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## Delinquent Behaviors Among Post-Socialist Juveniles: How Do Social Control and Self-Control Theories Explain Them?

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DELINQUENT BEHAVIORS AMONG POST-SOCIALIST JUVENILES: HOW DO  
SOCIAL CONTROL AND SELF-CONTROL THEORIES EXPLAIN THEM?

by

Boci Meng

A Thesis Submitted in  
Partial Fulfilment of the  
Requirements for the Degree of

Master of Arts  
in Sociology

at

The University of Wisconsin-Milwaukee

May 2022

## ABSTRACT

### DELINQUENT BEHAVIORS AMONG POST-SOCIALIST JUVENILES: HOW DO SOCIAL CONTROL AND SELF-CONTROL THEORIES EXPLAIN THEM?

by

Boci Meng

The University of Wisconsin-Milwaukee, 2022  
Under the Supervision of Professor Aki Roberts

This thesis examines the applicability of social control theory and self-control theory on explaining juvenile delinquency in post-socialist countries. Analyses were conducted with a subset data of the second wave of *International Self-Report Delinquency Study (ISR2)* in which includes 18,213 valid adolescent respondents in 9 East European countries. Negative binomial regression analyses showed that only attachment to parents, attachment to school and moral belief can reduce both severe and minor delinquency. Additionally, conventional activity can only reduce minor delinquency. Moreover, attachment to peers can encourage juveniles to commit delinquency. Last, the level of self-control can reduce both severe and minor delinquency. Future studies should use multiple waves of data to examine the dynamic change of the theories in these countries. Also, a better measure of self-control should be generated to capture how parenting is associated with the level of self-control. Finally, it is necessary to add more highly interrelated questions to each scale that has a low alpha to improve the reliability of each scale in future research.

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To  
my parents,  
my brother,  
and my mentors

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## **LIST OF ABBREVIATIONS**

ISRD	International Self-Report Delinquency Study
POMP	Percent of Maximum Possible
POMS	Proportion of Maximum Scaling

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## **1. Introduction**

Most post-socialist countries in Eastern Europe were members of the Soviet Union. In the Soviet era, the state “not only control[led] the use of force, but also had a monopoly as employer, provider of services, etc.” (Casier 1999). Thus, most social institutions were controlled by the Soviet state. Meanwhile, the state attempted to “comprehend every activity of the Soviet citizen and society to inspire them in every field, including family and fatherland, economy and politics, material and intellectual life, individual and collective life” (Chambre 1967). Simultaneously, workers were required to be “thoroughly imbued with the norms of ‘collectivistic’ morality, unhesitatingly subordinating their private interests to the interest of the social whole in all cases of conflict” (Kline 1964). Accordingly, Soviet citizens were tightly bound to Soviet institutions.

After the collapse of the Soviet Union, political reforms in its former republics “shaped the strength of the state, the rule of law and the ability of formal social control institutions to function legitimately and effectively” while “the economic reforms conducted in these republics “influenced citizen’s overall quality of life, their future prospects of well-being and the functioning of informal social control institutions, such as workplaces, families and educational systems” (Stamatel 2009). Accordingly, abilities to maintain social control would be affected by political and economic systems in these former Soviet republics (Stamatel 2009). In general, the levels of interpersonal and institutional trust, the levels of political participation or political apathy, and tolerance for socially marginalized groups are relatively low, whereas the levels of corruption in high-level politics and in daily life are high (Bernhard and Karakoç 2007; Denk, Christensen, and Bergh 2015; Hooghe and Quintelier 2014; Pop-Eleches and Tucker 2011, 2013).

Additionally, the collapse of the Soviet Union fostered individualism and more freedom to pursue personal interests. However, a longitudinal study examined the data on four waves

of the European Values Study, from 1990/91 to 2017, and found that values among Eastern European and Western European countries still contrast, though they have been approaching one another for decades (Manea and Rabušić 2020). Thus, individualism and collectivism continue to simultaneously exist in Eastern European countries.

Given the importance of social structure and socialization for preventing crime and delinquency around the world, a better understanding of how social structure and socialization are associated with human activity will help to clarify why some people are more likely to follow existing rules and orders while others are not. Similar considerations probably apply to the other Eastern Bloc countries in their transitions from socialism. However, existing studies provide valuable insights about social structure and socialization, but most of them are either typically based on samples from the United States and West Europe or based on small samples from East Europe. This focus on Western countries has limited scholars' ability to test one of sociology's core tenets that societies shape individuals' behaviors. Therefore, it would make a significant contribution to testing the applicability of those theories in societies with inverse contexts.

## **2. Literature Review**

### ***Hirschi's Social Control Theory***

In general, the term "social institution" entails a relatively stable social structure in one form or another that organizes relatively stable models of human activity (Turner 1997). Structure and pattern mean "a complex of positions, roles, norms, and values" (Turner 1997). Moreover, a structure and a pattern are constituted by the positions and roles that are independent of the people who occupy these positions and roles. Thus, norms and values are models of behavior that help people remind what conduct is considered acceptable or unacceptable (Turner 1997). In other words, individuals in social institutions are supposed to follow the norms and values that their social institutions expect. For example, soldiers in an

army are supposed to follow the chain of command. The mechanisms used to coerce individuals to respect institutional rules are referred to as “social controls” (LaFree 1998). In the 1950s, control theorists observed the relationships between crime and different social controls. However, instead of investigating why people commit crimes, control theorists have attempted to evaluate why people do not commit crimes. As Hirschi ([1969] 2017) stated, “in control theories, the Hobbesian question has never been adequately answered. The question remains, “why *do* men obey the rules of society?” Deviance is taken for granted; conformity must be explained.”

To answer this question, control theorists established the bases for control theories. For example, Reiss (1951) applied the concept of “social controls” to explanations of crimes by demonstrating that a deficiency in “personal” and “social” controls can cause delinquency. Later, Nye (1958) classified different social controls as either direct, indirect, or internal controls. These concepts are the foundations of modern control theories.

Social control theory (Hirschi [1969] 2017) has inherited the idea that a lack of social bonds contributes to delinquency and demonstrates how social bonds correlate with crime or delinquency. However, it pays less attention to explaining the motivations for delinquency. Instead, based on the assumption that every person has the potential to be an offender, this theory states that “delinquent acts result when an individual’s bond to society is weak or broken” (Hirschi [1969] 2017). Furthermore, the theory includes four bonds—attachment, commitment, involvement, and belief (Hirschi [1969] 2017). Specifically, the attachment includes three elements—attachment to parents, attachment to peers, and attachment to schools (Hirschi [1969] 2017; Costello and Laub 2020). Moreover, according to social control theory (Hirschi [1969] 2017), these bonds have negative relationships with delinquent behaviors and therefore reduce the likelihood of conducting delinquent behaviors.

Attachment to others refers to individuals' emotional connections to others and institutions, mainly including parents, peers, and schools (Hirschi [1969] 2017; Costello and Laub 2020). According to social control theory (Hirschi [1969] 2017), the internalization of norms relies on attachment to others. Thus, the more an individual admires others and cares about their expectations and opinions, the more likely he or she is to be bound by certain norms and, therefore, the less likely he or she is to violate these norms (Hirschi [1969] 2017) because “the essence of internalization of norms, conscience, or superego thus lies in the attachment of the individual to others” (Hirschi [1969] 2017).

Attachment to parents is the first element and the central variable in social control theory (Hirschi [1969] 2017). It refers to individuals' bonds with their parents. That is, a child who is mentally closer to his or her parents is more likely to accept their opinions about his or her activities and less likely to neglect such opinions when he or she considers an act that may violate a law, i.e., an act that may embarrass or inconvenience his or her parents (Hirschi [1969] 2017). In other words, a child who is more attached to his or her parents is more likely to follow their expectations and is consequently more likely to conform to a legal system (Hirschi [1969] 2017; Costello and Laub 2020).

Attachment to peers, the second element in attachment, refers to individuals' bonds with friends. It evaluates how individuals' bonds with peers are associated with delinquency. A child who is more attached to his or her peers, regardless of whether they are delinquent or not, is less likely to engage in delinquent behaviors because the more attached he or she is to friends, the more he or she practices the conventional values that are necessary to both maintain cohesion with his or her friends and restrain him or her from delinquency—i.e., honesty, integrity, loyalty, politeness, and kindness (Hirschi [1969] 2017). Furthermore, social control theory (Hirschi [1969] 2017) points out that “the idea that delinquents have comparatively warm, intimate social relations with each other (or with anyone) is a romantic

myth,” indicating that delinquents hardly practice conventional values and care little about other’s opinions.

Attachment to schools, the third element in attachment, illuminates feelings of closeness to a school. It assesses how individuals’ bonds with their schools are associated with delinquency. For a child, an approving attitude toward a school can protect him or her from delinquency regardless of the child’s intimate relationships with his or her parents and the child’s anxiety over the opinions of teachers (Hirschi [1969] 2017). Here, the mechanism determines how individuals internalize the values of schools in their own morality and whether they are willing to be controlled by these values. An individual who has less emotional attachment to a person or institution is more likely to deny institutional values and thus less likely to be controlled by these values (Hirschi [1969] 2017). Thus, a child who is less emotionally attached to teachers in his or her school or the school itself tends to deny the school’s authority providing him or her with the freedom to commit delinquent acts.

Commitments are the bonds between individuals and their interests. They can deter people from delinquent behaviors because people can lose their investments in conventionality as a result of delinquency (Hirschi [1969] 2017). Such investments are called “stakes in conformity” (Toby 1957) and include the reputations, goods, and prospects in a conventional society (Hirschi [1969] 2017). The presumption of a commitment is that people are rational enough to calculate the risks and costs of any action (Hirschi [1969] 2017). Accordingly, individuals who have high stakes in conformity are less likely to engage in any form of deviance (Hirschi [1969] 2017).

Involvement in conventional activities can reduce delinquent behaviors because individuals simply do not have the time to engage in delinquent behaviors or commit crimes. According to social control theory (Hirschi [1969] 2017), time and energy are important for individuals to commit crimes. Thus, people who are involved in conventional activities, such

as working, studying, and spending time with family, are restrained from delinquent behaviors because they are too preoccupied with or consumed by conforming goals to have the time to consider and commit delinquent acts (Hirschi [1969] 2017). Therefore, a child who spends more time studying is less likely to engage in delinquent behaviors because he or she does not have the time to consider and engage in those behaviors.

Finally, beliefs are negatively associated with delinquent behaviors. Social control theory (Hirschi [1969] 2017) explains that people violate the rules they believe in (Hirschi [1969] 2017) when the moral validity of the relevant norms and laws has been weakened (Hirschi [1969] 2017). Therefore, “the less a person believes he should obey the rules, the more likely he is to violate them” (Hirschi [1969] 2017). Accordingly, a child who does not believe in the moral validity of the rules and laws he or she has learned is more likely to violate them.

The vast majority of studies in the U.S. and other countries have found that some elements of social control theory (Hirschi [1969] 2017) are negatively associated with delinquent behaviors, and some have even determined that all of them are.<sup>1</sup> Moreover, other studies in the U.S. have found that some of the elements of social control theory (Hirschi [1969] 2017) are negatively associated with delinquent behaviors, such as attachment to parents (Hindelang 1973; Rosenbaum 1987; Wiatrowski and Anderson 1987; Laub and Sampson 1988; Thornberry et al. 1991; McGee 1992; Rankin and Kern 1994; Heimer 1996; Wadsworth 2000; Mack et al. 2007; Hovee et al. 2012), attachment to schools (Hindelang 1973; Rosenbaum 1987; Wiatrowski and Anderson 1987; Thornberry et al. 1991; McGee 1992), commitments (Hindelang 1973; McGee 1992; Wadsworth 2000), involvement in conventional activities (Hindelang 1973; Rosenbaum 1987), and beliefs (Hindelang 1973;

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<sup>1</sup> Some studies found that attachments to peers (Heimer 1996) and commitments (Wiatrowski and Anderson 1987) can increase delinquent behaviors.

Burkett and Jensen 1975; McGee 1992). In addition, some studies have determined that all four elements are negatively associated with delinquent behaviors (Wiatrowski et al. 1981; Krohn and Massey 1980; Agnew 1985; Patterson and Dishion 1985; Marcos et al. 1986). Some cross-culture studies have supported similar conclusions, i.e., that some components of the four elements can reduce delinquent behaviors, including attachment to parents (Junger and Marshall 1997; Williams et al. 1999), attachment to schools (Junger and Marshall 1997; Williams et al. 1999), conventional activities (Junger and Marshall 1997), commitments (Torstensson 1990), and beliefs (Junger and Marshall 1997), while others have concluded that all four elements can reduce delinquent behaviors (Ozbay et al. 2006; Wang et al. 2002; Zhang and Messner 1996; Hartjen and Kethineni 1999; Cohen and Zeira, 1999; Tanioka and Glaser 1991; Shoemaker 1994). Finally, some scholars have suggested that social control theory (Hirschi [1969] 2017) is better for evaluating minor delinquency than serious delinquency (Krohn and Massey 1980; Agnew 1985).

Geographically, cross-culture studies have been conducted in North Europe (Torstensson 1990), West Europe (Junger and Marshall 1997), West Asia (Cohen and Zeira 1999; Ozbay et al. 2006), East Asia (Tanioka and Glaser 1991; Shoemaker 1994; Zhang and Messner 1996; Wang et al. 2002), South Asia (Hartjen and Kethineni 1999), and Oceania (Mak 1990). However, few tests have been conducted in the context of East Europe. It is important to test the theory in this region because it not only has a relatively low level of interpersonal and institutional trust, relatively low level of political participation or political apathy, relatively low tolerance for socially marginalized groups, and a high level of corruption in everyday life and high-level politics (Bernhard and Karakoç 2007; Denk, Christensen, and Bergh 2015; Hooghe and Quintelier 2014; Pop-Eleches and Tucker 2011, 2013) but also has new values and previous values simultaneously.

Accordingly, the study meaningfully determines the applicability of social control theory (Hirschi [1969] 2017) in East Europe with large sample size, thereby contributing to the literature regarding its applicability in Eastern European countries.

### ***Gottfredson and Hirschi's Self-Control Theory***

Gottfredson and Hirschi (1990) defined self-control as “the tendency of individuals to pursue short-term gratification without consideration of the long-term consequences of their acts.” According to this definition, self-control is an individual’s ability to control the desire to pursue short-term benefits that have long-term costs. It assumes that people are rational but hedonistic and myopic (Felson and Osgood 2008; Burt 2020). Thus, people always try to maximize their own satisfaction by any means without considering the potential negative or positive results generated by such attempts. Furthermore, the theory demonstrated that individuals with high self-control would evaluate their behaviors and the consequences of these, will understand that the costs of crimes or delinquency outweigh their benefits, and will therefore avoid the formal and informal consequences of crimes (Gottfredson and Hirschi 1990; Burt 2020). In other words, individuals with high self-control will be “substantially less likely at all periods of life to engage in criminal acts” (Gottfredson and Hirschi 1990). In contrast, people with low self-control are more likely to pursue short-term pleasures with less consideration of the long-term costs of the associated behaviors (Gottfredson and Hirschi 1990). According to Gottfredson and Hirschi (1990), child-rearing is highly related to self-control. In particular, three conditions are necessary to foster a child’s self-control. They are (1) monitoring the child’s behavior, (2) recognizing delinquent behaviors when they occur, and (3) punishing the child for his or her delinquent behaviors (Gottfredson and Hirschi 1990). Parents who successfully adhere to these three conditions can lead their children to be “more capable of delaying gratification, more sensitive to the interests and desires of others, more independent, more willing to accept restraints on his

activity, and more unlikely to use force or violence to attain his ends” (Gottfredson and Hirschi 1990). Therefore, the level of self-control is related to socialization, and a family is an essential institution for generating self-control.

To measure the levels and operationalization of self-control, scholars use Gottfredson and Hirschi’s statement that “people who lack self-control will tend to be impulsive, insensitive, physical (as opposed to mental), risk-taking, shortsighted, and nonverbal, and they will tend therefore to engage in criminal and analogous acts” (Gottfredson and Hirschi 1990). For example, Grasmick et al. (1993) operationalized self-control as a unidimensional scale, which later became the most dominant measure (Burt 2020), with six components—*simple tasks, risk-seeking, physical activity, self-centered, and temper*— and found the negative relationship between self-control and crime.

Furthermore, empirical studies have found a strong connection between a lack of self-control and deviance or crime and that this connection does not vary much from one measure to another, from one assessment mode to another, from one study design to another, or from one culture to another (Vazsonyi et al. 2017). However, more evidence regarding self-control theory (Gottfredson and Hirschi 1990) in post-socialist countries is needed. Recent cross-culture studies conducted outside the United States have found that the self-control theory (Gottfredson and Hirschi 1990) is valid outside an American context, regardless of the measurements. (Vazsonyi et al. 2017). For instance, a study by Vazsonyi et al. (2001) with samples from Hungary, the Netherlands, Switzerland, and the United States found that the self-control theory (Gottfredson and Hirschi 1990) is valid outside the U.S. Later research by Tittle and Botchkovar (2005) tested the theory in Russia with a small sample size (N = 224). Moreover, a study by Vazsonyi et al. (2015) tested the theory with Grasmick et al.’s (1993) measures in eleven countries and regions, including China, the Czech Republic, Hungary, Japan, the Netherlands, Slovenia, Spain, Switzerland, Taiwan, Turkey, and the U.S., and

concluded that the self-control theory (Gottfredson and Hirschi 1990) is equally valid in all eleven countries. However, all existing studies have either ignored most post-socialist countries or have used small sample sizes. Regarding the research on post-socialist countries, the studies conducted by Tittle and Botchkovar (2005) and Vazsonyi et al. (2015) do not accurately reflect the applicability of the self-control theory (Gottfredson and Hirschi 1990) in these areas; either their sample size was too small (e.g., Tittle and Botchkovar 2005) or they did not include enough countries (e.g., Vazsonyi et al. 2015).

Accordingly, the study advances previous studies on self-control theory (Gottfredson and Hirschi 1990) and contributes to the literature regarding its applicability by examining the theory in nine post-socialist countries (Armenia, Bosnia-Herzegovina, Czech Republic, Estonia, Hungary, Lithuania, Poland, Russia, Slovenia) with a larger sample size (N = 18,213).

In summary, both social control theory (Hirschi [1969] 2017) and self-control theory (Gottfredson and Hirschi 1990) attempt to determine how individual self-control or social control stemming from social institutions reduces crime and delinquency (Hirschi [1969] 2017; Gottfredson and Hirschi 1990). Both originate from earlier control theories but focus on different categories of social control. Social control theory (Hirschi [1969] 2017) emphasizes the association between social institutions and crime or delinquency (Hirschi [1969] 2017), while self-control theory (Gottfredson and Hirschi 1990) focuses on the association between individual self-control and crime or delinquency (Hirschi [1969] 2017). Additionally, albeit with different methods, both emphasize that social institutions can prevent children from delinquency. Social control theory (Hirschi [1969] 2017) suggests that various social institutions prevent children from delinquent behaviors by monitoring and guiding their behaviors directly or indirectly (Hirschi [1969] 2017), while self-control theory (Gottfredson and Hirschi 1990) argues that individual self-control, which stems from parents'

child-rearing process, is the key factor in preventing delinquent behaviors (Gottfredson and Hirschi 1990).

Even though social control and self-control theories (Hirschi [1969] 2017; Gottfredson and Hirschi 1990) have been frequently tested, there is a lack of research using data from post-socialist countries. As discussed in the previous section, the levels of interpersonal and institutional trust, the levels of political participation or political apathy, and tolerance for socially marginalized groups are relatively low, whereas the levels of corruption in high-level politics and in daily life are high (Bernhard and Karakoç 2007; Denk, Christensen, and Bergh 2015; Hooghe and Quintelier 2014; Pop-Eleches and Tucker 2011, 2013) while individualism and collectivism simultaneously exist in Eastern European countries (Manea and Rabušić 2020). Consequently, balancing new rules of conduct with formal standards of honest and humane relations that are based on two opposing value systems is a novel and ongoing challenge for people who live in these countries (Tittle and Botchkovar 2005). Therefore, the study advances previous studies by testing the two control theories among adolescents in nine Eastern European countries (Armenia, Bosnia-Herzegovina, Czech Republic, Estonia, Hungary, Lithuania, Poland, Russia, Slovenia) with a larger sample size ( $N = 18,213$ ) than that of earlier research.

### **3. Data and Methods**

To evaluate juveniles' delinquent behaviors in a post-socialist society, I generated seven hypotheses based on the two theories. First, attachment to parents has a negative relationship with delinquent behaviors, meaning that individuals who are more attached to their parents are less likely to engage in delinquent behaviors. Second, attachment to peers has a negative relationship with delinquent behaviors, indicating that people who are more attached to their friends are less likely to engage in delinquent behaviors. Third, attachment to schools has a negative relationship with delinquent behaviors, indicating that people who are more attached

to a school are less likely to engage in delinquent behaviors. Fourth, the relationship between aspiration, which is the measure of a commitment, and delinquent behaviors is negative, whereby individuals who have greater aspirations are less likely to engage in delinquent behaviors. Fifth, involvement in conventional activities has a negative relationship with delinquent behaviors, indicating that juveniles who spend more time on conventional activities are less likely to engage in delinquent behaviors. Sixth, moral beliefs have a negative relationship with delinquent behaviors; people who have more moral beliefs are less likely to engage in delinquent behaviors. Finally, self-control has a negative relationship with delinquent behaviors, whereby individuals with low self-control are more likely to engage in delinquent behaviors. The data and methods employed to test these seven hypotheses are introduced below.

Regarding data, this study uses data from the Second International Self-Reported Delinquency Study (ISRD2) to explore how the variables, based on the two theories, are associated with juveniles' delinquent behaviors. The ISRD2 data were collected by investigators in institutions located in multiple countries from 2005 to 2007 and are maintained by the Interuniversity Consortium for Political and Social Research (ICPSR).<sup>2</sup> The investigators surveyed 31 countries that were classified into six categories based on social welfare (Saint-Arnauld and Bernard 2003), with approximately 2,100 youths per participating country. The questionnaires were given to children who were seventh- to ninth-grade students. The investigators conducted most of the surveys in classroom settings, and these were self-administered (pencil-and-paper) by the students with the supervision of the researchers or their teachers. The total response rate was approximately 74%, ranging from 65% to 70% (Enzmann et al. 2005). The questionnaires collected data on juveniles' social demographical information, delinquent acts, victimization experiences, attitudes toward

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<sup>2</sup> See Enzmann et al. (2005) for a detailed discussion of sampling and data collection.

violence, self-control, school contexts, life events, and neighborhood information, as well as on the theoretical variables of social control, self-control, social disorganization, and lifestyle theory.

The descriptive analyses reported below include all the observations in post-socialist countries. To protect respondents' privacy, all the sensitive information that may identify specific respondents was masked by the ICPSR. Furthermore, the ICPSR identified "ambiguous answer," "no answer," and "not applicable" as missing values in the survey (Enzmann et al. 2005). Therefore, by extracting observations from this dataset, the analyses below include multiple juveniles' serious delinquent behaviors in nine post-socialist countries (including Armenia, Bosnia-Herzegovina, Czech Republic, Estonia, Hungary, Lithuania, Poland, Russia, and Slovenia), measured from 2005 to 2007. The number of respondents in each country varies. Specifically, 2,044 respondents were surveyed in Armenia; 2,017 respondents were surveyed in Bosnia-Herzegovina; 3,245 respondents were surveyed in the Czech Republic; 2,611 respondents were surveyed in Estonia; 2,203 respondents were surveyed in Hungary; 2,175 respondents were surveyed in Lithuania; 1,458 respondents were surveyed in Poland; 2,313 respondents were surveyed in Russia, and 2,233 respondents were surveyed in Slovenia. Thus, in total, 20,299 respondents were surveyed in post-socialist countries. The majority of missing values are in the variable "Aspiration Level." The proportions of missing values were summarized in Appendix Table A1. And the descriptive statistic with all 20,299 observations included is shown in Appendix Table A2. By converting all respondents' answers such as "other/don't know," "ambiguous answer," and "no answer" to aspiration level into "lower level" and excluding observations that contain at least one missing value, 18,213 valid observations remain in the dataset. Specifically, 1,982 observations remained for Armenia; 1,683 observations remained for Bosnia-Herzegovina; 2,995 observations remained for the Czech Republic; 2,187 observations remained for

Estonia; 1,925 observations remained for Hungary; 1,885 observations remained for Lithuania; 1,343 observations remained for Poland; 2,196 observations remained for Russia; and 2,017 observations remained for Slovenia.

### ***Dependent Variables***

To measure juvenile delinquency, I classified delinquent behaviors over individual *lifetimes* and in the previous year into two categories based on the severity of each delinquent behavior by counting the number of delinquency categories in which the youth is engaged. The two categories are property-related and violence-related delinquent behaviors. Table 1 summarizes the descriptive statistics for property- and violence-related delinquent behaviors in respondents' *lifetimes* and the *last year* by using respondents' answers to the questions. The property-related category includes vandalism, shoplifting, burglary, bicycle theft, car theft, hacking, car break-in, snatching, and extortions. The questions regarding this type of delinquency are summarized Appendix Table B1. The violence-related category includes carrying weapons, extortions, group fights, and assaults. The questions regarding this type of delinquency are summarized Appendix Table B2.

**Table 1. Descriptive Statistics for Dependent Variables in the Analysis  
(N = 18,213)**

	Mean	SD	Min	Max
<i>Property-Related Delinquency</i>				
Lifetime	0.319	0.727	0.0	9.0
Last year	0.154	0.495	0.0	9.0
<i>Violence-Related Delinquency</i>				
Lifetime	0.283	0.617	0.0	4.0
Last year	0.174	0.480	0.0	4.0

*Sources: ISRD2.*

### ***Independent Variables***

For independent variables, the research uses multiple measures. Furthermore, attachment to parents, attachment to peers, and attachment to schools are measured as discrete independent variables.

An important issue is how to measure attachment. Scholars believe that attachment to others should be a unified measure that does not consider the three bonds (Costello and Laub 2020) because “the more closely a person is tied to conventional society in any of these ways, the more closely he is likely to be tied in the other ways” (Hirschi [1969] 2017). However, it is still possible that a unified measure of attachment that omits specific social bonds in this element may lead to the exaggeration of the attachment effect (Agnew 1991). Therefore, attachment to parents, to peers, and to schools should be measured as different independent variables.

Following the guidance of social control theory (Hirschi [1969] 2017) for the measures, attachment to parents is measured as relationships with family. Attachment to peers is measured as relationships with friends. Attachment to schools is measured as positive attitudes toward school. Commitments are measured as educational aspirations. Beliefs are measured as positive attitudes toward violence. Involvement in conventional activities is measured as time spent doing homework; because the responders were students, they were supposed to perform the conventional activities required of students, i.e., the roles they were expected to play.

To measure attachment to parents, attachment to schools, and beliefs, the study converted the percent of maximum possible (POMP) (Cohen et al. 1999) score of each of them in the ISRD2 dataset to the proportion of maximum scaling (POMS) (Little 2013) score. The POMP (Cohen et al. 1999) score derives from “the item sum scores by taking the difference between the score of each subject and the lowest possible score and dividing by the difference between the highest possible score and the lowest possible score” (Cohen et al. 1999). According to Cohen et al. (1999),

$$\text{POMP} = [(\text{observed} - \text{minimum}) / (\text{maximum} - \text{minimum})] * 100, \mathbf{(1)}$$

where observed = the observed score for a single case,

minimum = the minimum possible score on the scale, and

maximum = the maximum possible score on the scale.

The POMS (Little 2013) score is obtained by the procedure that “transforms each scale to a metric from 0 (= minimal possible) to 1 (= maximum) possible, by first making the scale range from 0 to the highest value, and then dividing the scores by the highest value” (Little 2013). According to Little (2013),

$$\text{POMS} = [(\text{observed} - \text{minimum}) / (\text{maximum} - \text{minimum})],$$

where observed = the observed score for a single case,

minimum = the minimum possible score on the scale, and

maximum = the maximum possible score on the scale.

Deductively,

$$\text{POMS} = \text{POMP}/100 \qquad (2)$$

Both the POMP (Cohen et al. 1999) and POMS (Little 2013) are alternative methods of z-standardization to assess differently measured items by the same metric without changing “the multivariate distribution and covariance matrix of the transformed variables” (Moeller 2015).

The guidance in the manual of *ISR2* suggests that POMP (Cohen et al. 1999) scores in the dataset should be transformed to POMS (Little 2013) scores or z-scores to prevent misinterpretation of effect sizes (e.g., odds ratios) when using them as independent variables in nonlinear regression models (Enzmann et al. 2005). Nonetheless, in longitudinal studies, z-scores created by z-standardization include risks that are related to standardization within individuals, standardization within time points, and misinterpretation of profile mean scores (Moeller 2015). Accordingly, given the risks entailed by z-scores and further longitudinal studies the researcher would establish based on the *ISR2* dataset in the future, the study uses POMS (Little 2013) scores to measure attachment to parents, attachment to schools, beliefs, overall self-control, and family SES. The explanations for each independent variable

measured with the POMS (Little 2013) score provide a more specific demonstration of the POMS (Little 2013) score of each variable.

First, the research uses the POMS (Little 2013) score of the family bonding scale in the *ISR2* dataset to measure attachment to parents. The family bonding scale is the mean score of four items (Enzmann et al. 2005) in POMP (Cohen et al. 1999) scores ranging from 0 to 100 that asked respondents about their relationships with their fathers/stepfathers and their mothers/stepmothers, how often they perform activities with their parent(s), and the number of days that they eat evening meals with their parent(s) in a week. Following Enzmann et al. (2005), the alpha of the family bonding scale in the dataset is low ( $\alpha = .55$ ). The original four items and the possible responses to them are summarized in Appendix Table B3. Responses to the items that asked about respondents' relationships with their fathers/stepfathers and mothers/stepmothers were recorded on a 4-point scale ranging from 1 (= *not at all*) to 4 (= *very well*). Additionally, responses to the item that asked about how often respondents perform activities together with their parent(s) were recorded on a 6-point scale ranging from 1 (= *almost never*) to 6 (= *more than once/week*). Finally, responses to the item that asked for the number of days per week that respondents eat evening meals with their parent(s) were recorded on an 8-point scale ranging from 1 (= *never*) to 8 (= *daily*). Then, the possible values of each of the four items were transformed to range from 0 to 100 as POMP (Cohen et al. 1999) scores based on *formula (1)*. Specifically, the values of the items that asked respondents to rate the relationships with their fathers/stepfathers and mothers/stepmothers were transformed from 1-4 to 0-100 (Enzmann et al. 2005). The values of the item that asked respondents to rate how often they perform activities with their parent(s) were transformed from 1-6 to 0-100 (Enzmann et al. 2005). Finally, the values of the item that asked respondents the number of days per week that they eat evening meals with their parent(s) were transformed from 1-8 to 0-100 (Enzmann et al. 2005). After these transformations, the

family bonding scale was obtained by dividing the sum of all scores of the four items by four as the mean value of the four items. Finally, each respondent's POMS (Little 2013) score on the family bonding scale was obtained based on *formula (2)*. According to social control theory (Hirschi [1969] 2017), family bonds should decrease the likelihood of delinquency. Therefore, the first hypothesis in this analysis is that *family bonds have negative relationships with delinquent behaviors*.

Second, to evaluate attachment to peers, the study uses the item that asked respondents whether they have certain friends that they spend time with, whether performing activities together or just "hanging out." The responses to the item are either "No" or "Yes." I coded this item dichotomously with "0" and "1" to facilitate the presentation and interpretation of the results. The original item and the possible responses to it are summarized in Appendix Table B4. This item directly measures attachment to peers as defined by social control theory (Hirschi [1969] 2017) because performing an activity with friends reflects a mutual relationship. Thus, based on social control theory (Hirschi [1969] 2017), attachment to peers should decrease the likelihood of delinquency. Therefore, the second hypothesis in this analysis is that *having friends has negative relationships with delinquent behaviors*.

Third, the study uses the POMS (Little 2013) score of the school bond scale to measure attachment to schools. The school climate scale is the mean score of three items in POMP (Cohen et al. 1999) scores ranging from 0 to 100 that asked respondents about their desire to attend their schools, the amount of attention teachers gave them, and their love for their schools. In other words, this scale measured respondents' attitudes toward their schools: the more they liked their schools, the more attached they were to them. The alpha of the school climate scale in the dataset is 0.65 ( $\alpha = .65$ ). The original three items and the possible responses to them are summarized in Appendix Table B5. Responses to the three items were recorded on a 4-point scale ranging from 1 (= *not at all true*) to 4 (= *very true*). Then, the

possible values of each of the four items were transformed from 1 to 4 to 0 to 100 as POMP (Cohen et al. 1999) scores based on *formula (1)*. After these transformations, the school climate scale was obtained by dividing the sum of all scores of the three items by three as the mean value of the three items. Finally, each respondent's POMS (Little 2013) score on the school climate scale was obtained based on *formula (2)*. According to social control theory (Hirschi [1969] 2017), school bonds should decrease the likelihood of delinquency. Therefore, the third hypothesis in this analysis is that *school bonds have negative relationships with delinquent behaviors*.

Fourth, the study uses the educational aspiration level in the *ISRD2* dataset to measure commitments. The educational aspiration level is a 3-category variable that was coded from the answers to the item that asked about respondents' plans after completing compulsory school. Specifically, responses to the item were recorded on a 5-point scale<sup>3</sup> ranging from 1 (= *I will look for a job*) to 5 (= *I will continue my education (in my school) to prepare for higher education*). The responses were coded as "lower level" (= *looking for a job*), "medium level" (= *vocational school/learning a trade*), and "higher level" (= *school to prepare for academic studies*). The item is summarized in Appendix Table B6. According to social control theory (Hirschi [1969] 2017), commitments should decrease the likelihood of delinquency. Therefore, the fourth hypothesis in this analysis is that *commitments have negative relationships with delinquent behaviors*.

Fifth, to evaluate involvement in conventional activities, the study uses the item that asked respondents about the amount of time they spent on homework. The original item and the possible responses are summarized in Appendix Table B7. Responses to the item were recorded on a 6-level scale ranging from 1 (= *none*) to 6 (= *four hours or more*). This item

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<sup>3</sup> Unfortunately, Enzmann et al. (2005) coded "other/don't know," "ambiguous answer," and "no answer" as "missing".

Therefore, it is impossible to use these answers as values of educational aspiration level.

directly measures conventional activities in social control theory (Hirschi [1969] 2017) because here, the main conventional activity is doing homework. Based on social control theory (Hirschi [1969] 2017), conventional activities should decrease the likelihood of delinquency. Therefore, the sixth hypothesis in this analysis is that *conventional activities have negative relationships with delinquent behaviors*.

Sixth, the study uses the POMS (Little 2013) score of the scale of positive attitudes toward violence in the *ISR2* dataset to inversely measure belief. The scale of positive attitudes toward violence is the mean score of five items (Enzmann et al. 2005) in POMP (Cohen et al. 1999) scores ranging from 0 to 100 that asked respondents about their attitudes toward various violent behaviors performed by young people. Following Enzmann et al. (2005), the alpha of the scale in the dataset is 0.71 ( $\alpha = .71$ ). The original five items and the possible responses to them are summarized in Appendix Table B8. Responses to the five items were recorded on a 4-point scale ranging from 1 (= *disagree fully*) to 4 (= *agree fully*). Then, the possible values of each of the five items were transformed from 1 to 4 to 0 to 100 as POMP (Cohen et al. 1999) scores based on *formula (1)*. After these transformations, the scale of positive attitudes toward violence was obtained by dividing the sum of all scores of the five items by five as the mean value of the five items. Finally, each respondent's POMS (Little 2013) score on the scale was obtained based on *formula (2)*. According to social control theory (Hirschi [1969] 2017), beliefs should decrease the likelihood of delinquency. Conversely, positive attitudes toward violence should increase the likelihood of delinquency. Therefore, the fifth hypothesis in this analysis is that *positive attitudes toward violence have positive relationships with delinquent behaviors*.

Finally, the study uses the POMS (Little 2013) score of the overall self-control scale in the *ISR2* dataset to measure self-control. The self-control scale is the mean score of four subscale scores (Enzmann et al. 2005) in POMP (Cohen et al. 1999) scores ranging from 0 to

100. The four subscales measured respondents' *impulsivity* ( $\alpha = .57$ ), *risk seeking* ( $\alpha = .79$ ), *self-centeredness* ( $\alpha = .68$ ), and *temperament* ( $\alpha = .69$ ) (Enzmann et al. 2005). Each subscale includes three items, and there are twelve items in total ( $3 \times 4 = 12$ ). Higher scores on the four subscales indicate less self-control (Enzmann et al. 2005). Conversely, higher scores on the overall self-control scale indicate more self-control (Enzmann et al. 2005). Following Enzmann et al. (2005), the alpha of the overall self-control scale in the dataset is 0.83 ( $\alpha = .83$ ). The original items of the four subscales and the possible responses to them are summarized in Appendix Table B9. Responses to the twelve items were recorded on a 4-point scale ranging from 1 (= *disagree fully*) to 4 (= *agree fully*). Furthermore, the possible values of all four subscales, as well as the overall self-control scale, were transformed from 1 to 4 to 0 to 100 as POMP (Cohen et al. 1999) scores based on *formula (1)*. After these transformations, each respondent's POMS (Little 2013) score on the overall self-control scale was obtained based on *formula (2)*<sup>4</sup>. According to self-control theory (Gottfredson and Hirschi 1990), people with less self-control are more likely to engage in delinquent behaviors. Therefore, the final hypothesis in this analysis is that *levels of self-control have negative relationships with delinquent behaviors*.

In addition to the theoretical predictors discussed above, the study controls for respondents' gender and SES. First, the study includes gender as a control variable because it is important to explore how gender plays a part in existing theories (Costello and Laub 2020). The original question and the possible responses are summarized in Appendix Table B10.

Additionally, the study controls for respondents' SES by using the POMS (Little 2013) score of the family affluence scale in the *ISR2* dataset. The family affluence scale is the mean score of four items (Enzmann et al. 2005) in POMP (Cohen et al. 1999) scores ranging from 0 to 100 that asked respondents whether they had their own room, whether their family

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<sup>4</sup> Enzmann et al. (2005) did not demonstrate how overall self-control was converted from the four subscales.

had a computer, whether they had their own mobile phone, and whether they or their family had a car. Following Enzmann et al. (2005), the alpha of the family affluence scale in the dataset is 0.48 ( $\alpha = .48$ ). The original four items and the possible responses to them are summarized in Appendix Table B11. Responses to the four items were coded as either 0 (= *do not have the property*) or 1 (= *have the property*). The family affluence scale was obtained by dividing the sum of scores of the four items by four as the mean value of the four items. Furthermore, possible values of the family affluence scale were transformed from 1 to 4 to 0 to 100 as POMP (Cohen et al. 1999) scores based on *formula (1)*. Then, each respondent's POMS (Little 2013) score on the family affluence scale was obtained based on *formula (2)*. Below, Table 2 provides descriptive statistics for the variables used in the study.

**Table 2. Percentage Distributions/Mean for Independent Variables in the Analysis (N = 18,213)**

	Proportion (n)	Mean	Min	Max
<i>Social control variables</i>				
Attachment to parents (POMS)		0.80	0.00	1.00
Attachment to peers (Having friends)				
Yes	78.8 (14,347)			
No	21.2 (3,866)			
Attachment to schools (POMS)		0.69	0.00	1.00
Commitments (Educational aspiration)				
Lower	40.0 (7,286)			
Medium	12.2 (2,221)			
Higher	47.8 (8,706)			

(continued)

**Table 2. (continued)**

	Proportion (n)	Mean	Min	Max
<i>Social control variables</i>				
Conventional activities (Time spent on homework)				
None	7.0 (1,279)			
½ hour	29.5 (5,379)			
One hour	30.1 (5,664)			
Two hours	19.2 (3,504)			
Three hours	8.6 (1,575)			
Four hours or more	4.5 (812)			
Beliefs (POMS)		0.34	0.00	1.00
<i>Self-control variable</i>				
Levels of self-control (POMS)		0.58	0.00	1.00
<i>Control variables</i>				
Gender				
Female	52.3 (9,531)			
Male	47.7 (8,682)			
Family SES (POMS)		0.79	0.00	1.00

*Source: ISRD2.*

The study uses negative binomial regression models to assess the associations between the independent variables and the dependent variables because overdispersion is detected in preliminary analyses. Although the Poisson regression model can provide nonbiased estimates for positively skewed event counts (Osgood 2000), it has a strict technical assumption that its mean and variance must be equal (Roberts and Roberts 2021). The violation of this assumption is referred to as overdispersion, whereby different cases have different expected values and variances (Roberts and Roberts 2021). Overdispersion is suggested when the ratio obtained from the chi-square statistic divided by the degrees of

freedom (df) is greater than one (Roberts and Roberts 2021). When overdispersion occurs, it biases the standard errors while leaving the regression coefficients unaffected (Hoffmann 2003). An appropriate response to overdispersion is to replace the Poisson regression model with the negative binomial regression model, which “extends Poisson regression by adding a model parameter that represents this overdispersion” (Roberts and Roberts 2021). Therefore, the study uses negative binomial regression to replace Poisson regression when the ratio is detected to be greater than one in preliminary analyses.

#### 4. Results

Model 1<sup>5</sup> (Table 3) indicates that the expected number of property-related delinquency categories in which the youth is engaged in the *lifetime* is negatively associated with attachment to parents, attachment to school, conventional activity, beliefs (inversely measured by attitudes toward violence), and the level of self-control but positively associated with attachment to peers and family SES, holding the other main independent variables constant. Nonetheless, it is not associated with commitment when other variables are controlled for. Additionally, the difference between genders on the expected number of property-related delinquency categories in which the youth is engaged in the *lifetime* is statistically significant when other variables are controlled for.

From the estimated coefficients and the descriptive statistics of the variables, a 0.1-point increase in the family bond is associated with a 12.5% reduction in the expected number of property-related delinquency categories in which the youth is engaged in the *lifetime*. When other variables are held constant, the expected number of property-related delinquency categories in which the youth is engaged in the *lifetime* is 72.3% higher for individuals who had friends than for individuals who did not. A 0.1-point increase in the school bond is associated with a 4.2% decrease in the expected number of property-related delinquency

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<sup>5</sup> The variance inflation factor (VIF) scores indicated no collinearity problem in the analysis.

categories in which the youth is engaged in the *lifetime*. Compared with individuals who did not spend time on homework, the expected number of property-related delinquency categories in which the youth is engaged in the *lifetime* is 14.5% lower for individuals who spent half an hour on homework, 32.1% lower for individuals who spent one hour on it, 41.7% lower for individuals who spent two hours on it, 59.4% lower for individuals who spent three hours on it, and 57.6% lower for individuals who spent four or more hours on it, with other variables held constant. A 0.1-point increase in beliefs is associated with a 10.1% decrease in the expected number of property-related delinquency categories in which the youth is engaged in the *lifetime*. A 0.1-point increase in the level of self-control is associated with a 17.1% decrease in the expected number of property-related delinquency categories in which the youth is engaged in the *lifetime*. Regarding gender differences, the expected number of property-related delinquency categories in which the youth is engaged in the *lifetime* is 71.3% higher for males than females, with other variables held constant. Finally, a 0.1-point increase in individuals' family SES is associated with a 3.8% increase in the expected number of property-related delinquency categories in which the youth is engaged in the *lifetime*. These statistical differences are large enough to correspond to an impact in the real world.

**Table 3. Results of Negative Binomial Regression for Property-related Delinquency Category in the Lifetime (N = 18,213)**

<i>Social control variables</i>	Model 1
Attachment to parents (POMS)	-1.330 (.086) ***
Attachment to peers (Having friends) <sup>a</sup>	
Yes	.544 (.047) ***
Attachment to school (POMS)	-.433 (.061) ***
Commitment (Educational aspiration) <sup>b</sup>	
Medium	-.011 (.047)
Higher	-.023 (.034)
<i>(continued)</i>	

**Table 3. (continued)**

<i>Social control variables</i>	Model 1
Conventional activity (Time spend on homework) <sup>c</sup>	
½ hour	-.157 (.049) **
One hour	-.387 (.052) ***
Two hours	-.539 (.061) ***
Three hours	-.902 (.091) ***
Four hours or more	-.858 (.117) ***
Belief (POMS) <sup>6</sup>	-1.062 (.081) ***
<i>Self-control variable</i>	
Level of self-control (POMS)	-1.880 (.095) ***
<i>Control variables</i>	
Gender <sup>d</sup>	
Male	.538 (.034) ***
Family SES (POMS)	.371 (.067) ***

Standard errors in parentheses.

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

<sup>a</sup> Referent is no.

<sup>b</sup> Referent is lower.

<sup>c</sup> Referent is none.

<sup>d</sup> Referent is female.

Moreover, Table 4 shows the results for Model 2<sup>7</sup>, which include the expected number of property-related delinquency categories in which the youth is engaged in the *last year* as the dependent variable and the theoretical variables discussed above, as well as control variables. In Model 2, the expected number of property-related delinquency categories in which the youth is engaged in the *last year* is negatively associated with attachment to parents, attachment to school, conventional activity, beliefs (inversely measured by attitudes toward violence), and the level of self-control but positively associated with attachment to peers and family SES, holding other variables constant. Additionally, the difference between genders on the expected number of property-related delinquency categories in which the youth is engaged in the *last year* is statistically significant, when other variables are controlled for. From the estimated coefficients and the descriptive statistics of the variables, a 0.1-point

<sup>6</sup> Inversely, the coefficient of belief equals to the *b* of positive attitude towards violence times negative 1.

<sup>7</sup> The VIF scores indicated no collinearity problem in the analysis.

increase in the family bond is associated with a 12.4% reduction in the expected number of property-related delinquency categories in which the youth is engaged in the *last year*. With other variables held constant, the expected number of property-related delinquency categories in which the youth is engaged in the *last year* is 97.8% higher for individuals who had friends than for individuals who did not. A 0.1-point increase in the school bond is associated with a 5.6% decrease in the expected number of property-related delinquency categories in which the youth is engaged in the *last year*. Further, educational aspiration is not associated with the expected number in the *last year*, although the expected number of conducting property-related delinquent behaviors in the *last year* is 1.4% lower for respondents who had medium commitment than those who had lower commitment. the expected number of property-related delinquency categories in which the youth is engaged in the *last year* is 24.7% lower for individuals who spent half an hour doing homework than for those who did not spend time doing homework, 43.2% lower for individuals who spent one hour on it, 52.2% lower for individuals who spent two hours on it, 67.2% lower for individuals who spent three hours on it, and 57.9% lower for individuals who spent four or more hours on it, with other variables held constant. A 0.1-point increase in beliefs is associated with an 11.8% decrease in the expected number of property-related delinquency categories in which the youth is engaged in the *last year*. In terms of self-control, a 0.1-point increase in the level of self-control is associated with a 19.9% decrease in the expected number of property-related delinquency categories in which the youth is engaged in the *last year*. Regarding gender differences, the expected number of property-related delinquency categories in which the youth is engaged in the *last year* is 91.2% higher for males than for females, when other variables are held constant. Finally, a 0.1-point increase in individuals' family SES is associated with an 8.8% increase in the expected number of property-related delinquency categories in which the

youth is engaged in the *last year*. These statistical differences are large enough to have an impact in the real world.

**Table 4. Results of Negative Binomial Regression for Property-related Delinquency Category in the Last Year (N = 18,213)**

<i>Social control variables</i>	Model 2
Attachment to parents (POMS)	-1.329 (.120) ***
Attachment to peers (Having friends) <sup>a</sup>	
Yes	.682 (.071) ***
Attachment to school (POMS)	-.572 (.085) ***
Commitment (Educational aspiration) <sup>b</sup>	
Medium	-.141 (.068) *
Higher	-.01 (.048)
Conventional activity (Time spend on homework) <sup>c</sup>	
½ hour	-.284 (.065) ***
One hour	-.566 (.071) ***
Two hours	-.738 (.086) ***
Three hours	-1.115 (.137) ***
Four hours or more	-.866 (.164) ***
Belief (POMS) <sup>8</sup>	-1.259 (.114) ***
<i>Self-control variable</i>	
Level of self-control (POMS)	-2.218 (.135) ***
<i>Control variables</i>	
Gender <sup>d</sup>	
Male	.648 (.050) ***
Family SES (POMS)	.844 (.103) ***

Standard errors in parentheses.

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

<sup>a</sup> Referent is no.

<sup>b</sup> Referent is lower.

<sup>c</sup> Referent is none.

<sup>d</sup> Referent is female.

Model 3<sup>9</sup> shows that the expected number of violence-related delinquency categories in which the youth is engaged in the *lifetime* is negatively associated with attachment to parents, attachment to school, beliefs (inversely measured by attitudes toward violence), and level of self-control but positively associated with attachment to peers, with other variables held constant. Nonetheless, it is not associated with commitment, conventional activity, or family

<sup>8</sup> Inversely, the coefficient of belief equals to the *b* of positive attitude towards violence times negative 1.

<sup>9</sup> The VIF scores indicated no collinearity problem in the analysis.

SES when other variables are controlled for. Additionally, the difference between genders on the expected number of violence-related delinquency categories in which the youth is engaged in the *lifetime* is statistically significant, when other variables are controlled for. The expected number of violence-related delinquency categories in which the youth is engaged in the *lifetime* is 168% greater for males than females when other variables are held constant. Based on the coefficients and the descriptive statistics of the variables, a 0.1-point increase in the family bond is associated with a 5.9% reduction in the expected number of violence-related delinquency categories in which the youth is engaged in the *lifetime*. With other variables held constant, the expected number of violence-related delinquency categories in which the youth is engaged in the *lifetime* is 62.4% higher for individuals who had friends than individuals who did not. A 0.1-point increase in the school bond is associated with a 3% decrease in the expected number of violence-related delinquency categories in which the youth is engaged in the *lifetime*. A 0.1-point increase in beliefs is associated with an 11.5% decrease in the expected number of violence-related delinquency categories in which the youth is engaged in the *lifetime*. In terms of self-control, a 0.1-point increase in the level of self-control is associated with a 16.7% decrease in the expected number of violence-related delinquency categories in which the youth is engaged in the *lifetime*. These statistical differences are large enough to have an impact in the real world.

**Table 5. Results of Negative Binomial Regression for Violence-related Delinquency Category in the Lifetime (N = 18,213)**

<i>Social control variables</i>	Model 3
Attachment to parents (POMS)	-.613 (.086) ***
Attachment to peers (Having friends) <sup>a</sup>	
Yes	.485 (.045) ***
Attachment to school (POMS)	-.306 (.059) ***
Commitment (Educational aspiration) <sup>b</sup>	
Medium	.011 (.045)
Higher	-.034 (.033)

*(continued)*

**Table 5. (continued)**

<i>Social control variables</i>	Model 3
Conventional activity (Time spend on homework) <sup>c</sup>	
½ hour	-.108 (.049) *
One hour	-.200 (.052) ***
Two hours	-.146 (.059) *
Three hours	-.185 (.079) *
Four hours or more	-.068 (.096)
Belief (POMS) <sup>10</sup>	-1.223 (.077) ***
<i>Self-control variable</i>	
Level of self-control (POMS)	-1.831 (.091) ***
<i>Control variables</i>	
Gender <sup>d</sup>	
Male	.986 (.036) ***
Family SES (POMS)	.087 (.063)

Standard errors in parentheses.

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

<sup>a</sup> Referent is no.

<sup>b</sup> Referent is lower.

<sup>c</sup> Referent is none.

<sup>d</sup> Referent is female.

Model 4<sup>11</sup> shows that the expected number of violence-related delinquency categories in which the youth is engaged in the *last year* is negatively associated with attachment to parents, attachment to school, beliefs (inversely measured by attitudes toward violence), and level of self-control but positively associated with attachment to peers, with other variables held constant. Nonetheless, it is not associated with commitment, conventional activity, or family SES, with other variables controlled for. Additionally, the difference between genders on the expected number of violence-related delinquency categories in which the youth is engaged in the *last year* is statistically significant, with other variables controlled for. The expected number of violence-related delinquency categories in which the youth is engaged in the *last year* is 205.6% higher for males than females, with other variables held constant. From the coefficients and the descriptive statistics of the variables, a 0.1-point increase in the

<sup>10</sup> Inversely, the coefficient of belief equals to the  $b$  of positive attitude towards violence times negative 1.

<sup>11</sup> Variance inflation factor (VIF) scores indicated no collinearity problem for the analysis.

family bond is associated with a 5.9% reduction in the expected number of violence-related delinquency categories in which the youth is engaged in the *last year*. With other variables held constant, the expected number of violence-related delinquency categories in which the youth is engaged in the *last year* is 59.5% higher for individuals who had friends than for individuals who did not. A 0.1-point increase in the school bond is associated with a 3.7% decrease in the expected number of violence-related delinquency categories in which the youth is engaged in the *last year*. A 0.1-point increase in beliefs is associated with a 13% decrease in the expected number of violence-related delinquency categories in which the youth is engaged in the *last year*. In terms of self-control, a 0.1-point increase in the level of self-control is associated with an 18% decrease in the expected number of violence-related delinquency categories in which the youth is engaged in the *last year*. These statistical differences are large enough to have an impact in the real world.

**Table 6. Results of Negative Binomial Regression for Violence-related Delinquency Category in the Last Year (N = 18,213)**

<i>Social control variables</i>	Model 4
Attachment to parents (POMS)	-.612 (.110) ***
Attachment to peers (Having friends) <sup>a</sup>	
Yes	.467 (.058) ***
Attachment to school (POMS)	-.373 (.075) ***
Commitment (Educational aspiration) <sup>b</sup>	
Medium	-.048 (.058)
Higher	-.024 (.043)
Conventional activity (Time spend on homework) <sup>c</sup>	
½ hour	-.143 (.062) *
One hour	-.29 (.066) ***
Two hours	-.177 (.074) *
Three hours	-.161 (.100)
Four hours or more	-.034 (.122)
Belief (POMS) <sup>12</sup>	-1.387 (.099) ***
<i>Self-control variable</i>	
Level of self-control (POMS)	-1.989 (.117) ***

*(continued)*

<sup>12</sup> Inversely, the coefficient of belief equals to the *b* of positive attitude towards violence times negative 1.

**Table 6. (continued)**

<i>Control variables</i>	Model 4
Gender <sup>d</sup>	
Male	1.117 (.048) ***
Family SES (POMS)	.193 (.083) *

Standard errors in parentheses.

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

<sup>a</sup> Referent is no.

<sup>b</sup> Referent is lower.

<sup>c</sup> Referent is none.

<sup>d</sup> Referent is female.

To summarize, attachment to parents, attachment to school, beliefs, and level of self-control can significantly reduce the expected number of property- and violence-related delinquency categories in which the youth is engaged. Meanwhile, conventional activity can only significantly reduce the expected number of property-related delinquency categories in which the youth is engaged. However, neither property-related nor violence-related delinquency categories in which the youth is engaged is associated with commitment. Family SES can only increase the expected number of property-related delinquency categories in which the youth is engaged in the *lifetime*. Regarding gender differences in delinquency, males are more likely to be delinquent than females both in their *lifetimes* and in the *last year*. The results are large enough to have real-world significance.

## 5. Discussion

Building upon previous research on social control theory (Hirschi [1969] 2017) and self-control theory (Gottfredson and Hirschi 1990), this study tested two theories of control in post-socialist countries. Drawing on data on juvenile delinquency in 9 Eastern European countries from *ISR2*, I find that social control theory (Hirschi [1969] 2017) is partially supported whereas self-control theory (Gottfredson and Hirschi 1990) is fully supported by the data. Based on this empirical research, most factors identified in social control (Hirschi [1969] 2017) theory are associated with delinquency, even though Hirschi abandoned the theory. Meanwhile, the level of self-control is also associated with delinquency regardless of

the validity of the Grasmick et al. (1993) scale. Therefore, it is clear that the social institutions highlighted in the two theories of control are associated with delinquency.

### ***Social Control Theory in Post-socialist Society***

I find that social control theory (Hirschi [1969] 2017) is partially supported by this study. Based on the results in Models 1 and 2, attachment to parents, attachment to school, time spent on homework, and beliefs are negatively associated with property-related delinquent behaviors in both the *last year* and the *lifetime* whereas attachment to peers is positively associated with them, indicating that having friends may increase the engagement of minor delinquency (e.g., property-related delinquency). For violence-related delinquency, the results in Models 3 and 4 generally indicate that attachment to parents, attachment to school, and beliefs are negatively associated with this type of delinquency in both the *last year* and the *lifetime* while attachment to peers is positively associated with this type of delinquency. Therefore, the models partially support social control theory (Hirschi [1969] 2017).

The findings on the relationship between attachment to parents and juvenile delinquency are supportive of the theoretical hypothesis that family bonds are negatively associated with delinquency (Hirschi 1969). Additionally, the results are consistent with previous empirical studies that found that the relationship between attachment to parents and delinquency is negative (Hindelang 1973; Rosenbaum 1987; Wiatrowski and Anderson 1987; Laub and Sampson 1988; Thornberry et al. 1991; McGee 1992; Rankin and Kern 1994; Heimer 1996; Wadsworth 2000; Mack et al. 2007; Hovee et al. 2012; Junger and Marshall 1997; and Williams et al. 1999). Furthermore, the parameter estimates for family bond in Models 1, 2, 3, and 4 indicate a pattern of a more negative relationship between family bond and property-related delinquency. That is, family bonds are more associated with minor rather than severe delinquency. In general, the results partially support the claim that social control theory

(Hirschi [1969] 2017) is more predictive of minor delinquency than of severe delinquency (Krohn and Massey 1980; Agnew 1985).

In terms of the relationship between peers and delinquency, the results indicate that they are positively associated with each other. The findings are not supportive of the theoretical statement that attachment to peers is negatively associated with delinquency (Hirschi 1969). Additionally, the results are inconsistent with most previous studies that found that attachment to peers is negatively associated with delinquency (Wiatrowski et al. 1981; Krohn and Massey 1980; Agnew 1985; Patterson and Dishion 1985; Marcos et al. 1986; Ozbay et al. 2006; Wang et al. 2002; Zhang and Messner 1996; Hartjen and Kethineni 1999; Cohen and Zeira, 1999; Tanioka and Glaser 1991; Shoemaker 1994) but consistent with the research conducted by Heimer (1996). Furthermore, the parameter estimates for attachment to peers in the four models reveal a pattern of a more positive relationship between attachment to peers and property-related delinquency, meaning that having friends may increase the engagement of minor delinquency more than severe delinquency. One possible explanation is that the original question regarding friendship not only asked whether respondents have friends but also examined whether they hang out or do things together. Therefore, some delinquent acts, such as shoplifting and group fights, may occur when youths do things together, and these collective acts reinforce the friendship between respondents and their peers.

The results for the relationship between attachment to school and delinquency confirm the theoretical claim regarding school bonds (Hirschi 1969). In addition, the findings are consistent with empirical research that found a negative relationship between school bonds and delinquency (Hindelang 1973; Rosenbaum 1987; Wiatrowski and Anderson 1987; Thornberry et al. 1991; McGee 1992; Ozbay et al. 2006; Wang et al. 2002; Zhang and Messner 1996; Hartjen and Kethineni 1999; Cohen and Zeira, 1999; Tanioka and Glaser 1991; Shoemaker 1994). Furthermore, the parameter estimates for school bonds in Models 1,

2, 3, and 4 indicate a pattern of a more negative relationship between school bonds and property-related delinquency. That is, school bonds are more associated with minor delinquency than severe delinquency. Furthermore, the results partially support the claim that social control theory (Hirschi [1969] 2017) is more predictive of less serious delinquency than of severe delinquency (Krohn and Massey 1980; Agnew 1985).

Regarding the relationship between time spent on homework and delinquency, the results partially support the theoretical claim that conventional activity can reduce delinquency (Hirschi 1969) because the findings indicate a negative association with property-related delinquency but not with violence-related delinquency. Therefore, the findings indicate that conventional activity is associated with minor delinquency and partially support the claim that social control theory (Hirschi [1969] 2017) is more predictive of less serious delinquency than of severe delinquency (Krohn and Massey 1980; Agnew 1985).

The findings on the relationship between beliefs and delinquency are supportive of the theoretical claim regarding moral beliefs (Hirschi 1969) because such beliefs are negatively associated with property- and violence-related delinquency in both the *last year* and the *lifetime*. The results are consistent with studies that found that beliefs are negatively associated with severe delinquency (Burkett and Jensen 1975; McGee 1992; Junger and Marshall 1997)<sup>13</sup> or overall delinquency (Ozbay et al. 2006; Wang et al. 2002; Zhang and Messner 1996; Hartjen and Kethineni 1999; Cohen and Zeira, 1999; Tanioka and Glaser 1991; Shoemaker 1994). However, the findings cannot confirm that beliefs are more predictive of less serious delinquency than of severe delinquency (Krohn and Massey 1980; Agnew 1985).

To summarize, the research proves that attachment to parents, attachment to school, conventional activity, and beliefs are negatively associated with delinquency, while

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<sup>13</sup> Severe delinquency in these studies was measured as drug use.

attachment to peers is positively associated with delinquency among juveniles in post-socialist countries with *ISRD2* data.

### ***Self-control Theory in Post-socialist Society***

The research finds that the level of self-control is negatively associated with property-related delinquency and violence-related delinquency in both the *last year* and the *lifetime*. This finding is consistent with results in previous research (Vazsonyi et al. 2001; Botchkovar 2005; Tittle and Botchkovar 2005). In addition, the research finds that the level of self-control is more associated with violence-related delinquency, meaning that self-control theory (Gottfredson and Hirschi 1990) is more supportive of severe delinquency than of minor delinquency.

### **6. Conclusion**

Based on *ISRD2* data, the present research examined how various sources of social control and the overall level of self-control are associated with juvenile delinquency in post-socialist countries. My findings are consistent with the theoretical hypotheses based on social control theory (Hirschi [1969] 2017) that family, school, and beliefs are firmly associated with delinquency among juveniles in post-socialist countries but that conventional activity is not a firm type of social control, as social control theory (Hirschi [1969] 2017) claimed, because it is only associated with minor delinquency. Furthermore, unlike the original theoretical hypothesis claimed, it appears that friends may encourage juveniles to conduct delinquent acts. Regarding self-control theory (Gottfredson and Hirschi 1990), the research offers support to a developing body of literature that suggests that the level of self-control is associated with delinquency. Finally, the educational aspiration level is not associated with delinquency, probably because juveniles in these countries can enter the middle class through apprenticeship when they become adults, meaning that postsecondary degrees are not

necessary. However, further research on social stratification in these countries is needed to support this explanation.

Some limitations related to data and measurement merit mention, and I hope they will be remedied in future research. First, one wave of *ISR*D data can only reflect the applicability of the two theories over a short period. If multiple waves of data can be used to test the two theories, a dynamic change over time may be revealed. Additionally, the lower educational aspiration level in the data may be overestimated because of the coding method in the original data. Although this study converted “other/don’t know”, “ambiguous answer”, and “no answer” to “lower level”, the real value of each of the three answers is still unknown due to the coding method in the original data set. Future surveys may retain these original categories of the answer and allow data users to determine how to use them in their own research. Moreover, it is necessary to improve the measure of self-control. Although the Grasmick et al. (1993) scale captures the idea that “people who lack self-control will tend to be impulsive, insensitive, physical (as opposed to mental), risk-taking, shortsighted, and nonverbal, and they will tend therefore to engage in criminal and analogous acts” (Gottfredson and Hirschi 1990), it cannot capture how the three conditions mentioned in self-control theory (Gottfredson and Hirschi 1990), known as monitoring, recognizing, and punishing, relate to juveniles’ level of self-control because it focuses on respondents’ characteristics rather than on the parenting process. Finally, the low alpha of attachment to parents, attachment to school, and family affluence may be due to a low number of questions, poor interrelatedness between items or heterogeneity on each scale (Tavakol and Dennick 2011).

Future research can extend the present findings by testing the theories with multiple waves of data. Although this research tested the theories with a large sample in Eastern European countries, the reality may have changed since then. Therefore, multiple waves of

data can provide firm conclusions. It is also important to use a measure that can reflect the relationship between parenting and self-control. Specifically, studies on how monitoring, recognizing, and punishing shape self-control are needed to reveal human beings' complex nature. Finally, it is necessary to add more highly interrelated questions to each scale that has a low alpha to improve the reliability of each scale in future research.

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## **APPENDICES**

**Table A1. Proportions of Missing Values (N = 20,299)**

	Proportion of missing (%)
<i>Property-related delinquency</i>	
In lifetime	2.36
In last year	3.04
<i>Violence-related delinquency</i>	
In lifetime	1.71
In last year	2.59
<i>Social control variables</i>	
Attachment to parents (POMS)	0.08
Attachment to peers (Having friends)	1.08
Attachment to schools (POMS)	1.08
Commitments (Educational aspiration)	20.48
Conventional activities (Time spent on homework)	1.63
Beliefs (POMS)	1.73
<i>Self-control variable</i>	
Levels of self-control (POMS)	1.16
<i>Control variables</i>	
Gender	0.13
Family SES (POMS)	0.08

Source: ISRD2.

**Table A2. Descriptive Statistics Including All Observations (N = 20,299)**

	Proportion (n)	Mean	Min	Max
<i>Social control variables</i>				
Attachment to parents (POMS)		0.80	0.00	1.00
Attachment to peers (Having friends)				
Yes	78.1 (15,861)			
No	20.8 (4,219)			
Missing	1.1 (219)			
Attachment to schools (POMS)		0.69	0.00	1.00

(continued)

**Table A2. (continued)**

	Proportion (n)	Mean	Min	Max
<i>Social control variables</i>				
Commitments (Educational aspiration)				
Lower	20.9 (4,237)			
Medium	12.2 (2,482)			
Higher	46.4 (9,423)			
Missing	20.5 (4,157)			
Conventional activities (Time spent on homework)				
None	7.3 (1,485)			
½ hour	29.3 (5,947)			
One hour	30.5 (6,194)			
Two hours	18.7 (3,793)			
Three hours	8.3 (1,685)			
Four hours or more	4.3 (865)			
Missing	1.1 (219)			
Beliefs (POMS)		0.34	0.00	1.00
<i>Self-control variable</i> Levels of self-control (POMS)		0.58	0.00	1.00
<i>Control variables</i>				
Gender				
Female	51 (10,362)			
Male	48.8 (9,911)			
Missing	0.1 (26)			
Family SES (POMS)		0.80	0.00	1.00

*Source: ISRD2.*

**Table B1. Questions: Property-related Delinquency**

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**54.** Did you ever damage on purpose something, such as a bus shelter, a window, a car or a seat in the bus or train or?

(1) No. (2) Yes

**54.2** Did you do this during the last 12 months?

(1) No. (2) Yes, \_\_times<sup>14</sup>

**55.** Did you ever steal something from a shop or a department store?

(1) No. (2) Yes

**55.2** Did you do this during the last 12 months?

(1) No. (2) Yes, \_\_times

**56.** Did you ever break into a building with the purpose to steal something?

(1) No. (2) Yes

**56.2** Did you do this during the last 12 months?

(1) No. (2) Yes, \_\_times

**57.** Did you ever steal a bicycle, moped or scooter?

(1) No. (2) Yes

**57.2** Did you do this during the last 12 months?

(1) No. (2) Yes, \_\_times

**58.** Did you ever steal a motorbike or car?

(1) No. (2) Yes

**58.2** Did you do this during the last 12 months?

(1) No. (2) Yes, \_\_times

**60.** Did you ever use your computer for 'hacking'?

(1) No. (2) Yes

**60.2** Did you do this during the last 12 months?

(1) No. (2) Yes, \_\_times

**61.** Did you ever steal something out of or from a car?

(1) No. (2) Yes

**61.2** Did you do this during the last 12 months?

(1) No. (2) Yes, \_\_times

**62.** Did you ever snatch a purse, bag or something else from a person?

(1) No. (2) Yes

**62.2** Did you do this during the last 12 months?

(1) No. (2) Yes, \_\_times

**64.** Did you ever threaten somebody with a weapon or to beat them up, just to get money or other things from them?

(1) No. (2) Yes

**64.2** Did you do this during the last 12 months?

(1) No. (2) Yes, \_\_times

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*Source: ISRD2.*

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<sup>14</sup> The data set only coded whether respondents conducted this behavior or not, regardless of times. Same as other questions in this category.

**Table B2. Questions: Violence-related Delinquency**

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**63.** Did you ever carry a weapon, such as a stick, knife, or chain (not a pocket-knife)?

- (1) No. (2) Yes

**63.2** Did you do this during the last 12 months?

- (1) No. (2) Yes, \_\_times<sup>15</sup>

**64.** Did you ever threaten somebody with a weapon or to beat them up, just to get money or other things from them?

- (1) No. (2) Yes

**64.2** Did you do this during the last 12 months?

- (1) No. (2) Yes, \_\_times

**65.** Did you ever participate in a group fight on the school playground, a football stadium, the streets or in any public place?

- (1) No. (2) Yes

**65.2** Did you do this during the last 12 months?

- (1) No. (2) Yes, \_\_times

**66.** Did you ever intentionally beat up someone, or hurt him with a stick or knife, so bad that he had to see a doctor?

- (1) No. (2) Yes

**66.2** Did you do this during the last 12 months?

- (1) No. (2) Yes, \_\_times
- 

*Source: ISRD2.*

**Table B3. Questions: Attachment to Parents (Parental Relationship)**

**POMP ( $\alpha = .55$ )**

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**16.** How do you usually get along with the man you live with (father, stepfather....)?

- (1) I get along just fine.  
(2) I get along rather well.  
(3) I don't get along so well.  
(4) I don't get along at all.  
(5) There is no man in the house.

**17.** How do you usually get along with the woman you live with (**your mother or stepmother**)?

- (1) I get along just fine.  
(2) I get along rather well.  
(3) I don't get along so well.  
(4) I don't get along at all.  
(5) There is no mother or other woman in the house.
- 

(continued)

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<sup>15</sup> The data set only coded whether respondents conducted this behavior or not, regardless of times. Same as other questions in this category.

**Table B3. (continued)**

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**18.** How often do you and your parents (or the adults you live with) do something together, such as going to the movies, going for a walk or hike, visiting relatives, attending a sporting event, and things like that?

- (1) More than once a week.
- (2) About once a week.
- (3) About once a month.
- (4) A few times a year.
- (5) About once a year.
- (6) Almost never.

**19.** How many days a week do you usually eat the evening meal with (one of) your parents (or the adults you live with)?

- (1) Always.
  - (2) Sometimes.
  - (3) Twice.
  - (4) Three times.
  - (5) Four times.
  - (6) Five times.
  - (7) Six times.
  - (8) Daily.
- 

*Source: ISRD2.*

**Table B4. Questions: Attachment to Peers**

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**27.** Some people have a certain group of friends that they spend time with, whether doing things together or just hanging out. Do you have a group of friends like that?

- (1) No.
  - (2) Yes.
- 

*Source: ISRD2.*

**Table B5. Questions: Attachment to School (Positive Attitude toward School)**

**POMP ( $\alpha = .65$ )**

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**45.** How strongly do you agree with the following statements about your school?

**45.1** If I had to move, I would miss my school.

- (1) I fully agree. (2) I somewhat agree. (3) I somewhat disagree. (4) I fully disagree.

**45.2** Teachers notice when I am doing well and let me know.

- (1) I fully agree. (2) I somewhat agree. (3) I somewhat disagree. (4) I fully disagree.

**45.3** I like my school.

- (1) I fully agree. (2) I somewhat agree. (3) I somewhat disagree. (4) I fully disagree.
- 

*Source: ISRD2.*

**Table B6. Questions: Commitments (Educational Aspirations)**

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**46.** What do you think of doing after you finish compulsory school? (Compulsory means that you are forced to go to school.)

- (1) I will look for a job.
  - (2) I will start an apprenticeship.
  - (3) I will start training on the job.
  - (4) I will (continue to) attend a school where I can learn a trade.
  - (5) I will continue my education (in my school) to prepare for higher education.
  - (6) Other:
  - (96) I don't know yet.
- 

*Source: ISRD2.*

**Table B7. Questions: Conventional Activities (Time Spent on Homework)**

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**24.** Outside school, how much time do you spend on an average school day on each of these activities?

**24.1** Doing homework.

- (1) None. (2) 1/2 hour. (3) 1 hour. (4) 2 hours. (5) 3 hours. (4) 4 hour or more.
- 

*Source: ISRD2.*

**Table B8. Questions: Beliefs (Acceptability of Violence) POMP ( $\alpha = .71$ )**

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**38.** How strongly do you agree or disagree with the following statements of violent behaviors by young people?

**38.1** A bit of violence is part of the fun.

- (1) Fully agree. (2) Somewhat agree. (3) Somewhat disagree. (4) Fully disagree.

**38.2** One needs to make use of force to be respected.

- (1) Fully agree. (2) Somewhat agree. (3) Somewhat disagree. (4) Fully disagree.

**38.3** If somebody attacks me, I will hit him or her back.

- (1) Fully agree. (2) Somewhat agree. (3) Somewhat disagree. (4) Fully disagree.

**38.4** Without violence, everything would be much more boring.

- (1) Fully agree. (2) Somewhat agree. (3) Somewhat disagree. (4) Fully disagree.

**38.5** It is completely normal that boys want to prove themselves in physical fights with others.

- (1) Fully agree. (2) Somewhat agree. (3) Somewhat disagree. (4) Fully disagree.
- 

*Source: ISRD2.*

**Table B9. Grasmick et al.'s Self-Control Scale POMP ( $\alpha = .83$ )**

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**39.** How strongly do you agree or disagree with the following statements?

*Impulsivity* ( $\alpha = .57$ )

**39.1** I act on the spur of the moment without stopping to think.

(1) Fully agree. (2) Somewhat agree. (3) Somewhat disagree. (4) Fully disagree.

**39.2** I do whatever brings me pleasure here and now, even at the cost of some distant goal.

(1) Fully agree. (2) Somewhat agree. (3) Somewhat disagree. (4) Fully disagree.

**39.3** I'm more concerned with what happens to me in the short run than in the long run.

(1) Fully agree. (2) Somewhat agree. (3) Somewhat disagree. (4) Fully disagree.

*Risk seeking* ( $\alpha = .79$ )

**39.4** I like to test myself every now and then by doing something a little risky.

(1) Fully agree. (2) Somewhat agree. (3) Somewhat disagree. (4) Fully disagree.

**39.5** Sometimes, I will take a risk just for the fun of it.

(1) Fully agree. (2) Somewhat agree. (3) Somewhat disagree. (4) Fully disagree.

**39.6** Excitement and adventure are more important to me than security.

(1) Fully agree. (2) Somewhat agree. (3) Somewhat disagree. (4) Fully disagree.

*Self-centeredness* ( $\alpha = .68$ )

**39.7** I try to look out for myself first, even if it means making things difficult for other people.

(1) Fully agree. (2) Somewhat agree. (3) Somewhat disagree. (4) Fully disagree.

**39.8** If things I do upset people, it's their problem, not mine.

(1) Fully agree. (2) Somewhat agree. (3) Somewhat disagree. (4) Fully disagree.

**39.9** I will try to get the things I want even when I know it's causing problems for other people.

(1) Fully agree. (2) Somewhat agree. (3) Somewhat disagree. (4) Fully disagree.

*Temperament* ( $\alpha = .69$ )

**39.10** I lose my temper pretty easily.

(1) Fully agree. (2) Somewhat agree. (3) Somewhat disagree. (4) Fully disagree.

**39.11** When I'm truly angry, other people better stay away from me.

(1) Fully agree. (2) Somewhat agree. (3) Somewhat disagree. (4) Fully disagree.

**39.12** When I have a serious disagreement with someone, it's usually hard for me to talk calmly about it without getting upset.

(1) Fully agree. (2) Somewhat agree. (3) Somewhat disagree. (4) Fully disagree.

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*Source: ISRD2.*

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**Table B10. Genders**

**1.** Are you male or female?

(1) Male.

(2) Female.

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*Source: ISRD2.*

**Table B11. Questions: Family Affluence POMP ( $\alpha = .48$ )**

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11. Do you have a room of your own?

(1) Yes.

(2) No, I share my room with other members of the family.

12. Do you have a computer at home that you are allowed to use?

(1) Yes.

(2) No.

13. Do you own a mobile phone?

(1) Yes.

(2) No.

14. Does your family own a car?

(1) Yes.

(2) No.

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*Source: ISRD2.*