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The influence of self-control on social bonds in predicting delinquent behaviour among youth in the Netherlands

Abstract

In the year 2017, adolescents aged 12 to 25 years embodied almost a third of all registered suspects of criminal offences in the Netherlands. It would be interesting to discover what causes this peak of crime in adolescence. Therefore I am testing – based on the general theory of crime and social control theory – whether social bonds mediate the relationship between self-control and delinquency, or whether this relationship appears to be spurious. To test for this relationship, binary logistic regressions and linear regressions were used to test for the direct effects, and Sobel's test was used to test for the mediation effect. Furthermore, I controlled every relationship for sex, educational level and peer delinquency. I operationalized social bonds into two variables: parental attachment and school attachment. Parental attachment was found not to be a partial mediator in the relationship between self-control and delinquency. School attachment was found to be a partial mediator in the relationship between self-control and delinquency, but the effect was very small. After adding the control variables, the effect became even smaller, yet remained significant.
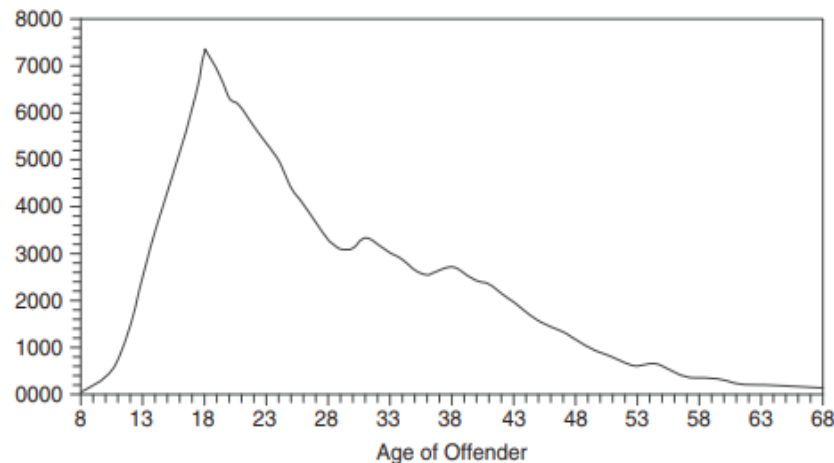
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Introduction

Several studies have found evidence for something called the 'age-crime curve', that is present across multiple countries (Farrington 1986; Tremblay & Nagin 2005). This curve displays the relationship between age and the average number of offenses, and has the following shape:

Figure 1 - Relationship between Offender's Age and Arrest Rate

(Stolzenberg & D'Alessio, 2008).

As you can see in the above figure, there is a tendency for offending to increase in the late childhood, followed by a peak in adolescence, after which there is a decline.

The past few years, there is a decrease in overall offending in the Netherlands (Centraal Bureau Statistiek, 2018). In 2005, the total amount of registered suspects of criminal offenses was 327.970. Since 2005, the number of registered suspected offenders has been declining, with a remaining number of 169.980 registered suspects of offending in 2017 (CBS Statline, 2018). This negative trend in criminal behaviour also visible in adolescent offending (Central Bureau Statistiek, 2016). But the amount of adolescent delinquency is still quite large. In the year 2017, still 55.280 of the registered suspects were between 12 and 25 years old. This is about 32,5 % of the total number of the registered suspects in 2017 (CBS Statline, 2018). So, from the total amount of registered suspected offenders, adolescents make up almost a third of it. I find this peak of crime in adolescence an interesting phenomenon to investigate.

This study will attempt to discover what causes crime amongst adolescents. More specifically, whether delinquency is caused by low levels of self-control, as suggested before by Gottfredson & Hirschi (1990), and whether social bonds mediate this relationship or not. Gottfredson & Hirschi (1990) themselves argue that self-control and social circumstances do not interact with each other in causing crime, and so reject the idea of a mediation effect. Yet, several other studies did find evidence

for social bonds operating as a mediator in the relationship between self-control and delinquency (Li, 2004; Wright, Caspi, Moffitt & Silva, 1999). But others like Evans, Cullen, Burton, Dunaway & Benson (1997) have found evidence in support for the claim of spuriousness as suggested by Gottfredson & Hirschi (1990). Since the evidence about whether there is a mediation effect or a spurious effect is mixed, I will try to clarify this discussion by conducting my own analysis.

Delinquency, or criminal behaviour can be defined as the types of behaviour that are punishable by law, and for that reason can lead to a fine or some form of punishment by the government (Nederlands Jeugdinstituut, 2018).

Self-control is defined as the extent to which one can resist temptation (Gul & Pesendorfer, 2001). In this research, it would be translated to the ability for an adolescent to resist the urge to commit crimes.

Finally, Social bonds are the bonds that one has to another person or institution (Sampson & Laub, 1990). For example, the bonds that one has with his or her parents, friends, teachers, church community and so on.

This, all taken together leads to the following research question that I strive to answer:

To what extent do social bonds have a mediating role in the relationship between self-control and delinquency among Dutch adolescents?

Answering this question could possibly provide a solution for reducing even more criminal behaviour among youth. If this research shows that a lack of self-control among adolescents in the Netherlands leads to negative or even disrupted social bonds, leading to adolescent delinquency, policy can be designed either to improve self-control, or to enhance social bonds which will hopefully reduce adolescent delinquency. Working on a decrease in crime overall is positive, since multiple studies have found that for the rest of society, fearing crime is negatively associated with general, physical and mental health (Ross & Mirowsky, 2001; Chandola, 2001; Whitley & Prince, 2005; Stafford, Chandola & Marmot, 2007). Since lots of crime is prevalent among adolescents, it is this type of crime that would benefit from investigation and policy design.

A large body of research on the relationship between self-control and (adolescent) delinquency has already been done (Gottfredson & Hirschi, 1990; Cheung & Cheung, 2008; Enzmann, Marshall, Killias, Junger-Tas, Steketee & Gruszczynska, 2010; Na & Paternoster, 2012). Most of this research builds on, or reacts to the initial study of Gottfredson & Hirschi (1990) and their general theory of crime. Their theory predicts that the absence of self-control is essential in predicting criminality. People who do have (high levels of) self-control are aware of the consequences of their behaviour, and will less likely become involved in delinquent behaviour. Those who lack self-control will not consider the consequences of their behaviour and will engage in criminal behaviour. So far, the scholars mentioned above have found evidence for this relationship.

Also, previous research has been done on the relationship between social bonds and delinquency (Sampson & Laub, 1990; Stewart, 2003; Chapple, McQuillan, & Berdahl, 2005). These studies have found that having social bonds are important when it comes to preventing criminal behaviour, or desisting from it. Wright, Caspi, Moffitt & Silva (1999) even investigated social causation, and found that social bonds together with adolescent delinquency were predictors for later adult crime, and that social bonds were largely mediating the effect of self-control on crime.

Yet, others have found evidence hinting at a spurious effect instead of a mediating one, in line with Gottfredson & Hirschi (1990). Scholars like the before mentioned Evans et al. (1997), Polakowksi (1994) and Pratt & Cullen (2000) came to this conclusion.

In short, this research will examine the effect of self-control on delinquency, and whether social bonds mediate this relationship or not. Since the evidence is mixed about whether there is a mediation effect or a spurious effect, I hope to contribute to the existing literature by clarifying this discussion. I will try to do so by conducting my own analysis.

Theory

In order to make sound predictions, two theories will be elaborated on in this research. Those theories are about self-control and social bonds. For self-control, I will use the general theory of crime from Gottfredson & Hirschi (1990) that was mentioned before, and for social bonds I will make use of the social control theory from Hirschi (1969).

Self-control on Delinquency

In their *General Theory of Crime*, Gottfredson and Hirschi (1990) follow the classical view of human behaviour, in the sense that they believe all people act in self-interest, either to pursue pleasure or to avoid pain. Gottfredson & Hirschi (1990) see crime as a way of enabling one to pursue their self-interest, because on the short term, it's an easy way to provide pleasure. Thus the question should not be about what causes crime, but rather what prevents it. According to Gottfredson & Hirschi (1990), the answer is self-control. When people have enough self-control, they are able to resist the immediate pleasures criminal behaviour brings. The opposite has also been found true, that people who lack self-control cannot resist the possible pleasures criminal behaviour brings, so turn to crime (Hay, 2001).

Self-control in this sense is being described one's ability to overlook the (long-term) consequences of their acts. It is expressed through one's ability to avoid acts from which the long-term costs are higher than the short-term benefits. People who still engage in crime are the people who are negligent of the long-term consequences. Those are the people who have low self-control (Lanier, Henry & Anastasia, 2014).

Furthermore, according to Gottfredson & Hirschi (1990), low self-control is a stable construct that consists of a number of different dimensions. Six to be precise. People who suffer from low self-control generally:

* Are impulsive

* Prefer simple/easy tasks over complex/difficult tasks

* Have a tendency for risk-seeking

* Have a preference for physical activities over mental/cognitive ones

* Are self-centred

* Are insensitive to the needs of others, and have a short temper (Grasmick, Tittle, Busik & Amekley 1993).

Following Gottfredson & Hirschi (1990), a possible cause for having low self-control is inadequate parental attachment and poor childhood socialization. Parents who in fact are attached to their children monitor them, recognize deviant behaviour and punish this behaviour of their children. If this happens adequately, their children will develop a sense of self-control. The opposite has also been found true, that a lack of parental attachment will result in low levels of self-control amongst children (Hay, 2001).

Monitoring has to do with how closely the parents watch their child's behaviour. It is not effective when there is lack of care, time or absence of the parents in their child's life. The 'recognizing' of parents implies the extent to which parents identify behaviour of their child as (in)consistent with the norms, rules, values and laws of society. It is possible that parents *monitor* their child, but not *recognize* their child's behaviour as deviant. This would still have problematic consequences. Lastly, even if parents monitor and recognize correctly, they may not punish (or reward) behaviour adequately. This all will possibly result in dysfunctional childrearing (Lanier, Henry & Anastasia, 2014).

Finally, the last proposition of Gottfredson & Hirschi (1990) that is valuable to discuss, is that of *persistent heterogeneity*. This is the opposite of *state dependence*, which prescribes that the context one finds him- or herself in, and recent life events are important causes for criminal behaviour. Persistent heterogeneity prescribes that displaying criminal behaviour is caused by stable differences in one's personality or traits, which are established early in life (Nagin & Farrington, 1992).

This is relevant for self-control theory, because once low self-control is established (by the age of six to eight) it remains a stable personality trait. This is confirmed by the study of Arneklev, Cochran & Gainey (1998). Therefore, low self-control should operate as a stable predictor for delinquent behaviour.

Self-control theory elaborates on a possible cause for low levels of self-control and how this can lead to delinquent behaviour. This results in the first hypothesis:

Hypothesis 1: *The more self-control one has, the smaller the chance that person will turn to criminal behaviour.*

The effect of self-control on delinquency will be tested twice. Once for the direct effect on delinquency, and a second time with social bonds as a possible mediating variable.

Social Bonds on Delinquency

In his book *Causes of Delinquency* (1969), Hirschi elaborated on Jackson Toby's (1957) "stake in conformity". This concept of Toby (1957) referred to the development of an investment in convention. It prescribes that the more invested in something, the higher (emotional) costs are of losing this thing. So therefore the threshold to violate or break the law (which will lead to the loss of one's investments) will be higher. In Hirschi's argument, the underlying assumption holds that bonds or ties to conventional friends, parents, schools and so on make crime too big of a risk for most people, because it is possible they lose those bonds (Lanier, Henry & Anastasia, 2014). According to Hirschi (1969), a social bond consists of several components: *attachment, commitment, involvement* and *belief*.

Attachment as intended by Hirschi (1969) implies how much one *cares* about others. This includes respecting their opinions and expectations. This sentiment is based on mutual respect and trust, that come about as the result of having occasional interactions with one another, and intimate relations with conventional adults. So, those who maintain warm relationships with family and friends tend to think about their reaction when committing a crime. This reaction will be negative, since only one moral order exists. This expectation of receiving a negative reaction after displaying criminal behaviour, is one reason why strong social bonds should lead to abstinence from delinquency. This is confirmed by the study of Matsueda & Heimer (1987), who found that attachment to both parents and peers have substantial and statistically significant effects on delinquency. Furthermore, a more recent study conducted by Sims (2002), who tries to explain deviant behaviour among employees at work by using social bonds theory from Hirschi (1969), concludes that attachment as a component of social bonds is a significant predictor for deviant behaviour.

Commitment has to do with the investment of the individual in conventional behaviour. This includes the willingness to do what is promised, and also the ability to respect the expectations of others. It also involves a cost-benefit analysis of the degree to which previous investment will be lost if one does something unconventional. People who are very committed to conventional ties (such as family or friends), do not want to risk losing what they have invested (Hirschi, 1969). Therefore committed people do not deviate from conventional norms, values, ideas and beliefs, and do not display criminal behaviour (Krohn & Massey, 1980). Additionally, Cernkovich & Giordano (1992) confirm in their study on school bonding (as a form of social bonds), race and delinquency that experiencing a weak commitment (as a component of social bonds theory) to education is one of the predictors for school failure and eventually delinquent behaviour.

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Involvement is about how much energy and time is spent on participating in conventional activities. Time and energy are not limitless, so the more time one spends on conventional activities, the less time there is for unconventional or deviant activities. Wiatrowski, Griswold & Roberts (1981) have found in their research on the relationship between social control theory and delinquency, while considering the four social bond elements, that the component involvement has a statistically significant effect on delinquency. This has also been found true by Jenkins (1997). In her research on school delinquency and the school social bond, she found that school involvement is a predictor for school delinquency.

Finally, *belief* (in the moral validity of conventional norms, and belief in the respect for authorities that limit behaviour) is what solidifies the bond. This is an explicit and fundamental assumption of control theory, which assumes that there exists something like a value system in society that is commonly shared. In their study on the influence of the four components of social bond theory on binge drinking among college students, Durking, Wolfe & Clark (1999) found that the indicators representing the belief component had an inverse relationship with binge drinking. Moreover, the belief component was even found to be the best predictor for binge drinking out of all four components.

With all this taken into account, one could thus argue that when one has invested in their social bonds, one has a strong social bond with society. Therefore, the barrier to turn to criminal behaviour is great, since one could risk losing his or her entire investment in social bonds. This brings us to the second hypothesis:

Hypothesis 2: *The stronger the bonds one has to social institutions as a result of one's investment in those bonds, the smaller the chance that person will turn to criminal behaviour.*

The effect of social bonds on delinquency will also be tested twice. Once for the direct effect, and a second time as the possible mediating variable between self-control and delinquency.

Self-control on social bonds on delinquency

The objective of this research is to discover whether self-control has a direct effect on delinquency and social bonds, and social bonds do not influence delinquency in any way, or whether the relationship between self-control and delinquency is mediated by social bonds. Research on behalf of the 'spuriousness hypothesis' has been done before, for example by Evans et al. (1997). They explain that the general theory of crime from Gottfredson & Hirschi (1990) has received a lot of empirical support so far, meaning that low self-control has an effect on delinquent behaviour. But Evans et al. (1997) also examined a part of the theory that so far has been neglected a lot. Namely the claim that low self-control not only affects delinquency, but also life chances, the quality of life and social bonds. Especially social bonds are of importance in this study. Gottfredson & Hirschi (1990) have argued

before that the relationship between social bonds and crime is spurious. This means that low self-control doesn't lead to disrupted social bonds and therefore delinquency, but that low self-control influences both social bonds and crime, and that social bonds do not affect delinquency at all. The purpose of the study of Evans et al. (1997) is to see whether this relationship is indeed spurious, or whether it is causal. Consistent with the general theory of crime, they found that their measures of self-control have an effect on delinquency, even when controlled for social factors. Next to Evans et al. (1997), Polakowksi (1994) and Pratt & Cullen (2000) have also found evidence in favour of Gottfredson & Hirschi's (1990) 'spuriousness hypothesis'.

But many others have investigated this relationship in favour of the mediation effect, such as Wright, Caspi, Moffitt & Silva (1999). In their article, they have investigated social-selection and social-causation processes that lead to delinquency. They made use of three models:

1. A model of social causation, linking crime to contemporaneous social relationships
2. A model of social selection, linking crime to personal characteristics that were formed in ones childhood
3. A model of mixed selection-causation, linking crime to social relationships and childhood characteristics.

Wright et al. (1999) found in favour of the social causation model that social bonds and criminal behaviour in adolescence were predictors for later adult crime. On top of that, they found that social bonds operated as a mediator in the relationship between self-control and delinquency. Furthermore, there was evidence that low self-control in childhood had an effect on disrupted social bonds and delinquency later in life, which provides support for the social selection model. Finally, there was also support for both selection and causation. The evidence showed that social-causation effects remained significant, even when there was controlled for pre-existing levels of self-control. But their effects diminished. Overall, these findings support social-selection and social-causation processes (Wright et al., 1999).

Other studies, such as those of Wright, Caspi, Moffitt & Silva (2001), Li (2004), Longshore, Chang, Hsieh & Messina (2004), Longshore, Chang & Messina, (2005) recognize either that self-control and social bonds are interdependent, or even that social bonds seem to be mediators in the relationship between (low) self-control and delinquency.

With all this taken into account, one could thus argue that in spite of the evidence for Gottfredson & Hirschi's (1990) 'spuriousness hypothesis', evidence has also been found in favour of social bonds as a mediator in the relationship between self-control and delinquency. Therefore, the following hypothesis can be derived:

H3: *The more self-control one has, the stronger the bonds one has to social institutions, and therefore the smaller the chance that person will turn to criminal behaviour.*

Methods

In this research, there will be made use of the data collected by the second International Self-Report Delinquency study (ISRD-2). This large, international study investigated delinquency and victimization among high school students in 31 different (mostly European) countries in seventh, eighth, and ninth grade classrooms. On average, the respondents were 12 to 15 years old at the time the data was collected. The years this data was collected, was from 2005 to 2007. Random samples were drawn either from national, or city level. Overall, the cross-national description of delinquency and victimization among these different countries allowed for comparison between those countries and their crime rates. The major purpose of the ISRD-2 study was to explore correlates of adolescent delinquent behaviour and victimization, following from the body of criminological theories.

As mentioned earlier, the study was conducted in 31 countries in total. For the purpose of this study, there will be focused on the data available for Dutch adolescents, since that is the group that is being investigated.

As for the method of the ISRD-2 study, in every one of these 31 countries, school classes were the primary source of the samples. The sampling process consisted of two stages: (1) the selection of towns/cities, and (2) the selection of a random sample within the seventh, eighth and ninth grade classes in the selected towns and cities. In the Netherlands, the sampling procedure consisted of the selection of three city levels: the large, metropolitan area (population +/- 1.150.000), some mid-sized cities (population +/- 120.000) and a few smaller cities (population +/- 10.000 – 70.000), in combination with the random selection of 7th to 9th grade school classes. This way, the data covered roughly the age group of 12 to 15 years old. Due to some practical issues, only 17.5% of the schools approached participated in the study. Even though this is a quite low response rate, the scholars were able to draw a sample from the classes that was still representative for the different types of education in the Netherlands. In the end, 2.295 students filled in the questionnaire, which means a response rate of 99.8% of those approached within the participating schools.

As mentioned before, the students were asked to fill in a questionnaire. The questionnaires were conducted in a classroom, where the students filled them in on their own (self-administering). The filling-in of the questionnaires was supervised by the researchers.

Since I am making use of the ISRD-2 dataset instead of collecting my own data, I am performing a secondary data-analysis. Furthermore, I will make use of four different variables: self-control, parental attachment and school attachment (as forms of social bonds), and delinquent behaviour. Since Dutch adolescents cover my group of interest, it is important that only the data measured among adolescents in the Netherlands is used. To make sure of this, I will filter the respondents first on their country code, and then on their age.

Self-control

The following statements in the ISRD-2 study measured self-control. They were presented to the students, and they had to indicate the extent to which they agreed with them: (1) "I act on the spur of the moment without stopping to think."; (2)"I do whatever brings me pleasure here and now, even at the cost of some distant goal."; (3) "I'm more concerned with what happens to me in the short run than in the long run."; (4) "I like to test myself every now and then by doing something little risky."; (5) "Sometimes I will take a risk just for the fun of it."; (6) "Excitement and adventure are more important to me than security."; (7) "I try to look out for myself first, even if it means making things difficult for other people."; (8) "If things I do upset people, it's their problem not mine."; (9) "I will try to get the things I want even when I know it's causing problems for other people."; (10) "I lose my temper pretty easily."; (11) "When I'm really angry, other people better stay away from me."; and (12) "When I have a serious disagreement with someone, it's usually hard for me to talk calmly about it without getting upset.". To judge whether the different items are internally consistent and measure the same thing (in this case self-control), Cronbach's alpha is used. Usually a value of .70 or higher is preferred in order to put different items together. Of the above 12 items, Crohnbach's alpha = .80. Since this is higher than the preferred score of .70, the twelve questions are allowed to be combined to measure one's self-control.

The students had to indicate whether they agreed with these twelve statements on a scale of 1 to 4, where 1 corresponds with "disagree fully" and 4 corresponds with "agree fully". This type of scale is a Likert scale. In the process, I did recode this variable since it would make more sense that a low score on the questions would be an indicator for actual low self-control. On this new scale measuring self-control, a score of '1'corresponds with 'agree fully', and a score of '4' with 'disagree fully' on the statements given. In the ISRD-2 dataset, one's self-control was measured based on the recoded mean score of 4 subscale scores. Those subscales are: impulsitivity (measured by question 1 to 3), risk taking (measured by question 4 to 6), self-centeredness (measured by question 7 to 9) and temperament (measured by question 10 to 12).

In the ISRD-2 dataset, after collecting the questionnaires, all the scores from the subscales of self-control were transformed into POMP (= Percentage of Maximum Possible) scores, with a range of 0 to 100. In short, when using POMP scores each individual is assigned a percentage (as a score) that reflects one's position on the scale as a Percent of the Maximum Possible score possible on the scale. One's POMP score can be calculated with the following formula:

POMP score = [(observed - minimum)/(maximum - minimum)] $\times$ 100

With 'observed' being the observed score for one single case, with 'minimum' being the minimum possible score on the scale, and with 'maximum' being the maximum possible score on the scale.

The use of POMP scores is beneficial, since it's a highly communicative way of scoring. By this I mean that by using a simple linear transformation of the information provided by the original scale, POMP scores transfer information that is easily understandable. Furthermore, this method of standardization allows for comparison between different scales (Cohen, Cohen, Aiken & West, 1999). I will also use this method in computing the variable parental attachment as a form of social bonds.

When operationalising social bonds, I will focus on the social bond of the respondent with their parents, since parents play an important role in the socialization of their child. In addition, I will focus on attachment to school, since adolescents spend a great part of their daily life in education. These variables will separately represent social bonds, and will not be combined into one variable of social bonds. This is because the Rotated Factor Matrix as part of a Factor Analysis in SPSS shows that the items measuring parental attachment work best when grouped together, and that the items measuring school attachment work best when grouped together. It would not be valuable to combine all of these items into one variable representing social bonds.

Parental attachment

In order to measure one's social bond with his/hers parents, I will use the following questions from the ISRD-2 dataset: "How do you usually get along with the man you live with (father, stepfather)?" and "How do you usually get along with the woman you live with (your mother or stepmother)?". The students could indicate again on a Likert scale (a scale of 1 to 4, with 1 being "not at all", and 4 being "very well") in how much they get along with their (step)parents. In addition, I included a measure on the leisure time that one spends with his or her parents as an indicator for the social bond with one's parents. The students were asked to rate the extent to which they do (fun) things with their parents, on a scale from 1 to 6, where 1 corresponds with "almost never", and 6 corresponds with "more than once a week". The reason I chose these items to represent the variable parental attachment, is that because the Factor Analysis in SPSS showed that these three variables are the best fit to measure the same thing (in this case parental attachment). In the Rotated Factor Matrix, getting along with one's father had a value of .627, getting along with one's mother .663 and the leisure time one spends with his parents .434. Since all values are higher than the preferred .30, these variables are a good option to take together in measuring parental attachment.

Furthermore, the scores of these three items will be transformed into POMP scores ranging from 0 to 100 in order to compare the scores on the different items. For these items, Crohnbach's alpha = .49, which is on the low side. This means that these three measures are not quite internally consistent, and are possibly not fit to measure the same thing. In spite of the low score on Crohnbach's alpha, I still choose to use these three variables as a means of operationalizing parental attachment. This is because the before mentioned results of the Factor Analysis in SPSS. The low value for Crohnbach's alpha is not ideal, but since I am conducting a secondary data analysis, I have to work with the data that I have.

School attachment

In addition, school attachment as an indicator of social bonds needs to be operationalised as well. In order to do so, I will take several question from the ISRD-2 dataset together to form the variable. The first one is: "Do you usually like school?". Students could answer this question on a Grasmick scale of 1 to 4, where 1 stands for 'not at all', and 4 stands for 'a lot'. Furthermore, I will use the answers of the students to some statements they had to rate. Those statements were: (1)"If I had to move I would miss my school."; (2) "Teachers do notice when I am doing well and let me know."; (3) "I like my school.";. Students could rate the extent to which they agreed with these statements again on a scale of 1 to 4, where 1 corresponds with 'not at all true', and 4 corresponds with 'very true'. The reason I chose these variables to represent school attachment, is because the Factor Analysis in SPSS showed that these four items are the fit to measure the same thing. In the Rotated Factor Matrix, the question "Do you usually like school"? had a value of .585. Missing one's school when moving away had a value of .628, the teachers noticing when one does well and letting them know a value of .377 and again liking one's school a value of .817. This means again that since all values are higher than the preferred .30, these variables are an option to take together in measuring school attachment. For these items combined, Cronbach's alpha = .68. This is a little below the preferred .70, but the difference is negligible. Another argument to keep parental attachment and school attachment separate, is the value of Crohnbach's alpha when combined. Crohnbach's alpha = .63, which is too low. Because of this, and the results of the factor analysis, I will proceed with a variable for parental attachment and school attachment in my analysis.

Delinquency

Finally, the dependent variable 'delinquency' also needs to be operationalised based on the ISRD-2 dataset. Even though drug use on itself is not prohibited in the Netherlands, using hard drugs can be seriously damaging to one's health. Also, (hard) drug use is in general related to nuisance and criminality (De Politie, 2018). Therefore I include hard drug use as a measure for delinquency. For drug use, the respondents were asked whether or not they had used XTC, LSD, heroin or coke within the last month. The students could respond with (0) "No" or (1) "Yes". Along with that, other measures of delinquent behaviour are included. The respondents were asked if in the last year they were guilty of: damaging something on purpose (vandalism), shoplifting, burglary, bicycle theft, car theft, hacking, stealing something out or from a car, snatching (a purse or a bag), carrying a weapon, (armed) robbery, being part of a group fight or assault. Again, the students could answer these questions with (0) "No", or (1) "Yes". These items are computed into one variable. For methodological reasons, this variable stays dichotomous. This means that the meaning of the value '0' stays the same (that one has not done one of the abovementioned things). Every score of '1' and higher when computing the variable will be recoded into '1'. This means the respondent is guilty of

one of the abovementioned crimes. All these items together result in Crohnbach's alpha = .70. This exactly the required .70, so these items are allowed to be taken together as a measure of delinquency.

As for the analysis, I will use a binary logistic regression to test hypothesis 1 and hypothesis 2. Here I test for the direct influence of self-control on delinquency and that of social bonds on delinquency. I will use this type of regression, since my dependent variable (delinquency) is dichotomous. To test for the mediation effect (hypothesis 3) I will make use of Sobel's test. But, in order to use this, I also have to test for the relationship between self-control and parental attachment and between self-control and school attachment. Since these variables are continuous, a linear regression is sufficient to test for this relationship. The linear regression and the binary logistic regression are easily performed in SPSS. However, Sobel's test for the mediation effect is a little more complicated. In order to perform this test, I need to run the regressions testing for the relationship between self-control and parental attachment/school attachment (independent variable and mediator), self-control and delinquency (independent variable and dependent variable), parental attachment/school attachment and delinquency (mediator and dependent variable, controlling for self-control) and self-control and delinquency (again independent variable and dependent variable, but controlling for parental attachment/school attachment). After conducting these regressions, the test statistics and standard errors are filled in, in an Excel spreadsheet created by Herr (2006) which automatically calculates the Sobel's test, the Z-score from which the p-value can be derived, and Baron & Kenny's proportion of the effect mediated. One final comment about this should be made. Namely that for the relationships which I can test with a linear regression (the effect of self-control on parental attachment and on school attachment), the standardized beta (instead of the unstandardized beta) is used to fill in the spreadsheet for Sobel's test. This is because the odds ratio from the logistic regression is also a standardized test statistic, and it would not make sense to use the unstandardized statistics for one relationship, and standardized statistics for the other.

Control variables

When testing for all these relationships, some control variables are being used. These are: sex, educational level and peer delinquency.

For sex, it is argued that girls are less delinquent than boys, This is due to several reasons. One of those is that girls disclose more information about their lives to their parents than boys, so parents can step in more easily when necessary. Furthermore, boys are seen to be more independent in comparison to girls, and therefore are granted more autonomy, so parents exert less control over their sons (Keijsers, Branje, Van der Valk & Meeus, 2010) . Therefore, sex might as well be a predictor for delinquent behaviour. One's sex is measured by one question: "Are you male or female?". Respondents could answer with 'female'(0), or 'male'(1).

One's educational level is a possible predictor for delinquent behaviour as well. This is because it is argued that the higher level of education one receives, the more human capital one

possesses, which increases the cost of delinquent behaviour. This is because all of the investments in one's human capital would be for nothing when one is incarcerated (Lochner, 2007). This argument is consistent with the results of Van Houtte & Stevens (2008) who have found that students in lower academic tracks display more school misconduct. Therefore it is to be expected that the higher ones educational level, the less likely that person will display delinquent behaviour. One's educational level is indicated on a scale of 1 to 3, where 1 stands for 'low', '2' stands for middle and 3 stands for 'high'.

Finally, having delinquent friends/peers might as well be a predictor for one's own delinquency. An important finding is that when one is attached to a peer or friend, the network structure is of more influence on their behaviour than one's own stable, individual traits. Thus, when one associates with delinquent peers, one is also expected to display delinquency at some point (Haynie, 2001). Peer delinquency is measured by asking the respondents whether people in their group of friends actually do illegal things (against the law) together. Respondents could answer this question with 'No (0) or 'yes' (1).

Analyses & Results

First, to make sure I only include Dutch adolescents in my analysis – since they are my group of interest - I have filtered the dataset on Dutch respondents only. I did so by selecting the respondents who were given a country code of 310 (which represents the Netherlands). In total, 2.330 Dutch adolescents participated in the study. For measuring the age of the respondents, the scholars who collected the ISRD-2 dataset created four categories, ranging from '0' to '3' representing the age of the respondents. A value of '0' stands for an age of younger than twelve years, '1' stands for twelve to fifteen years old, '2' stands for sixteen to eighteen years old, and '3' stands for eighteen years old, or older. Since my interest goes to the age group of twelve to fifteen, I included only those with a value of '1' on the question about one's age group. Since only one score of an item is used, it is not possible to make a statement about the division of age in this group of respondents.

After conducting this selection, 2.153 respondents remain to be included in the analysis. The male/female ratio is almost equal, with 1.064 respondents identifying as female, and 1.087 respondents identifying as male. The remaining two respondents could not provide an answer to this question. Furthermore, the mean score on self-control for Dutch adolescents is 2.90. This means that on average, Dutch adolescents have quite a lot of self-control. As for parental attachment, for which I used POMP scores ranging from 0 to 100 in order to be able to combine different scales, the average score is 83.03, meaning that overall, Dutch adolescents maintain good relationships with their parents, and experience high levels of parental attachment. Then, on attachment to school, which was measured on a Likert scale, Dutch adolescents had an average score of 2.99, meaning their attachment to school is also quite high. Finally, the average score for Dutch adolescents on delinquency, which was kept a

dichotomous variable, is 0.28. This means that in the past twelve months, 28% of the respondents have committed some type of crime, or have used XTC, LSD, heroin or coke in the last month. These results are also displayed in table 1.

As mentioned before, I will make use of a binary logistic regression to test for hypothesis 1 and hypothesis 2, since the dependent variable is dichotomous. First, I conducted a binary logistic regression to analyze the effect of the degree of one's self-control on one's delinquency. No control variables are included yet. The logistic regression indicated that there was a significant relationship between self-control and delinquency ($OR = .132$, $p < .05$). This points at a negative relationship, since odds ratio is smaller than 1. Generally, when OR has a value below 1, this means that an increase of one unit on the measure for (in this case) self-control means lower odds of becoming delinquent. In other words, the more self-control one possesses, the less they are expected to display delinquent behavior. To give an idea about the model fit, I will present Cox & Snell R^2. But, one must be cautious drawing conclusions for this R^2, since it is a pseudo R^2. Because my dependent variable is dichotomous, it is not possible to perform a linear regression. Therefore, it is also very difficult to calculate an R^2-statistic that has the same characteristics of an R^2-statistic calculated in a linear regression. Instead an R^2 is computed that is compatible with the dichotomous dependent variable. But, this R^2 is an approximation compared to the R^2 given in a linear regression. Thus this pseudo R^2 should be interpreted with caution (IBM Knowledge Center, n.d.). The Cox & Snell R^2 reports a value of .187, meaning that approximately 18.7% of the measured delinquency is explained by self-control.

Table 1

Descriptive statistics

Variable Name	Min.	Max.	Mean	STDDV
Sex	.00	1.00	.51	.500
Educational level	1.00	3.00	1.79	.806
Peer delinquency	.00	1.00	.29	.453
Self-control	1.00	4.00	2.9040	.56743
Parental attachment	.00	100.00	83.0292	16.06698
School attachment	1.00	4.00	2.9863	.65264
Delinquency	.00	1.00	.2799	.44906

When adding the control variables sex, educational level and peer delinquency (see Model 1, Table 2), the effect of self-control on delinquency remains significant ($OR = .218$, $p < .05$), yet

decreases. This still means that the more self-control one has, the less delinquent behavior they are expected to display. But the effect is smaller than when the control variables were not included yet. As for a substantive conclusion, this means that self-control is not the only predictor for delinquent behavior. All the control variables are significant predictors for delinquent behavior as well. For Sex (OR = 1.867, p < .05), educational level (OR = .796, p < .05) and peer delinquency (OR = 3.707, p< .05). For Sex, there is evidence for a positive relationship with delinquency. Therefore, males are expected to be more delinquent than females. Furthermore, for educational level a negative expected relationship with delinquency was found. This means that the higher the educational level one has achieved, the smaller the chance that they will display delinquent behavior. Finally, for peer delinquency was found plausible that the more delinquent peers one associates with, the greater the chance that they will display delinquent behavior. After adding the control variables, Cox & Snell R^2 reached a value of .258, meaning that it can be assumed that approximately 25.8% of the display of delinquent behavior is explained by the independent, and control variables. It makes sense that this number has increased, since more explanatory variables are included in the analysis. Overall, hypothesis 1: *The more self-control one has, the smaller the chance that person will turn to criminal behaviour* seems to be confirmed by these results.

A binary logistic regression was also conducted in order to analyze the direct effect of parental attachment as a form of social bonds on expected delinquent behavior. Again, the first analysis was conducted without the control variables sex, educational level and peer delinquency. According to the results of the binary logistic regression, there was a significant negative relationship between parental attachment and delinquency (OR = .978, p < .05). The negativity of this relationship means substantively that the more one is attached to his or her parents, the smaller the chance one will display delinquent behavior. Yet, this effect is quite small, since OR nearly reaches a value of 1. That parental attachment has a small effect on delinquency, is also indicated by Cox & Snell R^2. Cox & Snell R^2 = .027. This low value suggests that only 2.7% of the delinquency is explained by (lack of) parental attachment.

When control variables were added, the relationship between parental attachment and delinquent behavior remained significant (OR = .982, p < .05) (see Model 2 in Table 2). But, just as seen before with self-control, the effect of parental attachment on delinquency did decrease. After adding the control variables, it is still assumed that the more parental attachment one experiences, the less delinquent behavior they are expected to display, but the effect is smaller than when the control variables were not included yet. Again, this hints at the fact that parental attachment is not the sole predictor for delinquent behavior. Once more, all the control variables seem to be significant predictors for delinquent behavior. For sex (OR = 2.334, p < .05), educational level (OR = .697, p < .05) and peer delinquency (OR = 5.612, p < .05). For sex there is again evidence for a positive relationship with delinquency. So, males are again expected to be more delinquent than females. Furthermore, for educational level a negative relationship with delinquency is expected. Finally for

peer delinquency there is again evidence that the more one associates with delinquent peers, the greater the chance that they will display delinquent behavior. After adding the control variables, Cox & Snell $R^2 = .197$. This suggests that after adding the control variables, suddenly 19.7% of the delinquent behavior of adolescents can be explained by the independent and control variables. These results confirm at least part of hypothesis 2, since the variable social bonds is operationalised by both parental attachment and school attachment. Hypothesis 2 predicted the following: *The stronger the bonds one has to social institutions as a result of one's investment in those bonds, the smaller the chance that person will turn to criminal behaviour.*

Table 2

Results of binary logistic regression analysis of the effects of self-control, parental attachment and school attachment on delinquency, controlled for sex, educational level and peer delinquency

	Model 1		Model 2		Model 3		Model 4	
	B (SE)	OR	B (SE)	OR	B (SE)	OR	B (SE)	OR
Self-control on delinquency	-1.523 (.153)	.218*					-1.402 (.165)	.246*
Parental attachment on delinquency			-.019 (.004)	.982*			-.018 (.005)	.982*
School attachment on delinquency					-.339 (.104)	.713*	-.111 (.127)	.895
Control variables								
Sex	.624 (.149)	1.867*	.848 (.147)	2.334*	.665 (139)	1.944*	.742 (.166)	2.101*
Educational level	-.229 (.091)	.796*	-.360 (.087)	.697*	-.400 (.084)	.670*	-.210 (.098)	.811*
Peer delinquency	1.310 (.161)	3.707*	1.725 (.151)	5.612*	1.745 (.147)	5.726*	1.219 (.174)	3.383*
Constant	3.163 (.451)	23.635*	.391 (.398)	1.478*	.110 (.364)	1.116*	4.482 (.681)	88.371*
Cox & Snell R^2	.258		.197		.191		.258	
N	2.153		2.153		2.153		2.153	

* p < .05

To explore whether school attachment as a form of social bonds is a significant predictor for delinquency as well, another binary logistic regression analysis was conducted. According to these results, there is a significant negative relationship between school attachment and delinquency (OR = .508, p < .05). As said before, this relationship is negative, meaning that the more one is attached to school, the less one is expected to display delinquent behavior. This effect is not entirely small, but also not very large. That the effect is not very large, can also be assumed when looking at Cox & Snell R^2 = .039. This suggests that approximately 3.9% of the variable delinquency can be explained by attachment to school.

After adding the control variables, the relationship between school attachment and delinquent behavior remained significant (OR = .713, p < .05) (see Model 3 in Table 2). But again, just as witnessed before with the other independent variables, the overall effect of school attachment on delinquency did decrease. The relationship is still negative, meaning that the more one is attached to school, the less they are expected to display delinquent behavior, only is the effect smaller than when the control variables were not included in the analysis yet. So again, school attachment seems to be a significant predictor for delinquency, just not the only one.

Yet again, all the control variables are significant predictors for delinquent behavior as well. For sex (OR = 1.944, p < .05), educational level (OR = .670, p < .05) and peer delinquency (OR = 5.726, p < .05). For sex, the results point at the direction of a positive relationship between sex and delinquency. Again, males are expected to be more delinquent than females. Furthermore, for educational level there is again evidence for a negative relationship with delinquency. Finally for peer delinquency, the positive relationship between peer delinquency and one's own delinquency is also established. After adding the control variables, Cox & Snell R^2 = ,191 meaning that 19.1% of the variable delinquency can be explained by the independent and control variables (see model 3, table 2). This is an increase relative to the analysis without control variables. This means that by adding the control variables, we have possibly found more variables next to school attachment predicting delinquency. When looking at both of the analyses for parental attachment and school attachment, one can conclude that hypothesis 2 is confirmed by the data.

Furthermore, the fourth model in table 2 describes the effect of the main and control variables all taken together in their effect on delinquency.

Finally, to explore whether social bonds mediate the relationship between self-control and delinquency, or whether this relationship is spurious, Sobel's test for a mediation effect was conducted. The test was conducted both for parental attachment and school attachment as a form of social bonds. In order to perform Sobel's test, some additional linear regressions were performed, namely for the effect of self-control on parental attachment and for the effect of self-control on school attachment. Self-control was found to be a significant predictor for parental attachment (B = 4.761, t (1750) = 7.134, p < .05), as well as school attachment (B = .226, t (1897) = 8.744, p < .05). Even when controlled for sex, educational level and peer delinquency, self-control remains a significant

predictor for both parental attachment as well as school attachment. The results of the analysis including the control variables are displayed in table 3.

So far, self-control, parental attachment and school attachment are assumed to be of significant influence on delinquency. Also, self-control appears to have significant effects on both parental attachment as well as school attachment. All these effects remained significant after controlling for sex, educational level and peer delinquency.

Table 3

Results of linear regression analysis for the effects of self-control on parental attachment and school attachment, controlled for sex, educational level and peer delinquency

	Model 1: Parental Attachment		*Model 2: School Attachment*	
	B (SE)	*t*	B (SE)	*t*
Self-control	3.676 (.842)	4.365*	.127 (.033)	3.804*
Control variables				
Sex	2.102 (.888)	2.366*	-.118 (.035)	-3.348*
Educational level	.157 (.541)	.290	.016 (.021)	.770
Peer delinquency	-4.167 (1.058)	-3.939*	-.250 (.042)	-5.976*
Constant	72.216 (2.746)	26.299*	2.721 (.109)	25.045*
R^2	.042		.077	
N	2.153		2.153	

*p < .05

Finally, after collecting all the necessary data, Sobel's test for a mediation effect was conducted. It appears that for parental attachment, Sobel's test is not significant, meaning that parental attachment in fact does not seem to mediate the relationship between self-control and delinquency. Sobel's test shows that (Sobel = .207, p = .401). Sobel (the test statistic) stands for the amount of variance in the dependent variable for which the independent variable through the mediating variable is responsible. This means that the higher the test statistic, the greater the variance that runs through the mediating variable. After adding the control variables, the relationship is still not significant (Sobel = .261, p = .440) (see model 1in table 4). Even though parental attachment has a small, but significant effect on delinquency, it does not seem to operate as a (partial) mediator .

For school attachment as a form of social bonds, a different pattern is visible. School attachment does seem to be operating as a partial mediator between self-control and delinquency

(Sobel = .003, p < .05). Baron & Kenny's proportion of the effect mediated is equal to 32%, meaning that about a third of the total effect is mediated by school attachment. This is quite a large effect. After adding the control variables, the test statistic does not change (Sobel = .003, p < .05) (see model 2 in table 4). This means that school attachment is still a significant partial mediator in the relationship between self-control and delinquency. What is interesting, is that Baron & Kenny's proportion for the effect mediated has changed after adding the control variables. Now, it is equal to 14,2 %. So, after adding the control variables, a smaller part of the total effect appears to be mediated by school attachment. This is interesting, because when looking back at model 4, table 2 school attachment is no longer a significant predictor when all of the variables are taken together in the same analysis. This is another hint at the fact that besides school attachment, other variables might as well be predictors for delinquent behavior.

Thus, school attachment appears to be a significant partial mediator in the relationship between self-control and delinquency. However, parental attachment is not. This means that there is partial support in favor of the mediation hypothesis. Therefore, one can only partially confirm hypothesis 3, stating the following: *The more self-control one has, the stronger the bonds one has to social institutions, and therefore the smaller the chance that person will turn to criminal behaviour.*

Table 4

Results Sobel test for mediation with self-control, parental attachment, school attachment on delinquency, controlled for sex, educational level and peer delinquency

Variable	Model 1: Parental Attachment			Model 2: School Attachment		
	Test statistic (Sobel)	Baron & Kenny's proportion	*p*-value	Test statistic (Sobel)	Baron & Kenney's proportion	*p*-value
Self-control	.261	.593	.440	.003	.142	0.000

* p < .05

When summarized in a figure, the mediation effect for school attachment controlled for sex, educational level and peer delinquency looks like the following:

Figure 1 – The mediation effect of school attachment between self-control and delinquency controlled for sex, educational level and peer delinquency

.110*

School attachment

.815*

Self-control

.227*
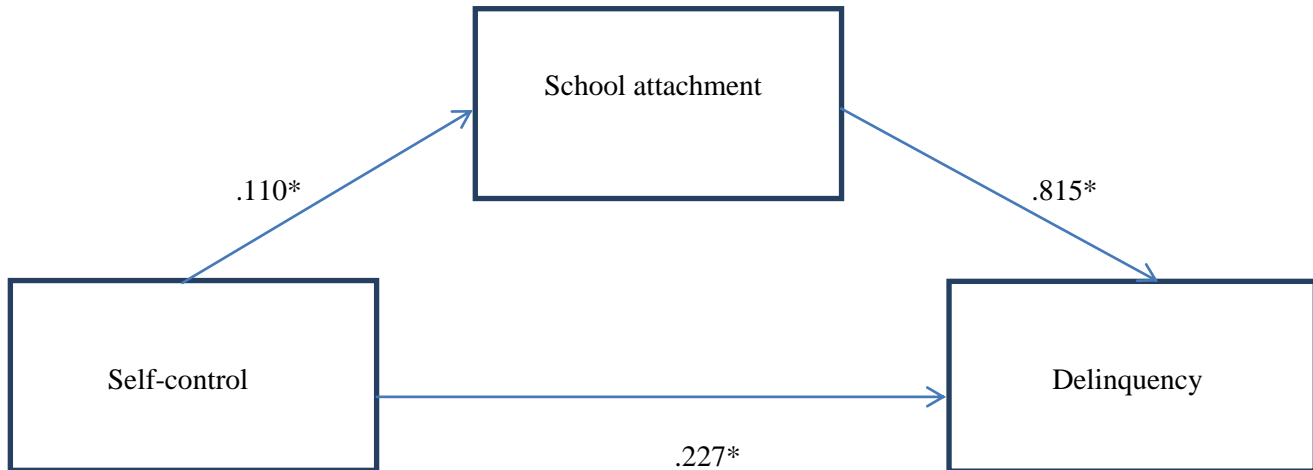
Delinquency

*p <.05

The relationship between self-control and school attachment was tested with a linear regression. As you can see, the effect of self-control on school attachment when controlled for sex, educational level and peer delinquency is not very large (β = .110, p < .05), yet it is significant. This relationship is in fact positive, meaning that the more self-control one possesses, the more school attachment (as a form of social bonds) this person is expected to have. As mentioned before, the relationship between self-control and delinquency was tested with a binary logistic regression, and appeared to be significant (OR = .227, p <.05) when controlled for school attachment, sex, educational level and peer delinquency. The direction of the relationship is negative, meaning the more self-control one has, the less likely one is expected to display delinquent behaviour. Self-control has quite a large impact on (the absence of) delinquent behaviour. Finally, the relationship between school attachment and delinquency was also tested with a binary logistic regression. There is a negative effect of school attachment on delinquency, and it appears to be significant (OR = .815, p < .05), when controlled for self-control, sex, educational level and peer delinquency. This means that the more attachment to school one experiences, the less likely this person will display delinquent behaviour.

As mentioned before, the overall mediation effect with school attachment as a mediator was tested with Sobel's test, and found to be significant (Sobel = .003, p < .05). School attachment appears to be a significant partial mediator in the relationship between self-control and delinquency.

Discussion & Conclusion

The findings of this study are interesting, but every study has its limitations that should be taken into account. In this study, they mostly have to do with the operationalization of the variables. I have conducted a secondary data analysis, instead of analyzing data that I have gathered myself. Having to work with data that others already have collected saved me a lot of time, which is beneficial, but at the same time is a limitation. This is because I could not come up with my own questions which I would have wanted to use in order to measure the main variables.

For example, operationalizing social bonds was quite a challenge. Crohnbach's alpha for the variable parental attachment is fairly low, namely .49. Crohnbach's alpha for school attachment on the other hand sufficed, with a value of .68. Taking them together could have been an option to solve the problem of the low Crohnbach's alpha for parental attachment. But, when taken together Crohnbach's alpha for social bonds would also have been too low. It would have had a value of .63. Therefore, I thought it would be more valuable to keep parental attachment and school attachment separate. Also, after conducting a Factor Analysis, it became even clearer that it would be of no use to combine parental attachment and school attachment into one variable for social bonds. Therefore I chose to keep parental attachment and school attachment as separate measures for social bonds, but tried to reach the highest possible Crohnbach's alpha.

Yet, the fact that I kept parental attachment and school attachment separate variables is also a positive aspect of this study. Since social bonds is operationalised by two different variables, one can be more specific in claims about what aspect of social bonds it is that possibly influences delinquency. In this case, school attachment in fact is found to be a significant partial mediator in the relationship between self-control and delinquency, and parental attachment is not.

Furthermore, another limitation has to do with the operationalization of the variable delinquency, more specifically in combination with the age group twelve to fifteen. Most of the items included in the ISRD-2 dataset included quite serious types of crimes, for example (armed) robbery, car theft, carrying a weapon etc. These type of crimes do not really fit with the type of crimes you would expect from twelve to fifteen year olds (Graham & Bowling, 1995). Therefore, one might find (unfairly) low scores on delinquency. I tried solving this by also including some minor types of crimes, like vandalism and shoplifting.

In addition, what can be seen as a limitation as well, is the fact that I created a dichotomous scale for delinquency as the dependent variable. This was in my opinion the most straightforward thing to do, since the items that I used in measuring delinquency were also measured on a dichotomous scale in the ISRD-2 study. This can be a limitation since one may miss out on valuable data. One is either delinquent, or not, there is no in between. But, having a dichotomous scale instead of a continuous one is beneficial for several reasons. First, this way there is no influence of extreme values, and therefore a much smaller chance on a skewed distribution. Second, the measured strength

of the association does not decrease when using a dichotomous scale if the appropriate measures are used. This is not per se a benefit, but an explanation as for why it is not a disadvantage. Third, dichotomization allows for researchers to make use of odds ratio (which I also used), which (in comparison with product-moment correlation and the percentage of the variance explained) is a more interpretable, meaningful and realistic way of measuring the strength of the association. Finally, a dichotomous scale simplifies the presentation of the analysis and its results, and it is easily understandable among a wide audience (Farrington & Loeber, 2000).

On the other hand, a strength of this study was the access to a very large dataset. Working with a remaining amount of 2.153 valid cases added to the external validity of this study, and possibly the significance of some of the proposed relationships.

Also, it is worth mentioning that according to my findings, almost all the proposed relationships are found to be significant, and almost all of the hypotheses are fully confirmed. This is noteworthy since I have not collected my own data. Overall, in spite of the fact that I was limited by the dataset, it was still possible to conduct a valuable analysis and contribute to the existing literature in testing the general theory of crime, in particular the spuriousness hypothesis, and social control theory.

Thus, based on this study's analysis, partial evidence was found in favor of the mediation hypothesis, meaning that some types of social bonds (not all) seem to mediate the relationship between self-control and delinquency. Therefore, hypothesis 3: *The more self-control one has, the stronger the bonds one has to social institutions, and therefore the smaller the chance that person will turn to criminal behaviour.* receives partial confirmation. Parental attachment as a form of social bonds (when controlled for sex, educational level and peer delinquency), appeared not to be a partial mediator in the relationship between self-control and delinquency. School attachment as a form of social bonds, when controlled for sex, educational level and peer delinquency, seems to function as a partial mediator . Baron & Kenny's proportion of the effect mediated is approximately 14% which is very tiny, but still found to be significant. Following these results, it seems as if school attachment has more of an influence in the relationship between self-control and delinquency than parental attachment does. Earlier research emphasizes the importance of both family/parents and school in the prevention of delinquency among children and adolescents (Yoshikawa, 1994; Dishion, Patterson, Stoolmiller & Skinner, 1991). But, when looking at the existing literature it is not quite clear which form of social bonds (parental attachment or school attachment) has more influence on adolescent delinquency, especially in this mediating relationship, and why. This might be an interesting subject for future research.

Furthermore, I have found an answer to the main question as proposed in the introduction. The question was proposed as following: *To what extent do social bonds have a mediating role in the relationship between self-control and delinquency among Dutch adolescents?* It appears that some types of social bonds possibly function as a partial mediator in the relationship between self-control

and delinquency among Dutch adolescents, and some types do not. This is a valuable conclusion in research investigating possible explanations for juvenile delinquency, yet this study is not conclusive. There might be other causes for delinquent behavior among adolescents that still need attention.

The remaining two hypotheses, hypothesis1: *The more self-control one has, the smaller the chance that person will turn to criminal behaviour.*, and hypothesis 2: *The stronger the bonds one has to social institutions as a result of one's investment in those bonds, the smaller the chance that person will turn to criminal behaviour.* were also confirmed. These findings confirm social control theory from Hirschi (1969). Social control theory prescribes that having (strong) social bonds is what keeps us from becoming delinquent. Evidence for this assumption was found, since both parental attachment and school attachment appear to be negatively related to delinquency. Yet, some effects (i.e. of parental attachment) are found to be very small.

This study's findings confirm only part of the general theory of crime from Gottfredson & Hirschi (1990). The general theory of crime looks at causes for crime more or less in the same way as social control theory. Both theories look at what it is that keeps people from becoming delinquent. For Hirschi (1969) with social control theory, this is social bonds. For Gottfredson & Hirschi (1990) with the general theory of crime, this is self-control. This is confirmed by this study's results. It was found that when one has high levels of self-control, it is expected that this person has a low chance of turning to delinquency. The reverse can also be assumed. This is in line with the results from previous research on the subject, for example done by Cheung & Cheung (2008), Na & Paternoster (2012), Grasmick, Tittle, Busik & Amekley (1993), Gibson & Wright (2001) and many more.

Furthermore, following Gottfredson & Hirschi's (1990) general theory of crime, it is proposed that self-control not only influences one's delinquency, but also one's life chances, quality of life and social bonds. According to them, there is a spurious relationship, in which self-control influences both delinquency and social bonds. They conclude that social bonds do not influence delinquency in any way. This part is refuted by this study. Even though parental attachment does not seem to mediate the relationship between self-control and delinquency, it does seem to be of significant influence in predicting delinquency among Dutch adolescents. The same goes for school attachment as a form of social bonds. There even is evidence that school attachment does partially mediate the relationship between self-control and delinquency, so social bonds seem to have a more important role when it comes to explaining delinquency than Gottfredson & Hirschi (1990) give them credit for.

As mentioned before, a lot of research has been done on behalf of this subject. Evans et al. (1997), Polakowksi (1994) and Pratt & Cullen (2000) have found evidence in favour of Gottfredson & Hirschi's (1990) 'spuriousness hypothesis'. Other studies, such as those of Wright, Caspi, Moffitt & Silva (2001), Li (2004), Longshore, Chang, Hsieh & Messina (2004), Longshore, Chang & Messina, (2005) on the other hand, present evidence in favour of a mediation effect. Noteworthy is that the research in favour of the mediation effect, is more recent than research in favour of the spuriousness hypothesis. One the one hand, this research adds to it, in the sense that it is in line with previous

literature and gives more power to the mediation hypothesis. On the other hand, since only one form of social bonds (namely school attachment) was found to be a significant partial mediator, this study gives reason for future research. Since apparently not all forms of social bonds function as (partial) mediators in the relationship between self-control and delinquency, social bonds could be operationalised into even more different types of bonds (i.e. with peers/friends, sports, clubs, extracurricular activities et cetera) to discover which mediate this relationship and which do not. Based on that, policy can be designed to enhance those social bonds which seem to operate as a mediator, which hopefully decreases juvenile delinquency.

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