

Does parental control moderate the effect of low self-control on adolescent offline and online delinquency?

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Abstract

The article elaborates on central interpretations of the general theory of crime regarding parental control, self-control, and delinquency by analyzing the effect of parental control on the association between low self-control and adolescents' offline and online delinquency. Analyses employ mediation and moderation models via structural equation modelling with a nationally representative sample of Finnish adolescents (N = 6,061). Results indicate parental control had direct and indirect associations (via self-control) with offline delinquency. Whereas, parental control had only an indirect association with delinquency online. The direct association between self-control (internal control) and offline and online delinquency was moderated by parental social control (external control). General theory of crime provides a useful perspective for exploring the effect of parental control on adolescents' delinquency. Findings bring new evidence on the dynamics between low self-control and parental control. Future studies should continue investigating the interplay between internal and external controls.

Keywords: Delinquency, adolescents, online delinquency, self-control, parental control, the General Theory of Crime

INTRODUCTION

The general theory of crime (GTC) by Gottfredson and Hirschi (1990) is one of the most influential criminological theories in contemporary criminology. The theory has increased the understanding of individual variations in crime involvement by arguing that differences in the propensity to commit criminal acts are due to differences in self-control. GTC has inspired an impressive array of theoretical and empirical research and gained extensive empirical support (Pratt & Cullen, 2000; Vazsonyi, Mikuska & Kelley, 2017).

The theory argues that self-control is the main cause of all types of criminal behavior. The argument has gained substantial support regarding traditional types of crime, such as violent behavior (e.g. Vazsonyi et al., 2017), but findings regarding newer types of crime, such as online delinquency, are more rare and have yielded mixed findings (Bae, 2017; You & Lim, 2016; Holt et al., 2012; Bossler & May, 2012; Moon, McCluskey & McCluskey, 2010; Vazsonyi et al., 2012). The theory suggests that self-control is created in the attachments formed early in life between parents or other caregivers and children and then remains stable throughout the child's life. Further, the theory argues that both delinquency and weak social bonds are originally the products of low self-control implying that the effect of parental bonds later in life on delinquency is mediated by self-control (Gottfredson & Hirschi, 1990; Hirschi & Gottfredson, 1994). However, several empirical criminological studies have shown that the effect of parental control also has an independent direct effect on adolescents' delinquency (Muftić & Updegrave, 2018; Perrone, Sullivan, Pratt & Margaryan, 2004), that parental control may even substitute for low self-control to a certain extent (Hirtenlehner & Meško, 2018), and that parental monitoring is related to positive development of self-control in later adolescence (Brauer, 2016).

These findings have been interpreted as non-supportive for GTC. However, these studies have failed to address all aspects of GTC in order to draw comprehensive conclusions about the usefulness of the theory. The relationship may be more complex as parental controls could impact

decision-making by limiting the opportunities a youth with low self-control has to engage in delinquency. Additionally, in their later work (e.g. Hirschi, 2004), self-control is defined as a “tendency to consider the full range of potential costs of a particular act.” One contemporaneous consequence is the influence of one’s actions on social bonds. Here Hirschi underscores the importance of the opinions of others, such as family members or teachers. In other words, the effect of a criminal act on these bonds could be considered a crucial element in the decision-making process whether to engage in criminal behavior. Further, research directly examining the relationship between internal and external controls have been limited in their methodological designs, meaning that comprehensive conclusions regarding parental control, self-control, and different types of delinquency remain. This study attempts to fill this gap by analyzing the role of parental control in adolescents’ delinquency. First, we test if the relationship between weak parental control and increased delinquency is mediated by low self-control, and second, we test if parental control moderates the relationship between low self-control and delinquency. The study employs structural equation modelling (SEM) with a nationally representative sample of Finnish adolescents (N = 6,061). Additionally, analyses are conducted on forms of both offline and online delinquency, where offline delinquency is evaluated by the use of physical violence and online delinquency is measured by engaging in online bullying.

Self-control and criminal behavior

According to GTC, criminal acts are exciting, risky, and provide immediate and easy gratification. Individuals with lower self-control have a tendency to respond to tangible stimuli in the immediate environment and tend to not take into consideration the full range of potential costs of criminal behavior (Gottfredson & Hirschi, 1990; Hirschi, 2004). GTC considers self-control to be an individual trait. It is a “general explanatory concept that can be measured independently of the phenomenon it is alleged to cause, and it is thus directly testable” (Gottfredson & Hirschi, 1990, p. 120).

The role of the environment in explaining delinquency is secondary to having low self-control, although important. The environment only provides (or not) an opportunity to express this individual propensity. This theoretical proposition is derived from developments in routine activity theories, which focus on situational elements of crime as it typically occurs (Cohen & Felson, 1979). Therefore, according to routine activity theory, crimes take place in situations in which a potential offender meets a potential victim without supervision. GTC assumes that differences between people with varying levels of self-control interact in settings that vary in the opportunities for crime and delinquency. Thus, routine activities theory is not intended to explain the causes of criminal behavior, but provide insight into why crime occurs in a particular place at a particular time and is compatible with theories dealing with individual differences in the propensity to commit criminal acts such as low self-control.

Existing empirical research has shown that the role of low self-control in explaining criminal behavior is evident. There are two extensive meta-analyses of the literature concluding that there are significant effects from low self-control on delinquency with a variety of study designs (Pratt & Cullen, 2000; Vazsonyi et al., 2017). Although, these studies have mainly focused on traditional types of criminal behavior, such as violent behavior or property crime. Studies analyzing the effect of low self-control on online delinquency are less common even though online delinquency has become a more frequent form of delinquency among adolescents (Keipi, Näsi, Oksanen & Räsänen, 2017). Most of these studies have also found a relationship between low self-control and delinquency online (Bae, 2017; You & Lim, 2016; Holt et al., 2012; Moon et al., 2010), but are based on non-Western samples (Bae, 2017; You & Lim, 2016; Moon et al., 2010) or small Western college samples (see however, Holt et al., 2012; Vazsonyi et al., 2012). Therefore, more research evaluating self-control and online delinquency is needed.

The relationship between self-control and parental control

According to Gottfredson and Hirschi (1990), self-control is created in attachments formed early in life between parents or other caregivers and the child. This child-rearing model accounts for the origins of self-control and argues that a lack of parental supervision, discipline, and affection creates low self-control in early childhood. The level of self-control remains relatively stable after the age of responsibility, which is estimated to be between 8 and 10 years old (Hirschi, 2004).

The meaning of parental control changes in the GTC along with child's age. In early childhood, parental control has a meaningful and active role in the *creation* of self-control. Then when children get older, if they develop low self-control, they will have cold and brittle relationships with their parents leading to weak social bonds (Gottfredson & Hirschi, 1990, p. 157). Therefore, after childhood, social relationships – even with parents – have been theorized to have less impact on delinquency (Gottfredson & Hirschi, 1990; Wright et al., 1999). This argument has created confusion regarding the relationship of self-control, parental control, and delinquency, at least partly because of the complex role of parental control in shaping self-control during childhood and the tendency of adolescents with low self-control to constrain the influence of family and other social institutions later in life.

Vazsonyi and Belliston (2007) argued that this confusion is caused by a fundamental misunderstanding of the theory. They argue it is a misinterpretation of the theory to suggest that self-control is the sole predictor of deviance. Accordingly, they note that Gottfredson and Hirschi meant self-control to be considered as a probabilistic factor in understanding the etiology of crime and not a deterministic one, which leaves room for other factors to explain crime, such as socialization (Vazsonyi & Belliston, 2007, p. 508). Therefore, empirical findings of both direct and indirect effects of parenting on criminal or deviant behavior after childhood would be in accordance with the theory.

Further complicating this relationship, the stability postulate – that self-control does not change after the age of responsibility – has also been challenged especially from the point of view of social learning theory (Akers, 1973; Akers, 1998; Pratt et al., 2010). While both self-control and social learning theory argue that what ultimately causes crime is the result of socialization, they differ fundamentally in their approach to behavioral change. As described above, self-control theory assumes that low self-control is caused mainly by ineffective parenting, and improvements in the individual's self-control after childhood is deemed to be difficult, while social learning theory both allows for and emphasizes socialization and re-socialization effects. This expectation is consistent with several other criminological theories, such as life-course criminology, which argues that life course trajectories can shape the level of self-control (e.g. Sampson & Laub, 1993; 2003), and situational action theory which emphasizes the interplay of internal and external forms of control by describing the process of choice as an interaction between an individual's crime propensity and their criminogenic exposure (Wikström, 2010; 2014).

Earlier empirical studies scrutinizing the complicated relationship between self-control and parental control have reported mixed results (Arneklev, Cochran & Gainey, 1998; Hay & Forrest, 2006; Turner & Piquero, 2002; Winfree, Taylor, He & Esbensen, 2006; Vazsonyi & Jiskrova, 2018), but many of them have reported direct effects between parental control and adolescent delinquency (Brauer, 2017; Finkenauer, Engels & Baumeister, 2005; Jennings, Higgins, Akers, Khey & Dobrow, 2013; Muftić & Updegrovel, 2018; Nakhaie, Silverman & LaGrande, 2000; Perrone et al., 2004; Unnever, Cullen & Pratt, 2003). Additionally, there is research evidence suggesting that parental monitoring is related to positive development of self-control even in later adolescence. And, thus, research has found the association between parental control and delinquency in later adolescence to be partly mediated via self-control (Brauer, 2016; Finkenauer et al., 2005). With the noted exception of Vazsonyi and Belliston (2007), these findings of direct effects have often been interpreted as non-supportive for GTC.

In addition to the direct effects of social control, the interaction effects between social control and self-control on delinquent behavior have been reported (Nakhaie, Silverman & LaGrande, 2000; Wright, Caspi, Moffitt & Silva, 2001). Wright and colleagues (2001) reported empirical evidence for their proposed “social protection hypothesis” in which prosocial bonds or external social control exercise a crime-dampening effect, particularly among individuals with a high propensity for crime, such as those with low self-control. The suggested protected effect of parental control was examined by Hirtenlehner and Meško (2018) who analyzed moderation effect between parental control, self-control, and offending among Slovenian adolescents. They found that external control was more effective in preventing adolescents’ criminal offending when internal control was low. However, the interaction (moderation) between self-control and parental control did not significantly predict offending. Doherty (2006) studied desistance from crime among serious juvenile delinquents and did not find any interaction between internal and external control. Further, in the Ousey and Wilcox study (2007), confirmation of the interaction hypothesis was dependent on the type of delinquency measured. Although, these studies have mainly been based on theoretical frameworks other than GTC.

The interplay between internal and external controls has also received interest in deterrence research (see e.g. Dölling, Entorf, Hermann & Rupp, 2009; Loughran, Paternoster & Weiss, 2016; Paternoster, 2010; Paternoster & Bachman, 2013; Pratt, Cullen, Blevins, Daigle & Madensen, 2006; Wikström, 2008; Wright, Caspi, Moffitt & Paternoster, 2004). For instance, in a recent study by Walters (2018), the association between parental knowledge and youth delinquency was mediated by time spent in unsupervised routine activities. However, these studies utilize a different theoretical framework which emphasizes the deterrability aspect of social control, whereas GTC emphasizes the effects of attachments and social bonds related to social control.

Finally, the studies on the dynamics of the internal and external control have focused solely on offline delinquency. Some studies include both self-control and social control in explaining

online delinquency as independent factors, but the interaction between these have not been studied (Bae, 2017). Holt and colleagues (2012) explored the mediation effect between peer relations and self-control on online delinquency but their study did not include measures of social control.

To conclude, there is ambiguity in research derived from GTC on whether the effect of parental control on adolescents' delinquency is fully mediated by self-control after early childhood formulation of self-control. However, most of these studies have failed to address all aspects of GTC in order to draw comprehensive conclusions about the usefulness of the theory. First, only few studies focused particularly on parental control, which would be the most relevant form of social control from a GTC perspective (Brauer, 2016; Finkenauer et al., 2005). Studies have used general measures of social control, through which social control by peers, family members, and the neighborhood have been combined (Nakhaie et al., 2000; Wright et al., 2001) or have focused only on neighborhood social control (Meier et al., 2008; Jones & Lynam, 2009). Finally, studies on interaction between internal and external control have used either moderation or mediation in their analytical strategy, not taking into account both possible ways of interaction.

Current Study

Utilizing GTC, the goals of this study are to explore in a sample of adolescents if 1) the relationship between weak parental control and increased delinquency is mediated by low self-control and if 2) parental control moderates the relationship between low self-control and delinquency. Thus, our analyzes go beyond previous studies (e.g. Wright et al., 2001; Hirtenlehner & Mesko, 2018) by including both moderation and mediation in the models simultaneously. The effect of parental control on the association between low self-control and delinquency is evaluated using Structural Equation Modeling (SEM) with a nationally-representative sample of Finnish adolescents (N = 6,061). Given our cross-sectional data, estimated associations in our structural equation models cannot be interpreted as causal relationships. Instead, all the modelled associations

and their directions are based on our theoretical model. Analyses are conducted separately on both offline and online delinquency, where offline delinquency is evaluated by measures of physical violence and online delinquency is evaluated by bullying on social media. Thus, the primary research question is whether the effect of parental control is fully mediated via low self-control on adolescents' delinquency, when individual background variables as well as measures of routine activities to evaluate opportunity are taken into account? (See Figure 1). The aim is to bring more insight to the empirical adequacy of GTC regarding parental control, self-control, and different types of delinquency.

[Insert Figure 1 here]

METHODOLOGY

Data

The analyses employ data from the 2016 Finnish Self-Report Delinquency survey (FSRD). The FSRD survey consists of a series of nationally representative self-report surveys that focus on juvenile delinquency in Finland that has been collected eight different times since 1995. The data are based on random samples of schools drawn up by Statistics Finland, the national agency for collecting statistics. The size of the school and type of community were considered in the sampling strategy (a stratified one-stage cluster sample with probability proportional to its size). Data was collected using an anonymous online survey, which respondents filled out during their school day using a computer either in the school computer laboratory or in a classroom (i.e. laptops). Respondents consisted of Finns attending the ninth grade (aged 15 to 16 years old), which is the final year of Finnish mandatory education.

The 2016 survey had 6,061 respondents with a response rate of 79%. For the empirical analyses, two separate data sets were utilized to analyze offline and online delinquency in separate models. Weights were used to adjust for sampling technique and non-response related factors. Of 6,061 respondents 49% were male and 51% female students. Approximately 16% of the

respondents attended a school located in Helsinki, the capital region of Finland, 52% in other urban areas, 18% in densely populated non-urban areas, and 14% in rural areas.

Measures

Offline delinquency is a dichotomous variable measuring whether the respondents have engaged in one of the following acts at least once during the last 12 months: bullied someone at school or on the way to school, beaten up someone, participated in a fight in a public place, or robbed somebody. *Online delinquency* is a dichotomous variable measuring whether the respondent has threatened or deliberately hurt somebody via email, a text message, or in social media at least once during past 12 months. Based on the follow-up question, acts perpetrated through social media (10%) could be separated from the others given their more public nature and how social media platforms have become an environment for aggressive behavior, such as cyberbullying (Zych et al., 2015) and cyber violence (Kaakinen et al., 2018; Peterson & Densley, 2017). Therefore, only threats and harm conducted through social media were included in the analysis to describe online delinquency.

In forming the offline delinquency and online delinquency variables, a combined variable was formed first describing four categories: engaged in neither, engaged only in offline delinquency, engaged only in online delinquency, and engaged in both. To be able to analyze the differences in associations between self-control and offline delinquency and self-control and online delinquency, those respondents who engaged in both types of delinquency were excluded ($n = 240$, 4% of all respondents). Two separate dichotomous variables (offline delinquency and online delinquency) were constructed from the rest of the categories.

Low self-control was measured using the nine-item standard International Self-Reported Delinquency study (ISRD) self-control scale (Marshall & Enzmann, 2012, p. 292) which is loosely based on the Grasmick et al. self-control scale (Grasmick, Tittle, Bursik & Arneklev, 1993). Items are: 1) "I often do whatever brings me pleasure here and now, even at the cost of some distant

goal,” 2) “I will try to get the things I want even when I know it’s causing problems for other people,” 3) “I often act on the spur of the moment without stopping to think,” 4) “I’m more concerned with that happens to me in the short run than in the long run,” 5) “I try to look out for myself first, even if it means making things difficult for other people,” 6) “Excitement and adventure are more important to me than security,” 7) “If things I do upset people, it’s their problem, not mine,” 8) “Sometimes I will take a risk just for the fun of it,” 9) “I like to test myself every now and then by doing something a little risky.” Items were scaled from one to four (1 = disagree, 4 = agree). For the descriptive results, a summed continuous variable was constructed from these items (Cronbach alpha = 0.88) suggesting the higher the value, the lower the self-control. In the SEM models, the latent construct of self-control was estimated including three constructs: impulse (items 1, 3, 4), risk-seeking (items 6, 8, 9,) and self-centered (items 2, 5, 7; see Data Analysis).

The parental control variable was based on a combined set of four items on parental supervision. These were 1) “When I go out, my parents ask who I go out with,” 2) “My parents know where I am after school,” 3) “My parents follow up on my grades,” and 4) “My parents make sure that I go to bed early,” each on a scale from 1 to 5 (1 = never, 5 = always). For the descriptive analysis, items were summed up for one continuous variable (Cronbach alpha = 0.79). In the SEM models, the latent construct for parental control was estimated (see Data Analysis).

The risky routine activities variable was based on a combined set of three items describing the way respondents spend their free-time. These were 1) “I hang around with my friends in public places after 9 pm,” 2) “I come home after 10 pm on school nights,” 3) “I go to parties organized by other adolescents, where no adults and most of the participants are drinking alcohol.” Items were scaled from 1 to 5 (1 = never, 5 = always). For the descriptive analysis, items were summed up for one continuous variable (Cronbach alpha = 0.79). In the SEM mediation model for offline delinquency, the latent construct for risky routine activities was estimated (see Data Analysis) as a

control variable. In the SEM mediation model for online delinquency, a measured variable of Internet use was used as a control variable to describe a risky routine activity measure. It was based on a statement “I spend a lot of time on the Internet” (1 = never, 5 = always).

All items within the questions measuring self-control, parental control, and routine activities, were obligatory for respondents¹ in the questionnaire. Therefore, there were no missing values among the items in any one particular measure. Missing cases, thus only applied to a respondent that did not complete any of the items and withdrew from answering the questionnaire. Cases containing missing values were excluded from the analysis including low self-control 2.0% (n=122), parental control 0.6% (n=37), and routine activities 1.2% (n=75).

Sociodemographic control variables included gender (female / male), family structure (nuclear family / other family structure including sometimes with mother and sometimes with father, step-family, single-parent family, or other situation), and immigrant background (neither / at least one parent born abroad). In preliminary analysis, parental unemployment (no unemployment / at least one parent unemployed) and the family’s economic situation (based on respondent’s evaluation if they were doing as well as other families / worse than other families) were also used as control variables but these were insignificant and therefore excluded from the final analysis.

Data Analysis

First, confirmatory factor analyses (CFA) were estimated to test whether the first-order (9 items) or second-order factor structure of self-control fits better with the data and to ensure that the latent constructs (low self-control, parental control, risk routines, and offline routines) were separate of each other. CFA models were executed for offline data using a Maximum Likelihood estimator and Mplus statistical software (Muthén & Muthén, 1998–2012). The first-order CFA included the latent factors of parental control (3 items), risk routines (3 items), and low self-control so that it consisted of 9 items. The second-order CFA was similar to the first-order CFA except that low self-

¹ Respondents were not able to continue to the next question in this online-questionnaire if they had not answered the key preceding questions.

control consisted of three separate factors: impulse (3 items), self-centered (3 items), risk seeking (3 items). The model fit for the measurement model was evaluated using Chi-square values (χ^2), the comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR). The cutoff values were .95 for CFI and TLI, .06 for RMSEA, and .08 for SRMR (Hu & Bentler, 1999).

Second, correlations between sum variables were explored. Third, mediation models via SEM were accomplished separately for offline/online delinquency to address the research questions. The mediation models included the mediation path from the latent factor of parental control to delinquency via the latent factor of low self-control (Figure 1). For statistical reasons, the mediation model requires including a path from parental control to low self-control (see Muthén, Muthén & Asparouhov, 2016, p. 58), but the aim of this study is not to analyze changes in self-control.

In the mediation models, we first offer causally-defined total, indirect, and direct effects (counterfactually-defined causal effects; Muthén, Muthén & Asparouhov, 2016, p. 191-200) by odds ratios as they take into account that the outcome is binary and the mediator is continuous but we also show the frequently used standardized regression coefficients. As counterfactually-defined causal effects were not available in models with control variables, first we ran analyses without them to get more accurate estimates about the hypothesized mediation. During the second run, the latent factor of offline routines was added into the offline model and an observed variable of online routines was added into the online model to control for these routines. Also, sociodemographic control variables (gender, immigrant background, and family background) were included into the models to test the robustness of the results. The mediation models via SEM were executed using the weighted least squares means and variance adjusted estimator (WLSMV; see Muthén & Muthén, 1998-2012). The missing data approach by Mplus statistical package (version 8.3) was applied which handles missing values through full information maximum likelihood procedure (FIML; see Muthén & Muthén, 1998-2012).

[Insert Figure 1 here]

Fourth, the moderated mediation model via SEM (see figure 2) was accomplished separately for offline/online delinquency using maximum likelihood robust estimation and Monte Carlo Integration (Muthén et al., 2016). This model used a random slope approach of the regression of outcome on mediator, that is, the mediation of delinquency on self-control was moderated by parental control. It is suggested to include an interaction of this kind to the mediation model by default in order to better capture the dynamics of mediation (Muthén et al., 2016, p. 112). As only the information criteria indices are available for the model with the latent interaction product by Mplus (see Maslowsky, Jager & Hemken, 2015; Muthén & Muthén, 1998–2012), we included them in the results. Including control variables was not possible in this model due to convergence problems. The moderated mediation model also requires a path from parental control to low self-control, but the aim of this study is not to analyze changes in self-control.

[Insert Figure 2 here]

RESULTS

Descriptive statistics

Table 1 presents descriptive statistics for the variables in the analysis. Among the 6,061 respondents 9.6% had engaged in offline delinquency, 2.9% in online delinquency and 4.0% in both. This is in line with Finnish rates reported in International Self-Report Delinquency Study (ISR3; Enzmann et al., 2018). Respondents who had been perpetrators of both were excluded from the analysis and dichotomous variables of offline and online delinquency were made for SEM models (offline, $n = 581$ / none = 5,061 and online $n = 175$ / none = 5,061). Regarding the independent variables, the mean for low self-control was 18.5 (SE=5.1), risky routine activities 10.6 (SE = 3.9) and parental control 24.0 (SE = 4.1). Of the respondents, 49.2% were male, 65.4% lived

in a nuclear family, and 12.4% had an immigrant background. Distributions of gender (48.6% males), family structure (64.7% nuclear family), and immigrant background (12.6%) are similar to the original population from which the sample was derived.

[Insert Table 1 here]

Tables 2 and 3 present bivariate correlation coefficients for the dependent and independent variables included in the multivariate SEM models. Separate models were done for offline and online delinquency, meaning that those two variables are not in the same model. Also, correlation coefficients were calculated separately from both sub-datasets. Statistically significant associations are displayed in boldface. Correlations between independent variables range between -.04 and .45 ($p < .05$). The highest correlation is between risky routine activities and low self-control ($r = .45, p < .05$) in the dataset concerning offline delinquency. Based on original data including both offline and online delinquency, the correlation coefficient of offline and online delinquency was .36 ($p < .05$).

[Insert Table 2 and Table 3 here]

The measurement models via CFA

First, confirmatory factor analyses (CFA) were estimated to test whether the first-order or second-order factor structure of low self-control fits better with the data and to ensure that latent variables in this study (low self-control, parental control, risk routines, offline routines) were separate constructs. The best fit was for the model for the second-order factor structure of self-control according to chi-square difference ($p < .001$). Other fit indexes also showed a better fit for the second-order factor structure model, $\chi^2(113) = 1485.270, p < .001$; CFI = .958; TLI = .949;

RMSEA = .046; SRMR = .036, vs. the first-order factor structure model, $\chi^2(116) = 4294.530, p < .001$; CFI = .871; TLI = .849; RMSEA = .080; SRMR = .055. This indicates that low self-control consisted of three sub-factors: impulse, self-centered, and risk seeking. All standardized factor loadings were significant at the .001 level and ranged from .532 to .870. Thus, the second-order factor structure of low self-control was included in later SEM mediation models.

Mediation models via SEM

The mediation model for offline delinquency using SEM revealed that lower parental control had harmful direct and indirect associations with offline delinquency via low self-control. According to the counterfactuals, the odds ratios of direct, indirect, and total effect of social control were, respectively, .694 ($SE = .029, p < .001$), .600 ($SE = .055, p < .001$), and .417 ($SE = .035, p < .001$). Standardized regression coefficients are displayed in figure 3. The model fit was good: $\chi^2(85) = 954.715, p < .001$; CFI = .933; TLI = .918; RMSEA = .042; SRMR = .029.

[Insert Figure 3 here]

The abovementioned results hold in the second run including the control variables (see Table 4). According to the standardized coefficients risky routine activities ($b^* = .244, p < .001$), male gender ($b^* = .189, p < .001$), non-nuclear family structure ($b^* = -.049, p = .022$), and immigrant background ($b^* = .075, p < .001$) were associated with offline delinquency. The R-square for offline delinquency was .226. The model fit was acceptable: $\chi^2(151) = 1693.725, p < .001$; CFI = .920; TLI = .889; RMSEA = .042; SRMR = .025.

[Insert Table 4 here]

The mediation model for online delinquency using SEM showed that parental control only had significant indirect association with online delinquency via low self-control, but no direct association. According to the counterfactuals, the odds ratios of direct, indirect, and total effect of social control were, respectively, .824 ($SE = .130, p = .175$), .597 ($SE = .042, p < .001$), and .492 ($SE = .072, p < .001$). Standardized regression coefficients are displayed in the figure 3. The model fit was good: $\chi^2(85) = 758.052, p < .001$; CFI = .945; TLI = .932; RMSEA = .039; SRMR = .028.

These results hold in the second run including control variables (see Table 5). According to the standardized estimates, Internet use ($b^* = .126, p < .001$) and male gender ($b^* = .119, p < .01$) were associated with online delinquency, but family structure and immigrant background were not. The R-square for online delinquency was .172. The model fit was acceptable: $\chi^2(119) = 1054.736, p < .001$; CFI = .937; TLI = .909; RMSEA = .039; SRMR = .025.

[Insert Table 5 here]

Mediation-moderation models

The moderated mediation model for offline delinquency showed that the association between adolescent's low self-control and offline delinquency was moderated by parental social control ($b^* = .083, SE = .022, p < .001$; Figure 4). This moderation effect is elaborated in Figure 5 which shows that when an adolescent's self-control was low, there was more offline delinquency when compared with the situation when an adolescent had high self-control. However, when there was more parental social control (solid line) there was less offline delinquency than when there was less parental social control (dashed line). That is, parental social control had a protecting effect against the effect of low self-control on offline delinquency. The information criteria indices for the

offline moderated mediation model were $\text{LogL} = -90461.384$ and $\text{BIC} = 181022.769$. The R-square for offline delinquency was .226.

[Insert Figure 4 and 5 here]

The moderated mediation model for online delinquency showed that the association between adolescent's low self-control and online delinquency was moderated by parental social control ($b^* = .075$, $SE = .031$, $p = .018$; Figure 4). This moderation effect is elaborated in Figure 6 which shows that when an adolescent's self-control was low, there was more online delinquency when compared with the situation when an adolescent had high self-control. However, when there was more parental social control (solid line) there was less online delinquency than when there was less parental social control (dashed line). That is, parental social control had a protecting effect against the effect of low self-control on online delinquency. The information criteria indices for the online moderated mediation model were $\text{LogL} = -82501.747$ and $\text{BIC} = 165431.831$. The R-square for online delinquency was .240².

[Insert Figure 6 here]

DISCUSSION

In this study, we analyzed mediation and moderation models between weak parental control and increased offline and online delinquency via low self-control. The analyses were informed by GTC, aiming to gain more insight to the interplay of parental control, self-control, and various types of delinquency. Structural equation modelling was utilized in the analyses and the models were evaluated according to GTC expectations: The direct effects of low self-control and

² We conducted additional analyses involving the 240 respondents with both offline *and* online delinquent behavior excluded from the main analyses. The inclusion of these respondents yielded slightly different estimates. Direct associations between self-control and offline as well as online delinquency remained significant ($p < .05$). Direct associations between parental control and offline delinquency remained significant ($p < 0.001$) and direct associations between parental control and online delinquency remained insignificant. However, the estimated moderation and mediation effects were not significant ($p > .05$) in this model.

parental control were analyzed side by side while the mediated associations of parental control with delinquency via self-control were tested.

First, low self-control had a significant effect on both offline and online delinquency giving support to the GTC argument that low self-control explains all types of crime. It is also in accordance with earlier studies (Vazsonyi et al., 2017; Bae, 2017; You & Lim, 2016; Moon et al., 2010; Holt et al., 2012). However, parental control had an independent direct effect only on offline delinquency, but not on online delinquency. This finding may reflect different parental strategies used to regulate online and offline behaviors (Attrill & Fullwood, 2017) or that dynamics between control and delinquency are different in online and offline settings. It has been argued that research on parental monitoring of children's offline delinquent behavior is actually measuring parental knowledge rather than parental monitoring (Stattin & Kerr, 2000), especially when measures employed in these studies inquire whether parents know where their children spend their free-time or whether parents know children's friends. Parental monitoring, instead, refers more to actively controlling and keeping watch over their children. In online setting this would, for example, mean setting rules and boundaries in the use of the computer, which has been shown to decrease adolescent online aggression along with parents' ability to create an environment and a relationship with their children that encourages them to talk about their online behavior. (Law, Shapka & Olson, 2010.) Additionally, these results could indicate that parental controls have less impact on limiting opportunities to engage in delinquency online than offline. Lastly, this finding could be a result of using a measure of parental control that reflects mainly control of offline activities and fails to capture online parental monitoring.

Earlier studies reporting direct effects between parental control and delinquency have usually interpreted those findings as non-supportive to GTC. It has been argued in some studies that direct effects of parental control on delinquency challenge the stability postulate and GTC's argument that the effect of parental control is fully mediated by self-control. We do not see the

direct effect of parental control on delinquency as challenging the stability postulate. Models suggesting the direct effect of parental control on delinquency do not actually say anything about how parental control affects self-control, which would be needed for arguing that self-control does not remain stable because of that direct effect. However, studies showing positive *indirect* association between parental control and delinquency via self-control could be interpreted as the effects of parental monitoring on self-control (see e.g. Brauer, 2016; Finkenauer et al., 2005). Our results concerning the positive indirect association between parental control and offline and online delinquency via self-control are in line with this interpretation, but we did not directly analyze changes in self-control and with cross-sectional data we are unable to make conclusions of such effects. It is notable that there is variation in the interpretation of the stability argument in GTC (Piquero, Jennings & Farrington, 2010, p. 804) and the stability argument has been challenged successfully in other disciplines, such as social psychology (Baumeister & Heatherton, 1996; Baumeister, 2018). We argue that findings of a direct effect between parental control and delinquency are not sufficient for this type of challenge.

Additionally, we do not see the direct effect of parental control on offline delinquency challenging Gottfredson and Hirschi's argument that the effect of parental control would be fully mediated by self-control. Most studies showing the direct effect of parental control on delinquency argue against GTC based on the interpretation that weak social bonds are a direct result of low self-control. This does not take into consideration the impact that social controls have on opportunity and decision-making and, therefore, the direct effect of parental control on delinquency should be interpreted more in relation to a "cost in decision-making process" point of view, where the conclusions would be more GTC supportive than non-supportive. Future research is needed to better parse out this measurement issue to determine if there are elements of parental control that are more influential in limiting opportunity and increasing perceived costs in the decision-making

process that are separate from the parental bonds argued by GTC to be fully mediated by self-control.

Finally, this study found that parental control also has a moderation effect on the association between low-self-control and offline and online delinquency. That is, parental control can buffer the effects on low self-control on delinquency. Earlier studies reporting this kind of interplay between internal and external controls have been framed from perspectives other than GTC (e.g. Hirtenlehner & Meško, 2018). We argue that this kind of a buffering mechanism also fits the GTC idea of seeing adolescents' bonds with their parents as a factor in the decision-making process. Depending on the type of parental control measure used in the study, it may be the actual attachment with parents which adolescents are afraid to lose if they engage in delinquent behavior or it may be a fear of parental control becoming stricter. In this study it may be the latter, because the items in the parental control variable were control-oriented. It is also notable that our measures of offline and online delinquency include only crimes against the person. Including other types of crime, for example, property crimes, could result in different findings. Further, in our additional analyses, where we included the 240 respondents that engaged in *both* offline and online delinquency, mediation as well as moderation effects were no longer significant. Thus, young people who commit offenses both online and offline may appear as a separate group that is affected differently by external and internal control. This is in line with previous studies on serious delinquent adolescents by Doherty (2006) and should be studied more in the future.

However, we also think that the GTC is not clear enough to be applied alone in interpreting these kinds of empirical findings, because it does not clearly recognize (or explain) the dynamics between key factors such as self-control, parental control, and routine activities, and how they change in time. That may be the reason why the literature has focused on only a few main arguments of GTC or applied another theoretical framework and, therefore, the theoretical adequacy of GTC regarding self-control, parental control, and delinquency has been questioned. We argue

that GTC offers a good perspective for studying those associations, but interpretation of empirical findings require support from other theoretical approaches (see. e.g. Jennings et al., 2013).

There are some limitations to be considered when interpreting the findings from the analysis. First of all, the analysis is based on cross-sectional data, which means that suggested associations are not evidence of causality. A significant strength of the study was employing a nationally representative sample of Finnish youth, but results might not be generalizable to other populations. Other limitations are mainly related to the measures. First, online routine activities are based on only one item describing time spent on the Internet, when offline routine activities are based on much broader scale of measures (3 items). Future research should evaluate whether the findings are similar with more detailed online routine activity measures. Second, the measure of parental control reflects mainly control of offline activities. This may partly explain why parental control had no direct effect on online delinquency. Future research should consider measures of online parental control in addition to traditional parental control measures. In addition, the measure of parental control mainly reflects the control-oriented factors of parental control. It would be interesting to see whether the findings are similar when attachment-related measures are used. Further, the measurement of parental control or parental bonds is complicated. Although we examined GTC from the perspectives that low self-control causes both weak parental bonds and delinquency or parental control impacts the opportunity to engage in delinquency, there is a third explanation offered by Hirschi to explain this relationship. In his Stockholm address, Hirschi (2016) indicates that measures of parental control are simply measuring low self-control. Suggesting that children with low self-control would not tell a parent who they are going out with or where they are after school. Therefore, Hirschi argues that this measure implies much more about the child's behavior than that of the parent. Future research is needed to develop empirical designs to further explore this issue.

It is also noteworthy that even though we found that parental control was associated with adolescents' self-control, this does not necessarily mean that self-control is a product of parental child-rearing as suggested by GTC. The association may be at least partly due to heredity (see e.g. Willems, Boesen, Li, Bartels & Finkenauer, 2019), which has been argued is consistent with GTC (see Vazonyi et al., 2015). Heredity of self-control would mean that children with low self-control have more likely been born to parents with low self-control (see e.g. Moffitt, 1993), and training programs provided for parents and families of young children have been useful for improving children's self-control (Piquero et al., 2016a; Piquero et al., 2016b). Yet, more research is needed on the effects of interventions targeted for adolescents.

This study concludes that GTC is a useful theoretical framework in exploring the effect of parental control on adolescent delinquency. However, there are shortcomings in how it could be applied to more complex models regarding the dynamics between self-control, parental control, and routine activities in explaining delinquency. This has led to a critique partly based on loose argumentation. To develop self-control research further from the GTC perspective, empirical findings on the interplay between internal and external controls should be looked at in conjunction with other theories.

Acknowledgements

Declaration of interest statement

There is no conflict of interests

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FIGURE 1. Mediation model.

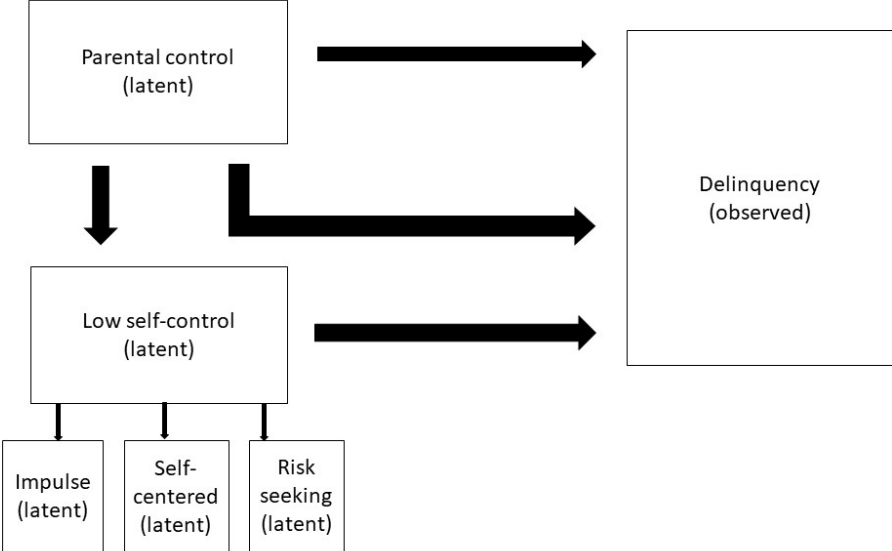


FIGURE 2. Moderated mediation model.

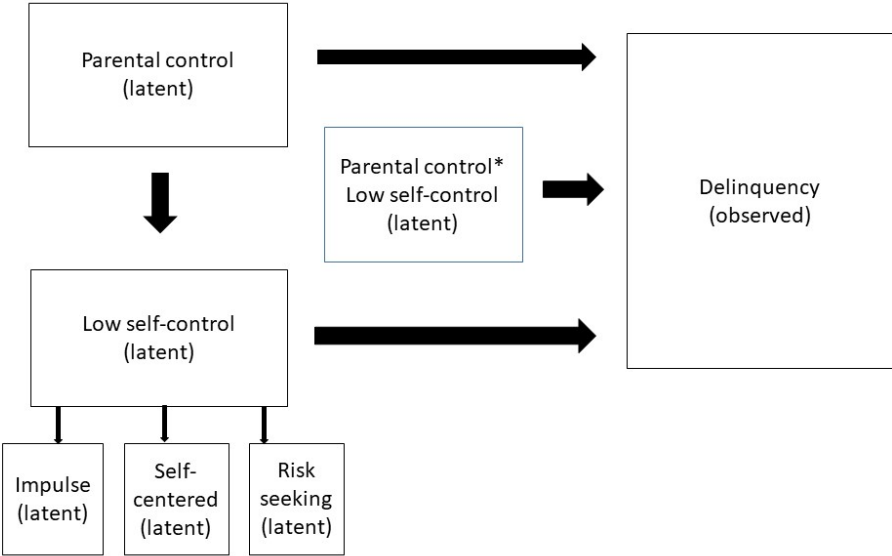
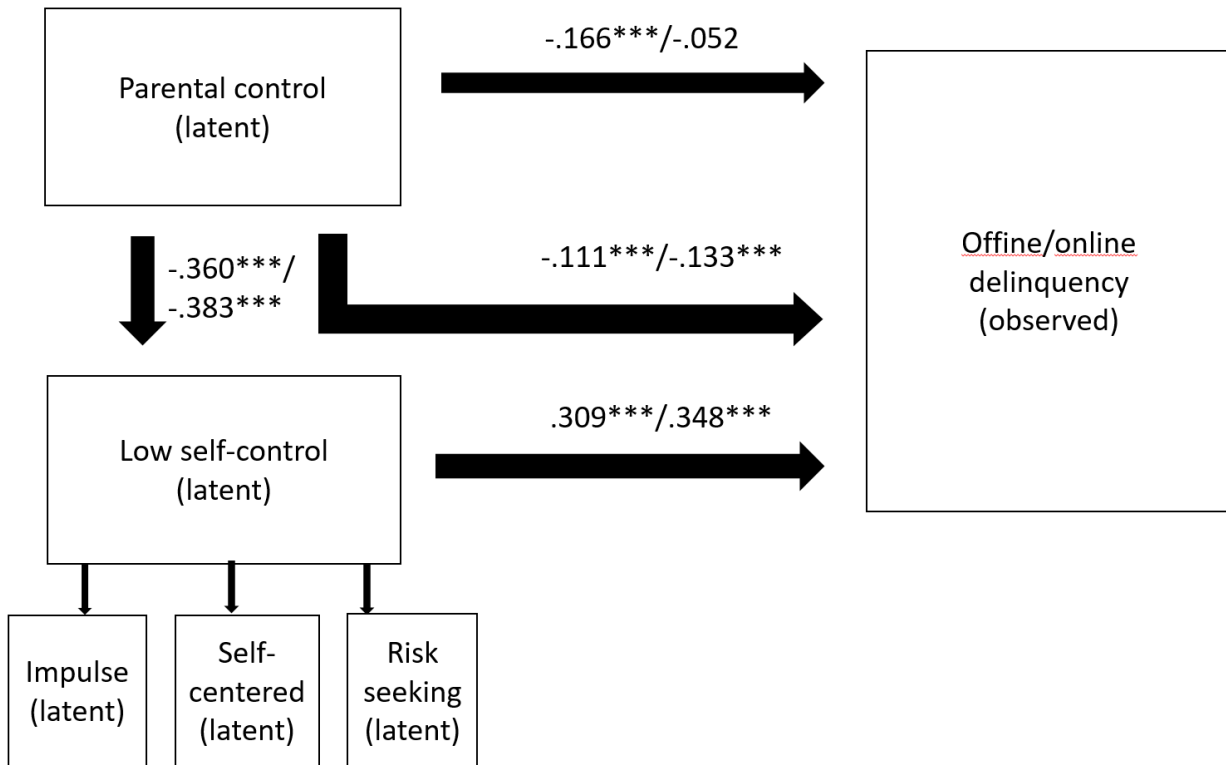


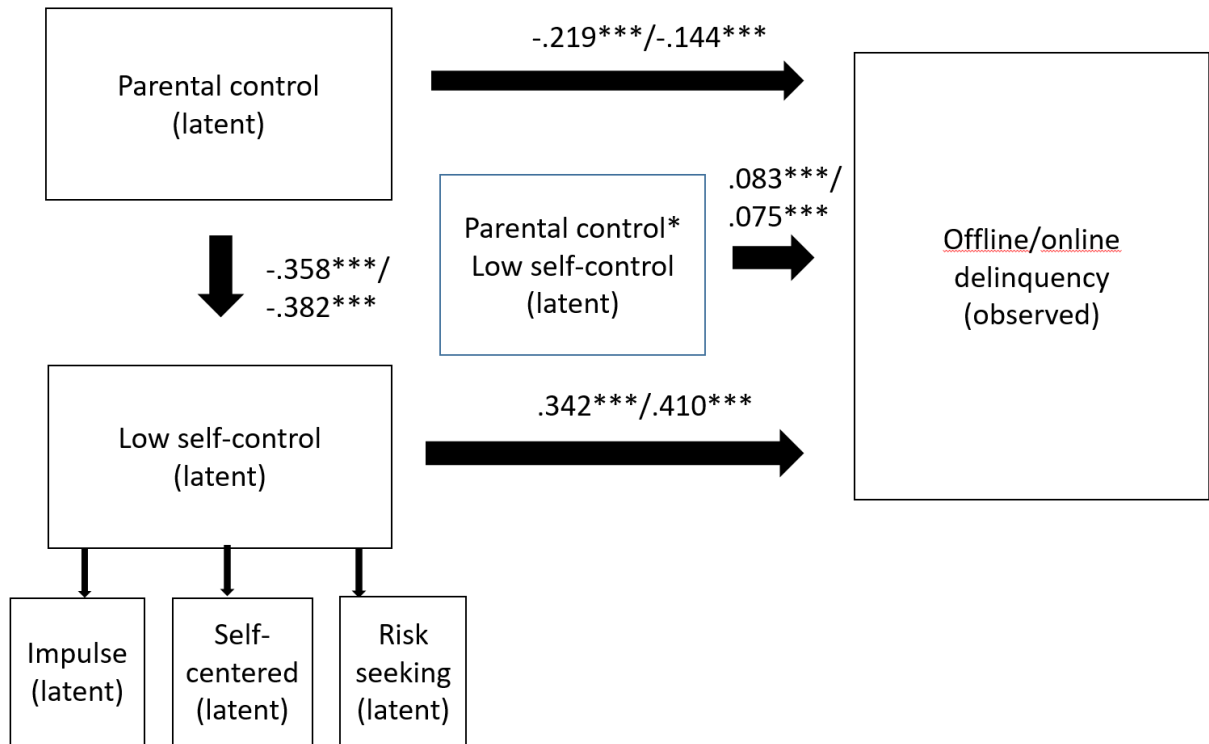
FIGURE 3. The associations between the main study variables in the mediation model for offline/online delinquency.



Note: The figure includes standardized coefficients for the offline / online models.

******* $p < .001$

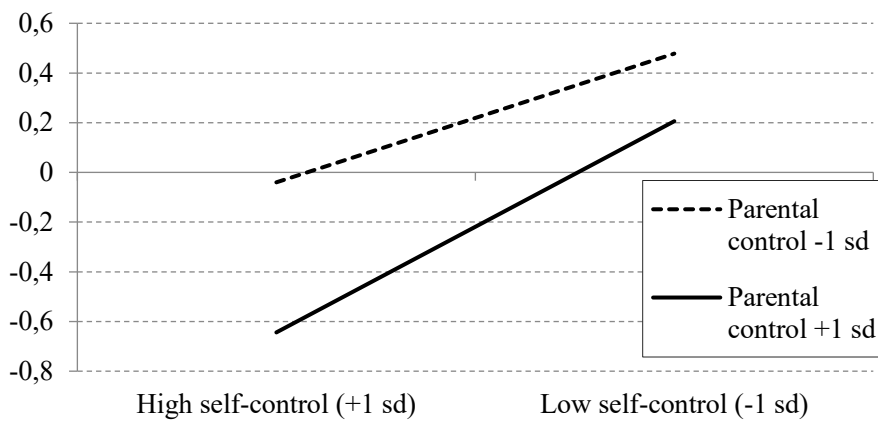
FIGURE 4. The associations between the main study variables in the moderated mediation model for offline/online delinquency.



Note: The figure includes standardized coefficients for the offline / online models.

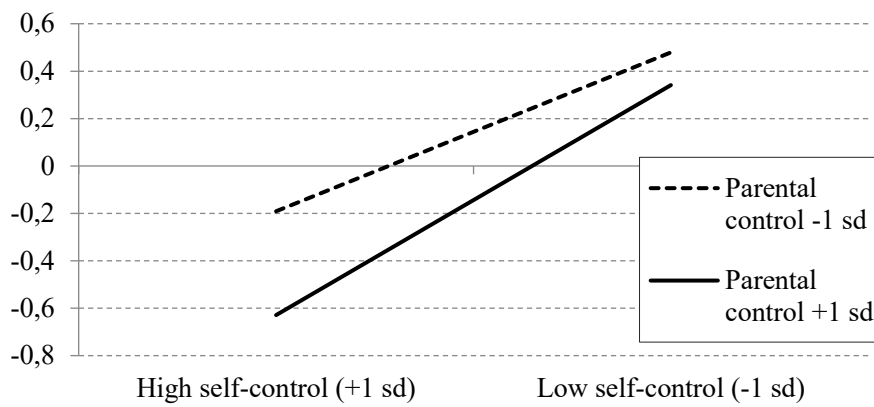
*** $p < .001$

FIGURE 5. Interaction of parental control and self-control predicting offline delinquency.



Note: Vertical axis refers to offline delinquency. The dashed line represents low parental control and the solid line represents high parental control. The figure includes standardized estimates. *SD* = standard deviation.

FIGURE 6. Interaction of parental control and self-control predicting online delinquency.



Note: Vertical axis refers to online delinquency. The dashed line represents low parental control and the solid line represents high parental control. The figure includes standardized estimates. *SD* = standard deviation.

TABLE 1. Descriptive Statistics

	Full sample (max n=6,061)			Valid n
	% or Mean	(SD)	Range	
Delinquency (dependent)¹				
None	83.5%		0 - 3	5,061
Only offline	9.6%		0 - 3	581
Only online	2.9%		0 - 3	175
Both	4.0%		0 - 3	244
Independent variables				
Low self-control ($\alpha=0.88$)	18.5	(5.1)	1 - 36	5,939
Parental control ($\alpha=0.78$)	24.0	(4.1)	6 - 30	6,024
Control variables				
Risky routine activities ($\alpha=0.79$)	10.6	(3.9)	0 - 25	5,986
Internet use	3.3	(1.1)	0 - 5	5,988
Male gender	49%		0 - 1	6,061
Nuclear family	65%		0 - 1	6,061
Immigrant family ²	12%		0 - 1	6,061

¹ For the analysis two variables were created based on this variable: offline delinquency/none and online delinquency/none. Those included in both categories were excluded from the analysis.

² At least one of the parents born abroad.

TABLE 2. Bivariate Correlations of offline delinquency and independent variables

	(1)	(2)	(3)	(4)
1. Offline delinquency	–			
2. Low self-control	.15	–		
3. Risky routine activities	.20	.45	–	
4. Parental control	-.13	-.07	-.12	–

Notes: Pearson correlation coefficients, bold indicates $p < .05$.

TABLE 3. Bivariate Correlations of online delinquency and independent variables

	(1)	(2)	(3)	(4)
1. Online delinquency	–			
2. Low self-control	.09	–		
3. Risky routine activities	.05	.22	–	
4. Parental control	-.04	-.07	-.20	–

Notes: Pearson correlation coefficients, bold indicates $p < .05$.

TABLE 4. The associations of parental control and low self-control on offline delinquency in mediation model with control variables

	<i>b</i>	<i>SE</i>	<i>p</i> -value	<i>b</i> *	<i>SE</i>
Parental control	-0.118**	.041	.004	-.086	.030
Low self-control	0.408*	.166	.014	.164	.040
Risky routines activities	0.291**	.039	.000	.244	.033
Male gender	0.377**	.047	.000	.189	.023
Non-nuclear family structure	-0.102*	.045	.022	-.049	.021
Immigrant background	0.230**	.062	.000	.075	.020

* $p < .05$; ** $p < .01$

TABLE 5. The associations of parental control and low self-control on online delinquency in mediation model with control variables

	<i>b</i>	<i>SE</i>	<i>p</i> -value	<i>b</i> *	<i>SE</i>
Parental control	-0.024	.063	.701	-.017	.043
Low self-control	0.920**	.137	.000	.325	.047
Internet use	0.144**	.039	.000	.126	.034
Male gender	0.238**	.073	.001	.119	.036
Non-nuclear family structure	-0.030	.070	.674	-.014	.033
Immigrant background	0.018	.105	.865	.006	.033

* $p < .05$; ** $p < .01$