

**AT THE SIGHT OF OPPORTUNITY WHO GETS HIGH:  
A CROSS-NATIONAL STUDY OF SELF-CONTROL**

by

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## TABLE OF CONTENTS

LIST OF TABLES .....	v
ABSTRACT .....	vi
Chapter	
1 INTRODUCTION .....	1
2 GENERAL THEORY OF CRIME .....	6
Low Self-Control .....	6
Opportunity .....	7
Cross-Cultural Generalizability .....	9
Present Study .....	12
3 METHODOLOGY .....	14
Data .....	14
Subsample .....	15
Measures .....	15
4 RESULTS .....	20
Analytic Strategy .....	20
Descriptive Statistics Across Country .....	20
Bivariate Relationships .....	24
Multivariate Regression .....	27
5 DISCUSSION .....	32
Limitations .....	35
REFERENCES .....	37

## LIST OF TABLES

Table 1	Descriptive Statistics for of Cross-National Cannabis Use Among Adolescents.....	23
Table 2	Compressed Bivariate Display of Cross-National Cannabis Use, Percentages of Adolescent Use Within Each Independent Variable Group.....	25
Table 3	Table 3. Multivariate Logistic Regression Predicting Cannabis Use Among Adolescents.....	29

## **ABSTRACT**

Among adolescents worldwide, cannabis remains as the most widely used illicit substance. However, the majority of research on criminal offending and delinquency among youth has mainly focused on addictive drugs and alcohol. Therefore, this study intends to assess self-control among adolescents in nations with differing cannabis policies. To explore the relationship between self-control and cannabis use among three countries with distinct regulations on cannabis, data from the second International Self-Reported Delinquency (ISRD-2) are used. Multivariate logistic regression models are country-specific and work independently, predicting cannabis use for the United States, Spain and Netherlands. Results indicate that across the three nations, self-control played an influential role in cannabis use. In addition, results demonstrate that countries with stricter cannabis policies have the most youth engaging in cannabis use. These findings suggest that strict cannabis policies does not necessarily mean a decreased use of cannabis, but in fact the opposite may be occurring.

## **Chapter 1**

### **INTRODUCTION**

Until recently, the majority of research on criminal offending and delinquency among adolescents has focused on addictive drugs and alcohol. However, cannabis<sup>1</sup> is the most widely used illicit substance among adolescents worldwide and its use has only increased since 2009 (Maniglio and Innamorati 2014; Hall and Degenhardt 2007). The number of cannabis users has reached nearly 200 million worldwide, a quarter of which are adolescents (United Nations Office on Drugs and Crime [UNODC] 2015). The increased use of cannabis is not an isolated trend, but rather, universal phenomenon occurring in numerous countries. Although cannabis is thriving as a commonly used substance, it would be erroneous to assume that patterns of cannabis are similar across nations. Prevalence of cannabis use is mostly observed in Western countries such as Europe, Canada and the United States; meanwhile less developed countries report lower rates of cannabis use (Hall and Degenhardt 2007). Despite cross-national variations in cannabis use, it is evident that cannabis remains the highest consumed drug among adolescents worldwide.

The widespread trend of cannabis use requires immediate attention to further understand whether the current policies intact are serving as a buffer to future

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<sup>1</sup> While the term “marijuana” is more widely known, this paper will refer to the substance as cannabis to maintain consistency, but most importantly, to divert from racist implications that has historically been associated with the term “marijuana” (see Hayes and Bowery 1933 for details on the drug’s historical evolution).

offending or exacerbating the problem of recidivism. In the United States, current federal policies regulate drugs through the Controlled Substance Act (CSA)<sup>2</sup>, which does not differentiate between the medical and recreational use of cannabis. In other words, cannabis is treated like every other controlled substance (cocaine and heroin), despite the legalization of cannabis in 44 states for recreational and/or medical purposes. Contradicting state and federal cannabis policies have influenced ways in which state and local detentions handle cannabis consumers. A recent evaluation of detentions “found not only a high recidivism rate for incarcerated young people, but that the experience of incarceration is the most significant factor in increasing the odds of recidivism” (Holman and Ziedenberg 2013:4). Among the juveniles detained, two-thirds were confined for nonviolent offenses such as cannabis possession. This number is reflected a little differently in countries where cannabis policies are less restrictive.

Attitudes toward cannabis use vary across cultures depending on the nations’ political and social acceptance of the drug. Since opportunity corresponds to the provisional character of availability and access in a given setting, the use of cannabis should vary across nations. Many criminological theories acknowledge differing rates of offending among groups, but rarely is there a focus on policy. Gottfredson and Hirschi’s (1990) self-control theory has not only generated an overwhelming amount of empirical and theoretical support for crime and delinquency (Pratt and Cullen 2000), but has been recognized as a theory that can explain all crime and delinquency, regardless of race, ethnicity, nationality, gender and cultural differences. Even more, theorists argue that individuals with low self-control are more likely to be impulsive,

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<sup>2</sup> The Controlled Substance Act (21 U.S.C § 811) became effective in 1971 as a form to combine all existing federal drug laws into a single statute to combat narcotic and dangerous drug problems in the United States.



risk-taking and generally less likely to consider the long-term consequences of their deviant acts. Since Gottfredson and Hirschi devote some attention to the issue of policy their theory should be applicable to the study of cannabis use among adolescents across nations with differing cannabis policies, given the generality of their theoretical statements.

From this perspective, the general theory of crime can be interpreted as transcending national and cultural boundaries because:

[C]ultural variability is *not* important in the causation of crime, that we should look for constancy rather than variability in the definition of and causation of crime, and that a single theory of crime can encompass the reality of cross-cultural differences in crime rates (Gottfredson and Hirschi 1990:175).

That is to say, individuals with low self-control are more likely to engage in criminal behavior *regardless* of demographic background or geographic boundaries. If self-control is genuinely the *general* theory of crime, then it should explain criminal offending and delinquent behavior in other countries in addition to the United States. Indeed, the vast body of research demonstrating a strong relationship between low self-control and criminal or delinquent behavior have involved samples drawn from the United States (Desmond, Ulmer, and Bader 2013; Ford and Blumenstein 2012; Conner, Stein, and Longshore 2009; Piquero et al. 2002). Taken together, these studies confirm that self-control is a strong predictor of crime and excluding it would be problematic (Pratt and Cullen 2000).

Despite the strong domestic support for self-control, few studies have empirically tested the applicability and validity of self-control theory using samples other than White and Black Americans (Alvarez and Fox 2010; Enzmann et al., 2010; Vazsonyi and Crosswhite 2004; Vazsonyi et al., 2001). The present study investigates

several propositions from Gottfredson and Hirschi's (1990) theory that focus on opportunity, self-control, and cannabis use among adolescents in three diverse countries: United States, Netherlands, and Spain. A key aspect to self-control is the availability of opportunity because when opportunities are available, low self-control becomes conducive to criminal behavior; when opportunity is not present, low self-control cannot manifest itself into crime (Hay and Forrest 2008).

From this stance, the theory suggests that low self-control is contingent on the presence of opportunity. A few U.S. studies have applied the interaction effect between low self-control and opportunity on crime and found empirical support (Pratt and Cullen 2000; Grasmick et al. 1993). Importantly, however, the role of opportunities remains debated and "a largely unexplored element of the theory" (Simpson and Geis 2008:50). Opportunity is the availability and access of a given event, and the three sampled nations of this study provide different opportunities to use of cannabis due to their drug policies. Therefore, involvement in cannabis use and self-control should differ between adolescents in Spain, Netherlands and United States.

This study will be one of the few studies to assess self-control across cultures using a diverse sample of Dutch, American, and Spanish juveniles. It also contributes to the sparse body of research that has explored the relationship between self-control and cannabis use among samples other than White and Black Americans. Lastly, this study will assess the claim made by Gottfredson and Hirschi that their theory is applicable across various groups and cultures. The analysis will provide notable information on understudied populations while simultaneously provide knowledge on the effectiveness of cannabis policies as a form of delinquent punishment.

To explore the applicability of self-control cross-nationally, data from the second International Self-Reported Delinquency (ISRD – 2) are used. ISRD – 2 is a cross-national dataset that allows for the comparison of juvenile offenses including substance abuse, self-control, and demographics across multiple nations. To facilitate the current state of research, self-control is first summarized as it relates to criminal behavior and provide a brief overview of previous empirical studies as it relates to cross-cultural samples. After describing the present study, bivariate and multivariate analyses explore cultural differences in cannabis use, self-control and opportunity among adolescents in Spain, Netherlands and United States. Finally, the concluding comments focus on the current study's findings in relation to cannabis use cross-nationally and future research avenues are proposed.

## **Chapter 2**

### **GENERAL THEORY OF CRIME**

#### **Low Self-Control**

The general theory of crime (also referred to as “self-control theory”), proposed by Gottfredson and Hirschi (1990) posits that differences in criminal and delinquent behavior is based on the variation of self-control in individuals. High self-control, they suggest, is a stagnant individual tendency that allows the actor to avoid instantaneous behaviors whose consequences exceed the long-term benefits. In contrast, individuals with low levels of self-control tend to engage in deviant acts if the opportunity present itself because immediate gratification cannot be deferred. More specifically, Gottfredson and Hirschi (1990) describe six defining features of low self-control:

In sum, people who lack self-control will tend to be impulsive, insensitive, physical (as opposed to mental), risk-taking, short-sighted, and nonverbal, and they will tend therefore to engage in criminal and analogous acts. Since these traits can be identified prior to the age of responsibility for crime, since there is a considerable tendency for these traits to come together in the same person, and since these traits tend to persist through life, it seems reasonable to consider them as comprising a stable construct useful in the explanation of crime (p. 90).

In the initial study of this fundamental component, Grasmick and colleagues (1993) tested and operationalized the self-control construct by creating a 24-item scale with its multiple elements. While, Hirschi and Gottfredson (1993) disagree with this type of measurement, it is notably the most widely used measure of self-control

among empirical studies (Marshall and Enzmann 2012). In fact, numerous studies have shown that measures of self-control, whether attitudinal or behavioral<sup>3</sup>, are significantly linked with crime (Hay and Forrest 2008; Pratt and Cullen 2000; Grasmick et al. 1993), analogous behavior (Yun, Kim, and Kwon 2016; Özbay 2008) and delinquency (Vazsonyi and Huang 2015; Podaná and Buriánek 2013; Vazsonyi and Crosswhite 2004; Vazsonyi et al. 2001).

### **Opportunity**

In addition to self-control, Gottfredson and Hirschi (1990) also mention opportunity in their general theory of crime. The theorists suggest that “even when circumstances are least favorable to crime, possibilities of crime may add up to the probability of crime (p. 8). This is because crimes occur at any given moment, Gottfredson and Hirschi (1990) argued that opportunities are ever present and anyone can commit and can engage in criminal behavior. Therefore, Gottfredson and Hirschi (2003) suggested that self-control can be measured without accounting for differences in the presence of opportunity to commit crime since it is ubiquitous.

However, most scholars accepted the concept of opportunity as the provisional character of availability and access in a given setting (Rodriguez 2012; Gibbs, Giever, and Higgins 2003). Most scholars suggest that when opportunity presents itself, individuals with low level of self-control are more likely to engage in immediate gratification, with disregard of the long-term consequences, than individuals with higher levels of self-control (Marhsall and Enzmann 2012). This interpretation implies an “interaction effect between low self-control and opportunity on crime” (Podana and

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<sup>3</sup> An attitudinal scale, measures beliefs and attitudes, whereas a behavioral construct measures an act or behavior (see Vazsonyi and Huang 2015 for specifics on design).

Burianek 2013:72). These findings suggest that some circumstances are prone to more opportunities than others which removes the ever presence of opportunity of all crimes.

Despite Gottfredson and Hirschi's (2003) rejection to this explanation, many scholars have found consistent empirical support for this interpretation (Burt, Simons, and Simons 2006; Pratt and Cullen 2000; Grasmick et al. 1993). For instance, Hay and Forrest (2008) made a convincing argument for incorporating self-control through routine activities theory<sup>4</sup>. They found that the relationship between self-control and crime is greater with more opportunities. Drawing on data from the National Longitudinal Study of Youth, they measured opportunities as the time adolescents spent with their peers or the absence of parental supervision. The International Self-Reported Delinquency-2 (ISRD-2) survey includes this measure which allows for opportunity to be operationalized in a similar manner.

More recently, using the ISRD-2 survey, Marshall and Enzmann (2012) tested this hypothesis across different countries. Their results indicated that opportunity played a more significant role for those with low self-control than for those with high self-control. These findings are consistent with previous studies that demonstrated an interaction effect of opportunities and self-control. However, in their cross-cultural study, Marshall and Enzmann (2012) found strong support in some countries and not others (Latin America). They propose "further interpretation and exploration" (p. 321) for cross-cultural comparative analyses that observe the interaction effect of opportunities and self-control. Since the role of opportunity remains ambiguous and

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<sup>4</sup> A criminological theory that posits that crime occurs because an opportunity results when victims and offenders converge in time and space.

controversial, this study makes it a central part of its analyses by exploring the role of opportunity in countries of differing cannabis policies.

Gottfredson and Hirschi (1990) explain that when discussing cross-cultural groups in the level of crime and delinquency the structure of opportunities remains ubiquitous. In fact, the relevance of opportunity on specific crimes “require goods, services, victims and opportunity, elements that do vary from time to time and place to place and therefore do much to account for cross-national differences in the rate at which crimes are committed” (Gottfredson and Hirschi 1990:177). Policy regulations and social acceptance of specific criminal acts can be vital to opportunity as well. Restrictions, policies and sanctions vary cross-culturally which would influence the role of opportunity. Despite these factors, there is a lack in the exploration of sanctions and regulations as a form of opportunity and its relationship self-control and delinquent behavior (Marshall and Enzmann 2012). Therefore, this study intends to focus on cannabis users as the delinquent behavior since policies and then therefore opportunity vary across countries.

### **Cross-Cultural Generalizability**

There is a relatively small but growing body of literature on testing the validity of self-control on criminal and delinquent acts using comparative cross-national studies (Meneses and Akers 2011; Vazsonyi et al. 2001). Most studies of criminal and delinquent behavior have found empirical support in the West, however, there are many other societies, especially in Europe that lack consideration (Marhsall and Enzmann 2012). While comparative cross-national studies are limited, there is an “essential means of understanding universal regularities in behavior” (Butters et al. 2011:342). Comparative research normally reveals patterns of delinquency or crime

that can help address a similar pattern of behavior in one's own country. For instance, previous comparative studies have highlighted special characteristics about criminogenic factors such as measurement of crime (reported vs. charged) that have then influenced ways in which government agencies report their crime (Vetere and Newman 1977). Knowledge and insight gained on the nature of crime from countries with various socio-economic and cultural contexts is of great significance to policy makers on either end (Junger-Tas 2010) especially when dealing with drug policies that may impact the livelihoods of young adults. Therefore, this study extends its analyses to countries of various backgrounds.

A relevant application of this was conducted by Menses and Akers (2011), who measured the frequency of cannabis use among adolescents in the United States and Bolivia to compare how well the general theory of crime explained self-control and delinquency. Using a similar measurement of self-control developed by Grasmick et al. (1993), the authors found that self-control was a relatively weak predictor of cannabis use and overall only significant for one component of their self-control measure. Similarly, Marshall and Enzmann (2012) conducted a cross-national comparative study using ISRD-2 and found that the strength of self-control as a predictor of deviance was stronger in some countries and not others. They speculate that the difference in self-control may be attributed to various socio-cultural factors including opportunity. Their aggregated measurement of delinquency may have generated their mixed findings for self-control. By combining criminal acts of various seriousness and violence levels into a single measurement analyses may not capture the full extent of the relationship. Therefore, this study only observes ever use of



cannabis across all nations to fully grasp its connection to self-control, but also to detect the role of cannabis' policies.

Gottfredson and Hirschi (1990) contend that the *general theory of crime*, “can explain all crime, at all times” (p. 117); including involvement in crime and delinquency across cultures, ethnicities and nations, regardless of their policy regulations and social tolerance to particular delinquent acts. Self-control theory then, is expected to extend to countries with different policies regarding cannabis, since opportunity which includes policies, may affect behavior. While, cannabis is the most used illicit substance among adolescents worldwide, there are different attitudes toward cannabis consumption reflected in countries' policies (United Nations Office on Drugs and Crime [UNODC] 2015). Since opportunity corresponds to the provisional character of availability and access in a given setting, the use of cannabis should vary across nations.

In this study, the attention is placed on the role that opportunity plays between this relationship. Since the precise role of opportunity remains a commonly debated concept of the theory (Marshall and Enzmann 2012), it becomes a central component of this study. For this reason, a comparative cross-national study of the United States, Netherlands and Spain will be analyzed. These countries were selected for their distinct policies regarding cannabis. Specifically, the United States criminalizes any use of cannabis under the federal government, making it illegal to consume, sell and purchase the drug<sup>5</sup>. In contrast, the Netherlands has adopted a non-enforcement policy for the possession or sale of a certain quantity of cannabis, as evidenced by their

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<sup>5</sup> Although criminalized at the federal level, cannabis policies vary state by state and even across cities now (United Nations Office on Drugs and Crime [UNODC] 2015).

cannabis coffee shops (Yacoubian 2007). Similarly, Spain has adopted a favorable legalization of cannabis, following several supreme court rulings establishing that the possession of even large amounts was not a criminal offense, unless intent for traffic and sell is determined (Gamella and Rodrigo 2004). Based on their legal differences regarding cannabis, the United States would be a context in which cannabis should be less available due to its strict sanctions and therefore self-control should be higher. Whereas, Spain and Netherlands are expected to have a weaker relationship between self-control and cannabis use since their legislation permit the use of the substance. While there are not many studies that examine how such cultural difference can impact the influence of risk factors on cannabis use; these different levels of cannabis regulations across countries in Europe and North America, should provide a representative scale of opportunity. This study will then explore the strength of the relationship between self-control and cannabis use across different countries to determine whether assertions attained from Gottfredson and Hirschi's (1990) general theory of crime can explain this disparity, if one exists.

### **Present Study**

The present study focuses on the relationship between self-control and cannabis use across three countries with distinct regulations on cannabis. There is a relatively limited but growing body of research on this issue, however, there are still many societies, especially in parts of Europe, where theories of crime and delinquency lack empirical validity (Menses and Akers 2011). Based on previous cross-national studies (Meneses and Akers 2011; Vazsonyi et al. 2001), a degree of disparity is expected in the relationship between self-control and cannabis, and an attempt to explain the different approaches to cannabis use in these countries will be made.

Following the assumptions of self-control theory, it is assumed that opportunity as indicated by degree of availability and access according to policies will impact the relationship between self-control and cannabis use. Based on previous studies, low self-control should increase criminal acts when perceived opportunity is high (Longshore 1998; Grasmick et al. 1993). Therefore, if access and availability to cannabis is limited for adolescents, the absence of opportunity should produce less cannabis use even among adolescents with low self-control. In other words, individuals with low self-control pursue more cannabis use when the social environment permits its opportunity.

Similarly, low self-control in all three observed countries is expected to be a strong predictor of criminal and delinquent behavior regardless of cultural background. Cannabis use varies across countries based on their perceived social acceptance of the drug. In Netherlands, cannabis use is an acceptable social norm and in Spain too under special regulations, whereas the United States has prohibited its use under federal law. It is then expected that variation among countries' perceived tolerance with respect to cannabis use should vary in predictability of self-control on delinquent acts.

### **Chapter 3**

## **METHODOLOGY**

### **Data**

Data for this study came from the second International Self-Reported Delinquency (ISRD – 2) study collected from 2005 to 2007. ISRD – 2 is a cross-national dataset aimed at estimating the frequency of juvenile offenses including substance use, property and violent offenses among 7th, 8th and 9th graders in 30 countries (N = 67,883). It is a school-based study that used classrooms from secondary institutions as the primary sampling unit (not individual students). For most countries, a city-based sampling strategy was used, just as it was for the United States, Netherlands and Spain. The sampling process used in the ISRD – 2 study included the following stages: selection of towns and cities, and random selection of schools and classes by school type (academic or vocational) as well as grade level (7th, 8th, and 9th). The city-based sampling contacted approximately 2,100 students per country, from which each sample included about 700 students from a large city, a medium-sized city, and a cluster of small towns. All students from selected classrooms were eligible to participate in this study with parental consent. The data of most countries in the ISRD – 2 study may be viewed as representative of students ages 12 to 16 in secondary schools (Enzmann et al. 2010). However, it is crucial to consider that data from city-based samples are not nationally representative because concentrations of populations are not equivalent intra-nationally.

### **Subsample**

The subsample used in the current study consists of data from the United States, Spain the Netherlands. The overall sample<sup>6</sup> includes 1,952 American, 1,442 Spanish and 2,019 Dutch students ages 12 to 16 years in grades 7th, 8th, and 9th. Gender proportions are almost equivalent across all three nations. In the American sample, there is an even split of female and male participants. Of the Dutch adolescents in the sample, 51 percent are male. Finally, the Spanish adolescents in the sample consist of 51 percent who identify as male and the remaining 49 percent are female. Grade levels are also almost proportionate across all three nations. Of the American adolescents in the sample, 24 percent are 7th graders, 24 percent are 8th graders and the majority are 9th graders (52 percent). Spanish students consist of 30 percent 7th graders, 36 percent 8th graders, and 34 percent 9th graders. Dutch students in the sample were 34 percent 7th graders, 32 percent 8th graders, and 34 percent 9th graders.

### **Measures**

All dependent, independent, and control variables were measured using the ISRD – 2 survey. The survey is a structured, self-administered questionnaire with a total of 67 questions containing elements of family, education, delinquent behavior, and peer influence. Qualified students were asked to complete the questionnaire during class while a researcher was present.

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<sup>6</sup> Since 91% of the original responses remained after testing for missing data, I proceeded without running multiple imputations (see Graham [2009] for more on missing data).

*Dependent Variable.* To ascertain whether adolescents had ever used cannabis in their lifetime, students were asked “Did you ever use weed, marijuana or hash?” Response options were coded as 0 for no and 1 for yes. All cases in which the student did not know or left the question empty, were coded as missing.

*Independent Variables.* Measurement of self-control has been a hotly debated topic among scholars. Hirschi and Gottfredson (2001) disagree with the attitudinal measure, claiming “it is illegitimate to see or treat this scale [Grasmick et al.’s scale of 1993] as the embodiment of the theory” (p. 230). Their disapproval of this applied measurement is derived from their belief that this instrument does not accurately measure the behavioral aspect of self-control. Despite their disagreement, Grasmick et al.’s (1993) measure of self-control remains as the most widely used scale for testing self-control (Pratt and Cullen 2000). In this study, self-control was measured using an adaptation from Grasmick et al.’s (1993) scale, which includes four components (self-centeredness, impulsivity, risk-taking and temper), each constructed by three items. The twelve questions were asked in Likert format with options of fully agree, somewhat agree, somewhat disagree, and fully disagree. From these 12 Likert type questions, a self-control index<sup>7</sup> was created. The measurement of the scale was evaluated by Marshall and Enzmann (2012) demonstrating positive outcomes because of its validity across the different countries it was applied. The self-control scale<sup>8</sup>

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<sup>7</sup> An eigenvalue represents the variance of the linear integration of items making up a particular factor and an eigenvalue greater than 1 is considered strong (Graham 2009; Rummel, 1970). All items included in this study were identified with an eigenvalue above 1.

<sup>8</sup> The twelve self-control items loaded positively with an alpha level of 0.94.

ranges from 12 to 48, with the lower end representing high self-control and the higher numbers indicating high low-control.

Strategies for conceptualizing opportunity are inconsistent and vary widely. A direct approach asking about presence of opportunity is problematic because not everyone detects opportunity the same way (Hay and Forrest 2008). However, scholars argue that this method is more likely to apply to repeat offenders than first time offenders because they former offenders have already engaged in crime (Longshore and Turner 1998). An indirect approach on the other hand, measures opportunity through environmental factors such as community crime rates, access and availability of educational programs and the like. Despite the difficultness in operationalizing opportunity, the present study will mock previous measurements of opportunity that employed direct indicators. Therefore, opportunity is measured in terms of availability and access, which earlier studies have demonstrated to be a suitable fit (Podaná and Buriánek 2013). For example, scholars have proposed that adolescents that spend more time with family during their spare time are expected to be less likely to engage in deviant acts (Glueck & Glueck 1950; Sampson & Laub 1994). Thus, in the current study, leisure time spent with family is used as a proxy for opportunity. Responses were coded 0 for rarely spend time with family and 1 for often spend time with family.

Peer influence has been shown to be one of the most important predictors of delinquent behavior, including drug use (Ford and Blumenstein 2012) and was included in the present study as a key independent variable. Peer influence was assessed by using a direct question that asked whether the student's core or primary group of friends participated in illegal behavior. The question asked whether "Do

people in your group actually do illegal things (against the law) together?” The respondent was given an option to answer yes or no. Responses were dichotomized (0 = no, 1 = yes).

A measure for school attachment was also included since prior research indicates that low attachment is often linked to delinquent and other analogous behaviors (Menses and Akers 2011). The assessment of school attachment was important to include because it is the primary environment youth spend their time, alongside their homes. School attachment in this study was assessed based on whether the respondent reported that they enjoyed school. Responses were then dichotomized to either yes (coded 1) or no (coded 0).

*Control Variables.* To reduce concerns related to spuriousness, several control variables were included. All analyses controlled for effects of gender, grade, and family structure. Gender is coded 0 for female and 1 for male. Grades 7, 8 and 9 are measured as dummy variables, where 7<sup>th</sup> grade is used as the reference group. Family structure included both whether the respondent lived in a nuclear family and whether their parents were divorced. Nuclear family measures the family structure by asking respondents whether he/she lives with both parents and divorce captures the disruption caused by separation within the family. Both forms of family structure<sup>9</sup> are included in the analyses because they measure different aspects of family dynamics. Including both forms of family dynamics, analyses can better capture the myriad of family

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<sup>9</sup> Multicollinearity refers to the problem when there are medium to high intercorrelations among the predictors. The variance inflation factor for a predictor indicates whether there is a strong linear association between it and all the remaining predictors. Multicollinearity was not found for the predictor variables; the variance inflation factors were low (1.20).



arrangements possible. Family studies on cannabis use suggest that children in one-parent households are more likely to deviate due to reduced supervision and or family disruption (Moon et al., 2004). Nuclear family was coded to indicate a nuclear family (coded 1) and living with others (coded 0). Similarly, divorce is coded as 0 for married and 1 combines separation and divorced.

## **Chapter 4**

### **RESULTS**

#### **Analytic Strategy**

To assess sample characteristics, frequencies and t-tests were utilized. Bivariate relationships between cannabis use and the independent and control variables across the three countries using chi square tests were conducted. A logistic regression was performed to assess whether the independent variables in this model adequately predict the dichotomous dependent variable of cannabis use, independent of all other factors. A logistic regression was used because the dependent variable is binary, making it inappropriate for the ordinary least squares regression model (Hosmer and Lemeshow 2000). Multivariate logistic regression models were country-specific and conducted independently, predicting cannabis use for the United States, Spain and Netherlands. All analyses were performed using the statistical software Stata 13 for Windows.

#### **Descriptive Statistics Across Country**

Table 1 highlights the descriptive statistics for the various predictors and outcome variables for each country's subsample. Lifetime cannabis use does not appear to vary greatly among the three countries included in the current study; at most a 2 percent difference is observed. Use of cannabis consumption appears to be highest among American adolescents (16 percent) and lowest among Spanish students (13

percent). America's deterrent federal policies<sup>10</sup> and enforcement on cannabis would suggest lower use, however, results indicate the opposite. On the other hand, cannabis use among adolescents in Netherlands are relatively low even though Dutch policies<sup>11</sup> permit the consumption of cannabis.

The proxy variable for opportunity is the quantity of leisure time spent with family. Across Spain, United States and Netherlands family time is closely related, showing little to no variation. Almost three-quarters of Spanish respondents, report spending regular leisure time with their family. Whereas, Dutch and American students report spending less time with their family (62 and 64 percent respectively).

For the rest of the independent variables, there was some slight variation across countries. In terms of delinquent peers, American respondents report the highest association to other delinquent adolescents (57 percent). Dutch and Spanish students report lower levels of delinquent friends (36 and 48 percent respectively). These students report having friends who at one point or another have engaged in an illegal activity. Attachment for school depicts the largest differences in outcomes. In Spain, only 39 percent of students enjoy school, 71 percent of Dutch students enjoy attending their school and 64 percent of American students enjoy school.

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<sup>10</sup> At the time of data collection (2005 – 2007), cannabis in the United States was illegal under the Controlled Substance Act of 1970 even though 10 states by 2005 had legalized cannabis for either recreational or medical purposes.

<sup>11</sup> Dutch policy on cannabis is the best known example of a decriminalized and regulated form of drug prohibition. Since the 1980s, cafes and snack bars have attained permits to sell small quantities of cannabis for consumption on the premise or off (Levine 2003).

The subsamples from the United States, Netherlands and Spain illustrate an almost even distribution across gender and grade. As for family structure, responses across countries demonstrate more variation. Nuclear families appear to be more common among Spanish students (81 percent) and lowest among American students (66 percent). Put another way, most adolescents in Spain report living with both parents, whereas only two-thirds of American students report having a nuclear family. These findings align with the rate of divorce across each country. The United States reports the highest rate of divorces (30 percent), Netherlands follows at 20 percent and Spain stands with the lowest rate of divorce (14 percent). Family structure corresponds to the divorce variable in that both find matching results, yet measure different aspects of family.

Table 1 Descriptive Statistics for of Cross-National Cannabis Use Among Adolescents.

	Country		
	United States ( <i>N</i> = 1952)	Netherlands ( <i>N</i> = 2019)	Spain ( <i>N</i> = 1442)
<b>Dependent Variable</b>			
Cannabis Use	.16	.15	.13
<b>Control Variables</b>			
Male	.50	.51	.51
Grade			
7 <sup>th</sup> Grader	.24	.34	.30
8 <sup>th</sup> Grader	.24	.32	.36
9 <sup>th</sup> Grader	.53	.34	.33
Nuclear Family	.66	.75	.81
Divorce	.30	.20	.14
<b>Independent Variables</b>			
Family Time	.64	.62	.70
Enjoy School	.64	.71	.39
Delinquent Peers	.57	.48	.36
Self-Control Index ( $\bar{x}$ )	27.16	25.21	23.84

### **Bivariate Relationships**

presents findings from the bivariate models demonstrating the percentage of cannabis users across the United States, Netherlands and Spain for each variable of interest. At the bivariate level, family structure was significantly related ( $p < .001$ ) to cannabis use for only American and Dutch students. For family structure, 10 percent of American students that live in a nuclear household reported using cannabis and the percentage of cannabis doubled (26 percent) for students that do not live in a two-parent household. Similar results were identified among students living in Netherlands, where only 13 percent of Dutch students living in a nuclear family report having used cannabis, but that nearly doubled (22 percent) for Dutch students living in a non-nuclear household. However, having a nuclear family had no statistically significant effect on cannabis use among Spanish adolescents. The relationship between divorce and adolescent cannabis use depicts similar findings. For Dutch and American students, the relationship between divorce and reported cannabis use among students showed a statistically significant relationship, similar to family structure. Among American students, a quarter of respondents who experienced divorce in their family reported the use of cannabis in their lifetime; that is more than double from that of students who have married parents. In Netherlands, 23 percent of children from divorced households reported that they engaged in cannabis consumption.

Table 2 Compressed Bivariate Display of Cross-National Cannabis Use, Percentages of Adolescent Use Within Each Independent Variable Group.

		Country		
		United States ( <i>N</i> = 1952)	Netherlands ( <i>N</i> = 2019)	Spain ( <i>N</i> = 1442)
<b>Control Variables</b>				
Gender				
	Female	.15	.14	.11
	Male	.16	.16	.14
Grade				
	7 <sup>th</sup> Grader	.13	.06***	.06***
	8 <sup>th</sup> Grader	.16	.13	.11
	9 <sup>th</sup> Grader	.17	.26***	.20***
Family Structure				
	Non-Nuclear	.26***	.22***	.14
	Nuclear	.10***	.13***	.12
	Married	.12***	.13***	.12
	Divorce	.25***	.23***	.14
<b>Independent Variables</b>				
Family Time				
	Rarely	.30***	.21***	.21***
	Often	.12***	.11***	.10***
School				
	Dislike	.26***	.24***	.18***
	Enjoy	.10***	.11***	.05***
Peers				
	Non-Delinquent			
	Delinquent	.01***	.01***	.03***
		.27***	.30***	.31***

Note. \**p* < .05, \*\**p* < .01, \*\*\**p* < .001

The rest of the independent variables also illustrated statistically significant results ( $p < .001$ ). First, family leisure time serving as a proxy for opportunity was found to be significantly related to reported cannabis use in all three nations. In the United States, 30 percent of students that rarely or never spend family time together have used cannabis and only 12 percent that often spend quality time with family reported using cannabis. The Dutch and Spanish students have even closer findings in that for both, 21 percent of students that rarely spend time with family reported cannabis use more than students who often spend their leisure time with family. Repeatedly at the bivariate level, family played an important role in predicting cannabis engagement. School also was found to have a statistically influential role in the reported use of cannabis across all three countries. Across all three nations, students who reported that they did not enjoy school were more likely to report the use of cannabis. In America, 26 percent of students that dislike school have used cannabis, compared to only 12 percent of students who enjoy school. In Netherlands, results display similar findings in that only 11 percent of students that enjoy school have used cannabis in comparison to their peers that dislike school (24 percent). Spain, depicts the most notable results, in that only 5 percent of students that enjoy school have used cannabis before, but more than triple that percent (18 percent) have used cannabis among students who dislike school.

Lastly, peer influence appears to hold the largest difference among variables for all three countries yet maintains the highest correlation between delinquent peers and reported cannabis use. In the U.S., 27 percent of students with delinquent peers reported the use of cannabis before, but only 1 percent with non-delinquent peers reported its use. Students in Netherlands also illustrated strong differences in that only



1 percent of students with non-delinquent peers have used cannabis in their lifetime, whereas 30 percent of students with delinquent peers reported the use of cannabis. In Spain, only 3 percent of students with non-delinquent peers reportedly engaged in cannabis use, compared to 31 percent of students with delinquent peers. At the bivariate level, the relationship between peer influence and cannabis consumption was observed to be the strongest.

Results do not indicate any statistically significant difference of cannabis consumption for either gender or 8<sup>th</sup> grade within country and cross-nationally. In terms of grade, in the United States, grade did not play a critical role in the use of cannabis. However, Spanish and Dutch students in grades 7<sup>th</sup> and 9<sup>th</sup> indicated a significant relationship ( $p < .001$ ) to cannabis use. In other words, Spanish and Dutch students in 7<sup>th</sup> and 9<sup>th</sup> grade have a higher percentage of use than 8<sup>th</sup> graders. Cross-nationally among these countries, at the bivariate level, gender did not play a significant role in cannabis use; both males and females were just as likely to report the use of cannabis.

### **Multivariate Regression**

Results from the multivariate regression models predicting self-reported lifetime cannabis use across the independent variables, net of all other factors are located in Table 3. Family showed the most change from the bivariate to the multivariate level. At the bivariate level family played a crucial role in cannabis use, however, after controlling for all other factors it lost significance in divorce for all countries. Only in the United States was family structure observed to have a statistically significant ( $p < .001$ ) role in cannabis use. American students from a non-

nuclear family were more likely to engage in cannabis use compared to American students who live with both parents (OR = .42).

In line with family arrangement, leisure time spent with family which serves as a proxy for opportunity was found to be significant for both Spain and the United States but not Netherlands. For the United States students who spend frequent time with their family as opposed to those who rarely spend time with their family were less likely to report the use of cannabis (OR = .69). The role of family time held a higher significance among students residing in the U.S ( $p < .01$ ) than it did in Spain ( $p < .05$ ). For Spain, students who reported spending leisure time with their family were less likely to report the use of cannabis compared to students who report rarely spending leisure time with their family (OR = .80).

School attachment played a crucial role in predicting cannabis use across all three nations, even after controlling for all other factors. This relationship seems to play a greater role in the United States and Spain ( $p < .001$ ) than in Netherlands ( $p < .01$ ). For instance, in the United States students who reported enjoying school as opposed to those who do not were less likely to report the use of cannabis (OR = .47). Similarly, in Netherlands, students who enjoy attending school were less likely to report cannabis use compared to students who do not enjoy school (OR = .68). In Spain as well, students who enjoy school were less likely to report cannabis use than students who do not enjoy school, net of all other factors (OR = .44). These findings seem to indicate that school attachment plays an influential role in cannabis use, when controlling for other indicators.

Table 3      Table 3. Multivariate Logistic Regression Predicting Cannabis Use Among Adolescents.

	Country					
	United States ( <i>N</i> = 1952)		Netherlands ( <i>N</i> = 2019)		Spain ( <i>N</i> = 1442)	
	Odds Ratio	S.E.	Odds Ratio	S.E.	Odds Ratio	S.E.
<b>Control Variables</b>						
Male	1.11	.16	.94	.14	.97	.18
8 <sup>th</sup> Grader <sup>12</sup>	.96	.21	1.7**	.37	1.3	.36
9 <sup>th</sup> Grader	1.28	.25	3.9***	.81	1.69*	.45
Nuclear Family	.42***	.09	.83	.21	1.24	.42
Divorce	.92	.19	1.34	.35	.85	.31
<b>Independent Variables</b>						
Family Time	.69**	.12	.89	.11	.80*	.19
Enjoy School	.47***	.07	.68**	.10	.44***	.10
Delinquent Peers	14.6***	4.66	19.9***	5.64	11.4***	2.75
Self-Control (coef)	1.08***	.01	1.08***	.01	1.07***	.01

Note. \**p* < .05, \*\**p* < .01, \*\*\**p* < .001

<sup>12</sup> Reference group for grade is 7<sup>th</sup> grade

The most influential factors in predicting cannabis use across all three nations were peers and self-control. Across Netherlands, Spain and the United States these two independent variables had a statistically significant ( $p < .001$ ) relationship to cannabis use even after controlling for all other independent and control variables. In the United States, students with delinquent friends were more likely to engage in cannabis use than adolescents without delinquent peers ( $OR = 14.6$ ). This relationship is even greater for the Dutch. In Netherlands students with delinquent friends reporting the use of cannabis greater than for those without delinquent friends ( $OR = 19.9$ ). Spanish students using cannabis when they have delinquent peers was more likely in comparison to those without delinquent friends ( $OR = 11.4$ ). Self-control also had a great influence in reported cannabis use among students in all three countries. American and Dutch students with low self-control were more likely to report cannabis use than students with high self-control ( $OR = 1.08$ ). Similarly, the odds of Spanish students with low self-control reporting the use of cannabis was greater compared to students with high self-control ( $OR = 1.07$ ). This finding illustrates the powerful effect that self-control appears to have on cannabis use among adolescents cross-nationally and net of all other factors.

For Netherlands, United States and Spain gender and divorce did not show a significant relationship to cannabis use, after controlling for all other variables. At the bivariate level divorce played a significant role in predicting cannabis use, but once all other variables were accounted for, divorce diminished in significance.

As for the rest of the control variables, grade played a significant role in predicting cannabis use for only some grades. For instance, 8<sup>th</sup> graders using cannabis was more likely than for 7<sup>th</sup> graders in the Dutch sample ( $OR = 1.7$ ). However, 9<sup>th</sup>

graders using cannabis in Netherlands was more likely than for 7<sup>th</sup> graders (OR = 3.9). In Spain it is even lower, 9<sup>th</sup> graders using cannabis were more likely than compared to 7<sup>th</sup> graders (OR = 1.69). These results seem to vary across countries and across models. While 8<sup>th</sup> grade at the bivariate level did not have any significant relationship to cannabis use; after controlling for all other variables, it appears significant ( $p < .01$ ) for only students residing in Netherlands. However, being in the 9<sup>th</sup> grade showed the most influence in the Netherlands ( $p < .001$ ) and only partial significance ( $p < .05$ ) in Spain, but no influence in the United States.

## **Chapter 5**

### **DISCUSSION**

Self-control theory has been one of the most empirically tested and influential criminological theories for over two decades (Akers and Sellers 2009; Vazsonyi et al. 2001; Pratt and Cullen 2000). Part of its appeal is derived from its explanation that crime and deviance transcends traditional psychological and sociological boundaries. The theory suggests that individuals low in self-control, are more likely to engage in criminal or deviant acts. This proposition is independent of sex, age, or culture, so that the same relationship should exist for males or females, for grade school children or young adolescents, and for Caucasian, Spanish or Dutch. The purpose of this study was to test specific tenets of Hirschi and Gottfredson's (1990) self-control theory, namely whether the relationship between self-control, opportunity and cannabis use varies by cultures; this relationship was examined in samples of American, Dutch and Spanish students. This study adds to the literature on self-control in that it examines cannabis use among adolescents cross-nationally in nations that differ in policies and enforcement. Previous studies have only focused on a single country's self-control (Cheung and Cheung, 2008; Cretacci and Cretacci, 2012; Forde and Kennedy, 1997) and studies that have included multiple countries have compared neighboring countries (Vazsonyi et al., 2012; Meneses and Akers, 2010) which often have similar cultures. Overall, findings from the current study provide support for Gottfredson and Hirschi's claims as they relate to the generality of self-control across groups.

For instance, the focus of study was to determine whether self-control can be generalized cross-nationally independent of culture. Each selected country in this study has differing policies regarding cannabis and if self-control theory is as general as Gottfredson and Hirschi (1990) proclaim it to be then differences in policies should not influence adolescents' level of self-control. Across Spain, Netherlands, and the United States self-control played an influential role in cannabis use. American students reported the lowest levels of self-control had the highest use of cannabis despite their strict federal policies on cannabis. Netherlands on the other hand, the second highest use of cannabis and self-control average even though Dutch policies are considered among the most liberal cannabis policies. Spanish students reported the lowest use of cannabis and had the highest level of self-control even though their drug regulations permit private cannabis consumption. The relationship between cannabis use and self-control seem to corroborate previous studies that report self-control to be a strong predictor of cannabis use (Ford & Blumenstein, 2013; Desmond, Ulmer, & Bader, 2013; Will et al., 2006). This further extends existing literature in that it extends it to countries that vary in culture and drug policies. Self-control as a predictor of cannabis use in the United States was relatively similar to its use among students in Netherlands and Spain even when controlling for other strong predictors.

Of these strong predictors, opportunity, school attachment and peers played a significant role in predicting cannabis use for all three countries. Consistent with previous control arguments, Gottfredson and Hirschi (1990) identify family as the primary source to provide children with an ability to recognize deviant behavior. These results corroborate previous studies that have found family arrangement to be related to deviance and analogous behavior (Moon et al. 2014; Vazsonyi and

Crosswhite 2004). Family time which served as a proxy for opportunity was observed to have an impact on American and Spanish students. In other words, American and Spanish students that spent more time with their family, and thus had less of an opportunity to engage in deviant behavior, were less likely to use cannabis. This finding is in line with other studies that have observed the relationship between deviance and family in that adolescents that spend more time with family during their spare time are less likely to engage in deviant acts (Glueck & Glueck 1950; Sampson & Laub 1994). In sum, these findings support theoretical predictions which specified that associations between self-control, family processes, and deviance would be largely invariant by culture. In addition, results suggest that family and related family processes are central in the socialization of self-control independent of groups, which is consistent with Gottfredson and Hirschi's (1990) emphasis on parents for the development of self-control at an early age.

Second, peers and school attachment were found to be important predictors of cannabis use among all three countries. Previous studies (Ford and Blumenstein 2012) have found friends to be influential in predicting deviant and analogous behaviors. Similar findings were observed in this study which found that Spanish, American, and Dutch students with delinquent peers are impressively more likely to use cannabis. Students often spend at least 7 hours in school, so apart from their homes adolescents spend a large majority of their time in school where relationships are formed and values are exchanged. Peer influence cannot be abandoned from any analyses observing deviant behavior because of its provided impact on respondents. Similarly, school attachment was found to be a key predictor of cannabis use. Among Dutch, Spanish and American students, those who enjoyed school were less likely to use cannabis.



School involvement and commitment seems to determine and impact whether students will engage in devious acts.

### **Limitations**

In terms of the broader impact, this study sought to determine if cannabis use across different countries would shape self-control levels. In theory, the United States should have lower levels of cannabis use among adolescents compared to Netherlands and Spain based on the more severe laws and regulations designed to deter and punish cannabis use. However, this study adds to the literature on self-control and deviant behavior because it observes this relationship across three countries that vary in policies and culture; it is important to keep in mind that no study goes without its limitations. First, the cross-sectional design used by ISRD-2 made it difficult to establish causality. Rather than an analysis of socialization or parent rearing, the relationship between self-control and cannabis use may just be a result of the selection process. For instance, there is no information of student's self-control prior to secondary school. Though self-control claims to be persistent throughout life, it would have been better to assess self-control at an earlier stage.

In the same vein, operationalizing opportunity was restrictive and family time had to be used as a proxy measure. Therefore, the unexplained variance in results may be attributed to the undeniable difference in culture. The United States' restrictive federal policies on cannabis serves as a deterrent yet it is quickly becoming a socially acceptable drug as states continue to legalize it. Another limitation to point out is the fact that secondary data was used for this study. Although the questionnaire was professionally translated it is uncertain whether the meanings of words in both cultures

are the same. A word in one country may mean something abstractly different in another.

Keeping this in mind, future research should explore the impact of state and local policies on cannabis use and whether aspects of self-control theory may help understand this relationship. As already established in this paper self-control is a predictor of cannabis cross-nationally, but other studies should focus on how policies impact use at a more localized level. It would also be important to extend this study to an older group. Coffee shops in Netherlands have an age requirement, in which students from this sample do not qualify for. An older age group of adults should be assessed to determine if those legally allowed to purchase cannabis differ from the adult population in the United States.

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