar to those of the first model of the main effect testing hypothesis 1. After adding self-control in the second model, results show that the model is significant with $R^2=.186$, adjusted $R^2=.185$, $F(3, 1424)=108.677$, $p<.001$. The Beta-values for both school performance levels are declined in the second model in comparison with the first model. However, they are not totally gone or non-significant. Self-control as a predictor for delinquency is significant, with $\beta=-.390$, SE=.001, $p<.001$.

Table 4. *Multiple regression results, regarding the effects of self-control on the relation of school performance and delinquency, N=1428.*

	Model 1		Model 2	
	β	SE	β	SE
School performance below average[a]	.218***	.112	.164***	.104
School performance about average[a]	.071**	.073	.062**	.067
Self-control			-.390***	.001

[a]= Reference category is school performance above average

Path models for the effect of informal social control on the relation between school performance and delinquency

In order to test the fourth hypothesis three path models were made using the process function in SPSS, one for each level of school performance (see figures 7, 8 and 9). This way, the indirect effects of the mediation of informal social control by schools become visible.[3] The fourth hypothesis states that the correlation between school performance and delinquency is a direct relation, mediated by social informal control by school, where higher levels of informal social control lead to lower levels of delinquency (H4). Note that unstandardized effects are reported, because the process function does not provide unstandardized coefficients. In each path model the effects of school performance are compared to people who do not have that particular level of school performance.

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[3] Remember that the encoding for informal social control by schools was reverse-coded, where high values on informal social control by schools mean that there is low informal social control. Therefore, a positive B-value for the effect of informal social control on delinquency means that the less control, the more delinquency.

The analysis for the path model for school performance below average (see figure 7) shows that the direct effect of school performance below average on delinquency is B=.6406, SE=.0950, p<.001. The indirect effect is given in two parts: first the effect of school performance on informal social control, and second the effect of informal social control on delinquency. The first effect is not significant, with B=.1031, SE=.0549, p=.0605. The second effect is significant, with B=.3486, SE=.0548, p<.001. The effect is positive, meaning that the lower the informal social control by schools, the higher the level of delinquency. The total indirect effect was also computed, B=.059. This was done by multiplying the two B-values of the two indirect effects: .1031*.3486. The process function does not give a p-value for the indirect effect. However, it does compute bootstraps with a 95% confidence interval. If this interval includes zero, then the indirect effect is not significant (for α=.05). If the interval does not include zero, then the indirect effect is significant. For this path model the confidence interval ranges from -.0019 to .0773, and thus includes zero. It can be concluded that the indirect effect of informal social control by schools is not significant.

Figure 7. *Path model for the mediation effect of informal social control by schools on the relation of school performance below average on delinquency, N=1428.*
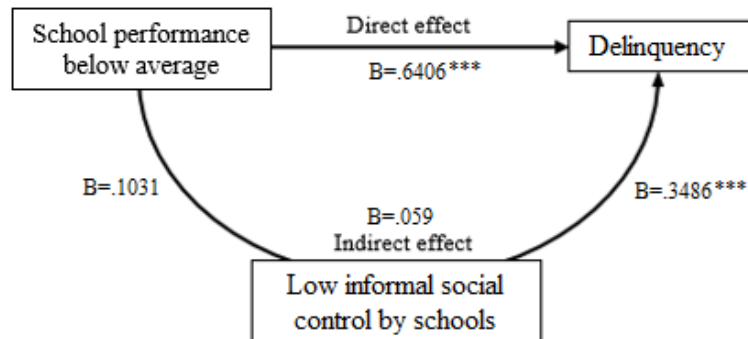

Figure 8 depicts the path model for the mediation of informal social control by schools on the relation of school performance about average and delinquency. The direct effect of school performance about average on delinquency is not significant, with B=-.1061, SE=.0628, p=.091. The indirect effect, the effect of school performance about average on informal social control by schools, is also not significant, with B=.0201, SE=.0359, p=.576. The effect on delinquency is significant, with B=.3650, SE=.0464, p<.001. The total indirect effect of informal social control by schools is B=.0073. The 95% confidence interval ranges from -.0155 to .0348, meaning that the indirect effect is not significant, for zero falls within the 95% confidence interval.

Figure 8. *Path model for the mediation effect of informal social control by schools on the relation of school performance about average on delinquency, N=1428.*
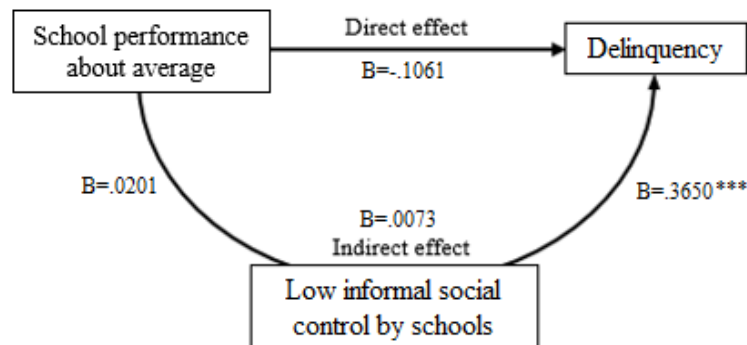

Figure 9 depicts the path model for the mediation effect of informal social control by schools on the relation of school performance above average on delinquency. The direct effect of school performance above average on delinquency is significant, with B=-.2194, SE=.0720, p=.002. The indirect effect, the effect of school performance above average on informal social control by schools, is also significant, with B=-.0843, SE=.0411, p=.041. The effect of the path from school performance to low informal social control is negative. This means that individuals with school performance above average experience higher informal social control by schools. The effect on delinquency is also significant, with B=.3562, SE=.0463, p<.001. The total indirect effect of informal social control by schools is B=-.0300. The 95% confidence interval ranges from -.0642 to -.0031, meaning that the indirect effect is significant, for zero does not fall within the 95% confidence interval.

Figure 9. *Path model for the mediation effect of informal social control by schools on the relation of school performance above average on delinquency, N=1428.*
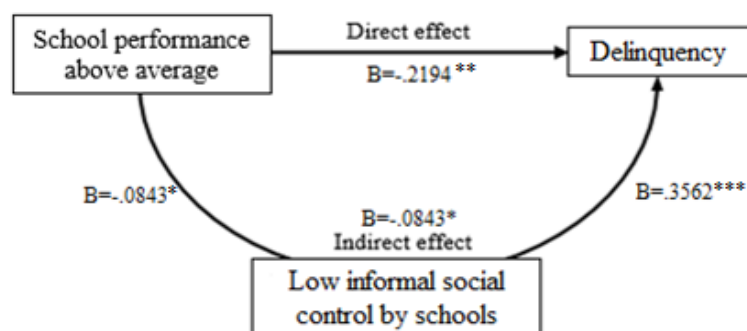
Conclusion

This research was conducted in order to examine the possible mechanism of the effect that school performance has on delinquency, building on the research by Felson and Staff. Two mechanisms were examined, one according to the self-control theory by Gottfredson and Hirschi, and one according to the theory of informal social control by Sampson and Laub. The mechanisms these two theories explain contradict each other, and thus cannot both be applicable at the same time. The authors of the theories are in constant debate about which theory is better suited for explaining mechanisms of crime, and with this research a new light is shed on this debate. Various hypotheses were drafted in order to address these effects. The first hypothesis concerns the main effect of school performance on delinquency and was derived from previous research. It expects that there is a correlation between school performance and delinquency, in which lower school performances are correlated with higher degrees of delinquent behaviour. In relation with the first hypothesis, the second hypothesis states that there are no differences between various indicators of delinquency in the effect between school performance and delinquency. The third hypothesis explains the mechanism according to the self-control theory. It expects that the relation between school performance and delinquency is spurious, and that low self-control accounts for both poor school performances and delinquency. The fourth and last hypothesis explains the mechanism according to the theory of informal social control. It expects that there is a direct relation between school performance and delinquency, which is mediated by informal social control by schools. Lower school performances lead to less informal social control by schools, which will enlarge the chances of getting involved in delinquent behaviour.

Looking at the results from the analyses it can be concluded that the first hypothesis is confirmed. Both for the sum variable of delinquency as for the different indicators of delinquency there is a significant effect for the relation between school performance and delinquency, in which each time lower school performances are more involved in delinquent behaviour than higher school performances. This finding is consistent with previous research (e.g. Maguin & Loeber, 1996). However, the second hypothesis cannot be confirmed. There seem to be differences between the different indicators of delinquency. The indicators 'burglary' and 'fighting' were not significant anymore for school performance below average after adding the control variables, while the other indicators did stay significant. The fact that these effects are not significant anymore for burglary and fighting could have something to do with the number of respondents indicating they had committed in burglary or fighting, with

N=33 for burglary and N=108 for fighting, which might not be representative for the population. Or it could be that the control variables simply have more influence on these two indicators of delinquency than on the other three. In answering the research question, *'What is the effect of school performance on delinquency?'*, it can be stated that in general, there is a direct effect of school performance to delinquency, in which lower school performances lead to higher degrees of delinquent behaviour than higher school performances. However, this effect is not the same for every indicator of delinquency.

As with the second hypothesis, the third hypothesis cannot be confirmed. When adding self-control to the regression model, the effect of school performance on delinquency did decline, yet not in such a way that its effect diminished completely. This means the relation is not spurious, and self-control does not account for both school performance and delinquency. It does, however, have a great, significant influence on one's delinquent behaviour. This finding is not in line with the research by Felson and Staff (2006), who did find a spurious relation.

Whether the fourth hypothesis is confirmed or not seems to differ for the three levels of school performance. The indirect effect of informal social control by schools was not significant for both school performance below average and about average, even though the effect of school performance below average on informal social control was in the expected direction. Yet, the mediation for school performance above average, in contrast to the others, was significant. When someone's school performance is above average, the level of informal social control is higher, and therefore the level of delinquency is lower. This theory may not have fully been confirmed, but the control variables Sampson and Laub (1990) named as important for explaining delinquency (life-events/transitions and parental attachment) were mostly significant. Also in line with the theory of informal social control, ethnicity was mostly non-significant, because delinquency should be stable over time, independent of background features such as ethnicity. This is promising for the potential of this theory.

In answering the second research question, *'What is the mechanism explaining this effect?'*, with its sub-questions, *'To what extent does self-control explain the effect between school performance and delinquency?'* and *'To what extent does informal social control by schools explain the effect between school performance and delinquency?'*, it can be stated that some remarkable findings have been found, even though the hypotheses were rejected. The relation between school performances stayed significant after adding self-control. However, the effect went down a fair amount, which means that self-control accounts for a big proportion of the variance. As for informal social control by schools, the effect was only significant for school performances above average, while it was expected that this effect would be equal for all levels

of performance. Nevertheless it can be concluded that informal social control does mediate the school performance-delinquency effect, just not for every level of school performance. For the debate about which theory is more fitting in explaining delinquency, no conclusive answer can be given. However, findings from this research might indicate that in fact both theories can be applicable at the same time, as long as the expectations about the relations are adjusted. The relation between school performance and delinquency might not be spurious, because this last bit of effect is explained by informal social control by schools. Even though these are just conjectures, it is worth considering it.

Discussion

This research brought some improvements in comparison with the research by Felson and Staff. Especially with the measurement of self-control, a 12-item variable, based on the Grasmick scale of self-control, which covers much more aspects of self-control than the variable that Felson and Staff created did. In addition, a new theory was introduced, the theory of informal social control, which involved the ongoing debate between the authors of the two theories in this research. However, there are also some limitations to be found within this research. For instance the skewed distribution of the dependent variable, delinquency. Assumptions of the performed regression models were nonetheless not violated, for these expect the *errors* to be normally distributed. Another limitation to this research is the measurement of informal social control by schools. Cronbach's alpha for the used items was considerably low. Unfortunately, there were no other questions available for a better measurement of this variable.

An implication for future research is to investigate why informal social control by schools only accounted for a significant mediation effect for school performances above average. Another implication is to test the theory of informal social control using longitudinal data instead of cross-sectional data, as this theory puts much emphasis on the developments of delinquency over the life-course. Also, future research could take another look at the differences between indicators of delinquency in the effect of school performance on delinquency. This aspect of the well-known correlation of school performance and delinquency has not been researched much yet, but this research indicates that there may be some differences there. Once again, a correlation between school performance and delinquency has been confirmed in this research. Therefore, it is important for school boards to recognise this correlation and give individuals who do not perform well in school some extra attention in order to possibly prevent them from turning to delinquency.

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