Assessing the role of context on the relationship between adolescent marijuana use and property crimes in Mexico

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Revised manuscript

May 2016

ABSTRACT

Background: A limited amount of research has been conducted on the association between marijuana use and adolescent crime in developing countries such as Mexico, where crime rates are high and marijuana use is increasing.

Objectives: To examine the association between the frequency of marijuana use and the likelihood of committing of a property crime, and to identify contextual factors explaining individual differences in the likelihood of committing a property crime.

Methods: The contribution of marijuana use to property crimes was examined based on two nationwide probabilistic surveys of public high school students, using a multilevel mixed effects logistic regression model.

Results: Marijuana use significantly increased the odds of committing a property crime. Differences between schools were observed in the random effects of marijuana use, suggesting that the likelihood of committing a property crime was differentially affected by contextual factors. In addition, students who were victims of bullying by peers and who had parents that abused alcohol had higher odds of committing a property crime. Perceived

disorder in students' schools and neighborhoods also increased students' odds of reporting that they had commited a property crime.

Conclusion: The importance of the effect of school context on the relationship between marijuana use and the commission of a property crime among Mexican public high school students seemed to increase over time. However, these results may also be due to changes in sampling designs over time.

Recently, there has been a wave of decriminalization of marijuana possession in countries around the world. Mexico City's recent decriminalization of the possession of small quantities of marijuana implies that marijuana use may be a public health problem instead of a criminal one. Indeed, marijuana is the most widely used illegal drug among adolescents in the world (Pardini et al. 2015; Johnston et al. 2013). But does adolescent marijuana use lead juveniles to crime? Some studies find a positive relationship between marijuana use and crime (Green et al. 2010; Harris et al. 2010; Swartout and White, 2010; Mulvey et al. 2006; Friedman et al. 2001; Dembo and Schmeidle, 2003; Niveau and Dang, 2003; Menard et al. 2001; Ellickson and McGuigan, 2000) while others find a negative relationship (Morris et al. 2014) or report mixed results (McGinty et al. 2016; Pedersen and Skardhamar, 2010; Brady et al. 2008; Wei et al. 2004).

In light of increasing drug cartel activity in Mexico, policymakers are concerned about the impact of the legalization of marijuana. Much debate has centered around the issue of whether the legalization of marijuana will help the Mexican government to win the war on organized crime by weakening the finances of drug cartels. Some argue, without much evidence, that legalization is the only viable option based on the fact that prohibitionist policies (e.g. eradication and criminalization) have not worked,[i] while others argue that Mexico is not ready for such a discussion since Mexicans "… lack the education awareness needed to understand the complexities of the issue." [ii] This study comes about to provide objective data to inform this debate.

To address the true extent of the relationship between marijuana use and crime among adolescents, this study used a cross-sectional multilevel study design to analyze the relationship above and beyond the social context and adolescents' individual characteristics.

The importance of context

The fact that more crimes occur in some places than in others can only mean that crime is dependent on social and physical context (Miethe and McDowell, 1992). The context is the setting or place in which individual decisions are made and behaviors manifested (Weeks, 2016). Very often context escapes scientific inquiry, as it is constantly present and is considered as a given. However, the context is a key organizing concept for social research. A social context is a social structure. People influence other people´s behavior, so much that different contexts may have the same demographic and socioeconomic composition, yet people may not behave in the same way. In this sense, the effect of context must not be confused with aggregate-level or compositional effects. Social contexts may be unique not only due to their demographic and socioeconomic composition, but because of the attitudes, behaviors, and routines of the people living in them (Vilalta, 2013).

The social context is not a unit of information or data container. The social context is a unit of analysis. Typically, the context has been operationalized in geographic terms and with the use of spatially aggregated data. However, there is no sense of place or context in a census tract or census block. These units of information are merely census bureau statistical subdivisions of the territory, lacking any meaning to the individuals residing within their

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boundaries. Instead, there is a sense of place or social context in a neighborhood, school, family, etc.

Contextual analysis is the name given to all of the research strategies and techniques used for investigating the gap between the individual and the social context. By itself, the aim of contextual analysis is to connect two (at least) levels of analysis: the micro-level analysis of the individual and the macro-level analysis of the setting where these individuals are located. The basic premise of contextual analysis is, precisely, that individual behavior is influenced by the group and vice versa.

This multilevel conceptualization of the social world or combination of different levels of analysis is well-suited for multilevel statistical modeling (Logan, 2016). The main advantage of using a multilevel modeling approach is that it allows the inclusion of a contextual measure (e.g. neighborhood, school, or family) by enabling appropriate random error structures, including random intercepts and random coefficients (Siordia and Matthews, 2016). Multilevel modeling is particularly appropriate in the use of nested data (e.g. students within schools) like the data used in this study.

Juvenile crime, drugs, and context

Most theories on the relationship between drugs and crime fall under the following tripartite model (Goldstein, 1995): psychopharmacological, economic need, and the drug market system. The psychopharmacological perspective posits that violent behaviors arise

from the chronic effects of drug intoxication (Pihl and Hoaken, 1997) although the relationship between marijuana (i.e. cannabinoids) and violence is not consistent (McGinty et al. 2016; Ostrowsky, 2011). The economic need perspective hypothesizes that drug use leads to crime, as drug habits require substantial amounts of money (Moore and Stuart, 2005; Sanders, 2005; Bean, 2001; Jacobs and Wright 1999), often cash. The third perspective theorizes that violent behaviors often arise as consequences of gang disputes over territory (Moore and Stuart, 2005; White, 1997).

Another type of theory is general deviance theory, which proposes that drug use does not cause violence or vice versa, but rather that individuals involved in one type of deviant behavior are likely to get involved in other types of deviant behaviors (Faulkner, 2012; Reyes et al. 2012; Moore and Stuart, 2005; Osgood et al. 1988). As such, this theory proposes that varied contextual factors operate as determinants of different types of deviant behaviors. In this respect, some researchers have suggested that it may be important to address substance use problems and violence concurrently (Goldkamp et al., 1996, Leonard, 2001, Neavins et al., 1999 and Stuart et al., 2003). The general conclusion of previous studies is that, irrespective of causal mechanisms, marijuana users are at greater risk for exposure to crime and violence (Moore and Stuart, 2005; Sussman, 1996).

It is argued that safe neighborhoods, schools, and family contexts serve as protective factors against juvenile deviance and crime (Chen et al. 2016). Sampson and Laub (2005) argued some time ago that the "strongest and most consistent effect on… delinquency in adolescence flow from processes of social control connected to family, school, and peers"

(p. 168). A subsequent goal is to assess the relationship between various contexts and juvenile crime.

The neighborhood context

The relationship between neighborhood context and juvenile crime has been studied for a long time by social disorganization theorists. Early Chicago School criminological studies made use of the ecological model. For example, Breckinridge and Abbott (1912) examined the geographic distribution of the homes of juvenile delinquents in Chicago and found that a disproportionate number were located in a small selection of neighborhoods. In its original formulation, social disorganization predicted that spatial variation in crime depended on levels of poverty, ethnic heterogeneity, and rapid population growth (Shaw and McKay, 1942). The basic argument was that these factors would weaken social bonding and therefore reduce the capacity of communities to manage and regulate themselves or monitor the behavior of their members.

Social disorganization theory was later updated with the concept of 'collective efficacy' (Sampson et al. 1997). Collective efficacy refers to the degree of social cohesion between neighbors and their willingness to act on behalf of the common good. As such, social disorganization theory predicts that the greater the level of collective efficacy in a neighborhood, the lower the level of crime and violence (Valdimarsdottir and Bernburg, 2015).

Neighborhoods exhibiting low levels of collective efficacy are characterized by scarcity of social ties, low levels of civic participation, weak friendship networks, and unsupervised teenage peer groups. In contrast, the theory argues that close social ties among neighborhood residents allow for the supervision of adolescents (Valdimarsdottir and Bernburg, 2015; Coleman 1988; Krohn 1986), and fewer squabbles among residents, thus strengthening adolescent commitment to local norms (Valdimarsdottir and Bernburg, 2015; Bernburg and Thorlindsson 2007). The causal mechanism is that neighborhoods with weaker social ties have lower levels of social control, which is necessary to prevent crime and disorder when it appears (Hipp 2009). Furthermore, the neighborhood serves as a ready source of crime accomplices for adolescents (Schaeffer et al. 2014) who often have ties with antisocial role models that promote delinquent behavior rather than discouraging it (Valdimarsdottir and Bernburg, 2015).   In addition, adolescents in problematic neighborhoods may tend to believe that social success and status is not possible without breaking the law (Warner 2003; Sampson and Bartusch 1998). Briefly put, disorganized neighborhoods lack social capital to prevent crime (Putnam, 2000).

Recent evidence beyond the English-speaking world is that neighborhoods with lower levels of socioeconomic status also have higher levels of unsupervised youth groups and higher crime rates (Vilalta and Muggah, 2016; Badiora, 2015; Valdimarsdottir and Bernburg, 2015). On the whole, the neighborhood context has been found useful in the examination of a wide range of variable relationships and their impact on juvenile crime.

The school context

The school context is so critical in the prediction of juvenile crime that it has been argued that there is often a direct school-to-prison pipeline (Mallet, 2016; Porter, 2015). In many cases, school policies are to blame. The impact of the punitive school paradigm and policies such as zero tolerance is notorious. School systems, overburdened and underfinanced, have tended to resolve low safety risks and low-level student misdemeanors by suspension and expulsion rather than by the use of counseling. As a consequence, these schools have made communities more insecure by means of more juvenile arrests, referrals to the juvenile courts, and higher incarceration rates (Mallet, 2016).

Piko and Kóvacs (2010) report that talking about problems with teachers and being happy with school reduces marijuana use among high school students. Similarly, low levels of commitment to school, weak bonds with teachers, and limited parental supervision after school facilitates the development of deviant behaviors (Fong et al. 2008). In Mexico, family intimacy and parent-adolescent communication seem to be important predictors for substance use among adolescents (Martyn et al. 2009).

The family and peer context

The family context plays a major role in predicting juvenile crime. Adolescents in families with lower levels of cohesion tend to exhibit lower levels of self-control (Hay 2001), higher levels of antisocial behavior such as physical aggression (Dodge et al. 1990), and higher

levels of criminal involvement (Herrenkohl et al. 2000; Farrington 1995; Loeber et al. 1990). Cohesive families are effective sources of control as they promote group activities and are aware of potential problems (Sampson, 1987). Some studies have found that as the degree of monitoring increases, family cohesion increases, and the involvement of children in crime decreases (Simons et al. 2007; Hay 2001; Storvoll and Wickstrom 2002;). In this respect, some studies argue that adolescents in single-mother families are more likely to commit crimes (Breivik and Olweus 2006; Sampson and Laub 1994). One potential explanation is that single mothers have less time available for the monitoring of their children (Smith, 2004; McVie and Holmes 2005; Sampson and Loeb 1994), leading to lower levels of parental control and family cohesion (Allen, 1996; Sampson and Laub, 2005).

The opposite of family cohesion is child maltreatment. A substantial body of literature suggests that abused children (from both sexes) are more delinquent than children who have not been abused (Maxfield and Widom, 1996; Foley et al. 2004). Maltreatment as a predictor of crime may take the form of sexual abuse (Boyd 1993; Kakar, 1996; Bensley et al. 1999b; Freeman et al. 2002). Sexual abuse also increases the likelihood of using illegal drugs (Glover et al. 1996).

In addition, individual level factors, such as gender and age, also have an effect on drug use and criminal behavior. Young men are much more likely than young women to commit a crime (Sanders, 2005). They may commit theft as a mean to reinforce their masculinity among their peers (Messerschmidt, 2000; Sanders, 2005); they may believe that committing

a crime will make them to gain a reputation of being "tough" in school. Likewise, being female has been shown to be a protective factor for marijuana use in high school (Reddy et al. 2007).

Overall, many prior studies rely on evidence from countries that are either more economically developed (e.g. the UK or US), or where the social context and social expectations may be very different from the context faced by Mexican adolescents. Also, these studies are case studies of major importers of marijuana. Mexico is a major producer and trafficker of marijuana. In addition, since 2007, Mexico has been facing a major war on organized crime. Consequently, we do not know if previous findings are applicable and to what extent they may be applicable to the Mexican adolescent context. In addition, no Mexican refereed studies were found that make use of the same data sources used in this study.

Methods

Data and measures

Data for the current study come from two national cross-sectional surveys of Mexican public high school students: the Exclusion, Intolerance, and Violence in High Schools (EIVHS) surveys of 2007 (n = 13,104) and 2009 (n = 9,235).[iii] These surveys were designed by Mexican researchers in the Ministry of Public Education and the Ministry of Health. Their purpose is to produce reliable information regarding violent behaviors among

adolescents. These data are being utilized for the design of public health policies in Mexican high schools.

EIHVS data are stratified probability samples of public high schools in all thirty-two states of Mexico. The stratification procedure was not exactly the same for both surveys. In general, the stratification was based on the three different types of Mexican public high schools: general, technological and professional. In 2007, five schools were selected on average in each state that would represent all strata (i.e. at least one school per type of high school per state). In this sense, the schools were randomly selected proportional to the number of schools per type (i.e. general, technological and professional) in the state. A total of 149 public high schools were ultimately selected. In 2009, however, the stratification and selection of the sample of schools changed slightly, as a new procedure was put in place. That year, a subsample of schools of the 2007 survey was obtained and a new stratum was established, that is, a stratum representing schools participating in the Construye-T federal program. This program was launched in 2008 with the intention of reducing high school dropout. As a consequence, a total of 104 schools were sampled in 2009, of which 77 (74.0%) had already participated in the 2007 survey. Under this procedure, three schools were selected on average in each state. No private high schools were included in either of these two surveys. The representativeness of the public high school student population and the statistical comparability of the sample estimates from one year to another are implicit in the methodological documentation of these federal government surveys.

After stratification, interviewers randomly selected one classroom for each grade level in each school in order to apply the questionnaire. The questionnaire was administered during class sessions. Respondents were volunteers that self-reported their demographic and socioeconomic characteristics, and provided information on their family, peers, school and neighborhood contexts, criminal and other deviant behaviors, addictions, and other subjects such as sexual behaviors, self-esteem etc. Students and parents were informed of the purposes of the survey and assured of anonymity several days before its application.

The dependent variable (DV) was the self-reported admission of having committed a property crime during the last year. The survey question framed in the following manner: "In the last year… (a) I have taken things that do not belong to me with a value above 1,000 pesos, or (b) below 1,000 pesos."[iv] Response options were never (1), almost never (2), sometimes (3), often (4), and very often (5). These variables were joined and recoded into two categories where 0 = never and 1 = at least once.

The independent variable (IV) was the self-reported use of marijuana. It was measured with the following question: "How many times in your life you have used any of the following substances?... that is Marijuana".[v] Response options were never (0), a few times (1), sometimes (2), several times (3), often (4), and very often (5). This is the only measurement available in the survey related to marijuana. One obvious difficulty is the link between the past year prevalence for a property crime (DV) and the lifetime prevalence for marijuana (IV) variables.[vi] Although the proper identification of cause-and-effect relationships plays an indispensable role in applied research (Steinberg, 2007), this study is based on general

deviance theory which predicts that marijuana use does not cause crime in itself, but rather that students involved in one type of deviant behavior such as marijuana use will likely be involved in other types of deviant behaviors such as crime (Faulkner, 2012; Reyes et al. 2012; Moore and Stuart, 2005; Osgood et al. 1988).

Information regarding the adolescents' context was obtained from the same data sources (Table 1). To assess the neighborhood context (NC), three different characteristics were examined: how dirty the neighborhood is, how dangerous it feels, and how often disputes occur between neighbors. The social disorganization mechanism by which these measures operate is related to the potential impact that signs of disorder and neglect may have on students that live in these neighborhoods. These variables were measured following a list of Likert-type attributes rated with response categories of "never" (coded 1) to "very often (coded 4 or 5, depending on the survey year). The school context (SC) was operationalized using five characteristics: how dirty the school is, how dangerous it feels, the frequency of drug dealing, how close students feel to their teachers, and how often equality of treatment is guaranteed to students. Likewise, it is hypothesized that signs of disorder and physical decay in the school predispose students to antisocial behaviors. Most of these variables were measured in an ordinal scale ranging from "never" (coded 1) to "very often (coded 4 or 5, depending again on the survey year). Drug dealing in school was measured as a binary variable. The family and peer context (FP) included the following characteristics: whether parents live together, whether one or both parents drink alcohol daily, how angry the student is with his/her parents, how difficult is for him or her to make friends, and how often the student is a victim of ridicule or bullied by his or her peers. Finally, personal

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demographic (PD) variables the data set included gender and age. From a criminological perspective, high levels of neighborhood and school signs of disorder increase crime risks as they depict a lack of social and self-controls. Exposure to an abusive family and peers also was viewed as reflective of a lack of positive or role model influences.

TABLE 1 – HERE

Analytic strategy

The analysis begins with a discussion of the descriptive statistics for the student samples as presented in Table 2. The analyses then turn to the multivariate analysis. Contextual variables were analyzed in a multilevel regression framework to account for the nested structure of the data (i.e. students are nested in schools). Because the dependent variable was dichotomous (whether or not the student committed a property crime) and it was measured across two different years, a binary multilevel logistic regression was fitted separately for each survey year. The initial set of models includes only the independent variable and the neighborhood context variables. This first model examines the direct effect of each of the measures of the neighborhood context as the most general setting. School and family/peer contexts are progressively included into the models in a deductive fashion, whereby each context points to a particular set of risk factors each time nearer to the student. Intercept and random slopes models were estimated to examine whether the relationship between marijuana use and property crime commission differs from one school to another. Odds ratios were calculated for simplicity of interpretation.

Results

No statistically significant change in the self-report of whether a student had committed a property crime was observed between 2007 and 2009 (t = 0.925, p = 0.347). Between 5.8% and 6.1% of the students reported to have committed a property crime in the past year. The results in Table 2 show other contextual differences between samples for both years. Significantly, students reported higher mean levels of marijuana use in 2009 than in 2007. In addition, more students in 2009 said their parents were separated and more of them (their parents) were drinking alcohol on a daily basis, but the students also reported being angrier at their parents and found it harder to make friends. About 26% of the students attended a high school where drugs were being sold. On the other hand, signs of neighborhood disorder (i.e. students' perceptions of how dirty their neighborhoods were) decreased, while students' perceptions of teacher equality increased.

TABLE 2 – HERE

Tables 3 and 4 present the odds ratios of multilevel logistic regression models of marijuana use and property crime by correlates in each level. All multilevel correlates considered, students that had used marijuana more often in the past year were 43.2% (OR = 1.432, 95% CI=1.310-1.565) more likely to self-report that they had committed a property crime in 2007 and 36.1% in 2009 (OR = 1.361, 95% CI=1.234-1.502). Higher levels of

neighborhood and school disorder (i.e. dirty, unsafe and reports of drug dealing in school) were significantly associated with property crimes in 2007 and 2009. Students who reported binge drinking among their parents were about 80% more likely than their counterparts to indicate that they had committed a property crime. Likewise, students that reported that their parents lived together were about 20% less likely to commit a property crime in 2009. Finally, compared with students that were less bullied at school, students that were bullied more often were also more likely to report that they had committed a property crime (OR: 1.286, 95% CI=1.172-1.411, and 1.292, 95% CI=1.118-1.492 respectively).

Results show that the progressive addition of contextual variables to the models contributed to their predictive capacity. The family and peer context variables were expected to have the greatest impact on property crimes. This was demonstrated through the incorporation of measures for parental alcohol abuse and the bullying by peers. The neighborhood context variables were expected to have the least impact on theft crimes. This was also demonstrated through the incorporation of the school dirtiness variable. The impact of this variable was statistically consistent but small in comparison with the independent variable and other contextual factors.

It should be noted that between 2007 and 2009, only four out of nine contextual variables maintained a statistically significant relationship with the variable representing whether the student self-reported having committed a property crime: neighborhood dirtiness, drug dealing at school, parental alcohol abuse, and victimization by bullying. Altogether, these

results in the data could arise for one of two reasons. Either these results suggest a marked instability between contexts across time or that contextual effects are highly sensitive to sampling designs. These two different explanations have important implications. For instance, the estimated standard deviation of the varying slope models for 2007 indicates that marijuana use and property crimes do not have very different correlations across schools. On average, marijuana use did not seem to affect property crime more in one or other school. In other words, marijuana use in 2007 was not a better predictor in one school over the other. But in 2009, the estimated standard deviation of the school intercepts and marijuana use slopes was notably larger, suggesting that much more variation across schools remained after controlling for this set of contextual and individual characteristics.

TABLES 3 AND 4 – HERE

CHART 1 – HERE

One implication is that the relationship between marijuana use and property crimes was significantly different across schools, meaning that the school context itself needs further elaboration in future studies. However, it is important to note that in 2007 and 2009, the smaller the intra class correlation (ICC) in models 1 to 4 and the significant likelihood ratio (LR) tests indicate that the addition of different levels of analysis led to an important reduction of unexplained variance between schools. But in 2009, about 4.9% (ICC: 0.049) of the variation in the report of the commission of a property crime was accounted for by the clustering of students in their respective schools, whereas is 2007 only 1.9% (ICC:

0.019) of the variation in the dependent variable was accounted for by the clustering. Overall, this last finding may suggest that either students within schools became over time more different than students from different schools, or it may be the result of the different sampling procedures employed in the period of study. Based on the current available evidence, it is not possible to determine the cause or disprove either of these two possibilities.

Discussion and conclusion

The results of this study reveal that self-reports of marijuana use significantly increased the odds of committing a property crime among Mexican public high school students in 2007 and 2009. Also, the results show that the differences in the prevalence rates of property crimes between public high schools can be explained by the number of neighborhood, school and family and peer contextual factors used in this study. The intra class correlation coefficient (ICC) in the different multilevel models showed that these relationships varied across schools, suggesting an influence of the school environment. In this sense, the results of this study support the social contextual model in which adolescent criminal behavior cannot only be explained by some elements in just one level of analysis.

With this study, we found an important association between the family and peer context and whether or not a student had committed a property crime. After gender, parental alcohol abuse was the strongest correlate of juvenile property crime. Marijuana use by the

students was the third most important correlate. Drug dealing in school came in fourth and bullying victimization was fifth.

The findings above extend the existing literature in several significant ways. First, general deviance theory proposes that marijuana use may not cause crime and crime may not lead to marijuana use, but rather that engaging in one form of deviant behavior increases the odds of engaging in other forms of deviant behavior (Moore and Stuart, 2005; Harrison et al. 2001). This theory also identifies the context as an influence in the onset of deviant behaviors.

With demographic factors held constant, general deviance theory and contextual analysis were able to provide a good description of the observed differences in Mexico between juvenile offenders and non-offenders. The evidence presented in this study shows a strong and positive relationship between marijuana use and juvenile property crime.

Contrary to our expectations, most neighborhood and school characteristics were not consistently associated with self-reported juvenile property crimes. Only neighborhood dirtiness and drug sales in school were consistently associated with property crime. Mexican juvenile offenders do not rate their neighborhood and schools as more dangerous than non-offenders, nor do they consistently differ in their views of their teachers. These findings suggest that students at public high schools who commit property crimes are not as motivated to offend by the neighborhood and school contexts as they are by the family and peer context. Although parental alcohol abuse does not equate to parental illegal drug use,

there is a clear positive relationship (correlation not shown) between parental alcohol abuse and juvenile marijuana use, and this relationship persists even after taking into account whether parents live together or not, and whether adolescents are angry with their parents or not.

Taken together, these correlations seem to point to a tendency for Mexican juvenile offenders to be more likely to be affected by living in an environment where there is substance use and misuse rather than by anger, a sense of insecurity, or other conditions in their neighborhoods and schools. In other words, it is likely that poor family and peer socialization plays a fundamental role in the initiation of illegal drug use and offender behavior in Mexico. Another theory not stated in this study, social learning theory, suggests that youth can discover substance use by seeing drug and alcohol use and drug selling in their immediate environment (Reboussin et al, 2014). Further studies may shed light on these relationships.

Overall, findings do not contrast sharply with previous findings in the U.S. However, the national contexts of Mexico and the U.S., by some measurements, seem to differ significantly. For instance, marijuana is the most commonly used illegal drug in the U.S. (Ostrowsky, 2011), as is the case in Mexico. However, even in the absence of perfectly comparable data, it can be suggested that juvenile marijuana use prevalence rates are significantly lower in Mexico. According to the National Institute of Drug Abuse, 21.2% of U.S. high school seniors in 2014 had used marijuana in the past 30 days. In 2009, only 9.6% of Mexican public high school students had used marijuana in the past 12 months. In

addition, drug selling in schools seems to be more prevalent in the U.S. According to the 2009 School Crime Supplement to the National Crime Victimization Survey (SCS-NCVS), 51.0% of U.S. students aged 12 to 18 reported that drugs were available at school. For the same year, according to our data, 26.2% of Mexican public high school students (94% aged between 14 and 18 yrs. old) reported that drugs were available at school.

With respect to juvenile crime, our findings do not contrast with those in the majority of previous studies. According to Goode (2008) and Moore and Stuart (2005), marijuana users in the U.S. have a lifestyle that involves a greater tolerance for deviant behaviors, as it is found in this study. This study confirms the relationship between marijuana use and criminal involvement (Green et al. 2010; Harris et al. 2010; Swartout and White, 2010; Bennett et al. 2008; Mulvey et al. 2006; Friedman et al. 2001; Dembo and Schmeidle, 2003; Niveau and Dang, 2003; Menard et al. 2001; Ellickson and McGuigan, 2000).

As mentioned previously in the introduction, the findings of this study may have important policy implications. Since the Mexican government is currently undergoing a public debate on the legalization or decriminalization of marijuana, there is urgent need for evidence on the alleged effects of marijuana use on crime. As said above, there is a positive correlation between self-reported marijuana use and property crimes. This of course does not imply a causal relationship between the two variables, but the fact that they are consistently concomitant suggests that it will not be easy to argue in favor of the legalization of marijuana use. At a minimum, the assertion that marijuana use is separate from juvenile crime does not stand up to the standards of evidence.

There are a number of limitations to this study. One is our reliance on self-report of property crime and marijuana use. Underreporting is common in these matters (Magura and Kang, 1996). Another limitation is that this study did not control for other contextual variables, such as organized crime and gangs that may (or may not) have affected the association between the self-report of marijuana use and property crime. Also, this study follows a cross-sectional design with large samples, but did not include control groups. As such, causal conclusions must not be drawn. Finally, criminal activity is not broken down into sufficient detail in the datasets. Even though property crimes are generally income-generating crimes, it may also be the case that some of these crimes may be the result of anger or revenge, perhaps in cases where the juvenile offender is looking for care and attention. Knowing the motivation of juvenile offenders could contribute to a better test of general deviance theory and more insight in the relationship between marijuana use and juvenile crime.

To conclude, while these findings should be useful to a variety of researchers and the public, there is more work to be done. Future research on the link between marijuana use and crime should focus more on the complexity of the family and peer context and adolescents' motivations for committing crimes. Given the evolving structure of the Mexican family over this century with more teen pregnancies, single parents, working mothers, and divorced families, and given the range of factors associated with the high levels of alcohol abuse (ranked as the fourth cause of mortality nationwide) and victimization by bullying in the country (ranked first in the OECD countries), a better understanding of these classic

units of analysis in the social sciences may bring better policy results for the prevention of crime, substance use, and other juvenile problems. Also, future research should closely examine how school surveys are being conducted, how sampling designs and procedures may affect results, and how to better define and specify the role of context.

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TABLES AND CHARTS

Table 1

Variables and coding

Variable	2007	2009
Theft (DV)	Binary (0, 1)	Binary (0, 1)
Marijuana use (IV)	Ordinal (1-5)	Ordinal (1-5)
Neighborhood Characteristics (NC)		
Dirty	Ordinal (1-5)	Ordinal (1-4)
Perceived unsafety	Ordinal (1-5)	Ordinal (1-4)
Squabbles	Ordinal (1-5)	Ordinal (1-4)
School characteristics (SC)		
Dirty	Ordinal (1-4)	Ordinal (1-4)
Perceived unsafety	Ordinal (1-4)	Ordinal (1-4)
Drug dealing	Binary (0, 1)	Binary (0, 1)
Teacher bonding	Ordinal (1-4)	Ordinal (1-4)
Teacher equality	Ordinal (1-4)	Ordinal (1-4)
Family and peers (FP)		
Parents live together	Binary (0, 1)	Binary (0, 1)
Parent(s) drink daily	Binary (0, 1)	Binary (0, 1)
Angry w/parents	Ordinal (1-4)	Ordinal (1-5)
Hard to make friends	Ordinal (1-4)	Ordinal (1-5)
Victim of bullying	Ordinal (1-4)	Ordinal (1-3)
Personal demographics (PD)		
Male	Binary (0, 1)	Binary (0, 1)
Age	Continuous	Continuous

Table 2

Descriptive statistics

	2007		2009	
	Mean or %	SD	Mean or %	SD
Theft (DV)	5.8%	23.3%	6.1%	24.0%
Marijuana use (IV)	0.12	0.55	0.17	0.64
Neighborhood Characteristics (NC)				
Dirty	2.08	1.05	1.96	0.86
Perceived unsafety	1.91	1.10	1.84	0.91
Squabbles	2.16	1.19	2.08	0.95
School characteristics (SC)				
Dirty	1.79	0.93	1.79	0.92
Perceived unsafety	1.56	0.81	1.52	0.78
Drug dealing	26.2%	44.0%	26.2%	43.9%
Teacher bonding	2.32	0.92	2.34	0.90
Teacher equality	2.65	1.12	2.76	1.12
Family and peers (FP)				
Parents live together	77.4%	41.8%	75.3%	43.1%
Parent(s) drink daily	2.2%	14.5%	2.7%	16.3%
Angry w/parents	1.94	0.94	2.17	1.27
Hard to make friends	2.12	1.01	2.37	1.10
Victim of bullying	1.40	0.72	1.39	0.58
Personal demographics (PD)				
Male	44.9%	49.7%	49.1%	49.9%
Age	16.3	1.1	16.4	1.4
n	13,104		9,235	

2

Table 3

Odds ratios from multilevel logistic models predicting property crimes among public high school students, 2007

	Bivariate	[1] NC	[2] NC + SC	[3] NC + SC + FP	[4] Full model
Marijuana use (IV)	1.668***	1.597***	1.500***	1.481***	1.432***
Neighborhood Characteristics (NC)					
Dirty	1.255***	1.192***	1.144***	1.135***	1.137***
Perceived safety	1.193***	1.004	0.965	0.958	0.968
Squabbles	1.195***	1.060	1.044	1.031	1.022
School characteristics (SC)					
Dirty	1.335***		1.164***	1.149***	1.142***
Perceived unsafety	1.424***		1.135**	1.125**	1.109*
Drug dealing	1.944***		1.341***	1.302***	1.272**
Teacher bonding	0.955		1.076	1.056	1.051
Teacher equality	0.852***		0.900***	0.930*	0.926*
Family and peers (FP)					
Parents live together	1.031			0.893	0.917
Parent(s) drink daily	2.634***			1.782***	1.871***
Angry w/parents	1.228***			1.121***	1.129***
Hard to make friends	1.109***			1.072*	1.096**
Victim of bullying	1.516***			1.390***	1.286***
Personal demographics (PD)					
Male	2.322***				1.849***
Age	1.075**				1.001
Wald´s Chi-square		191.09***	239.67***	307.72***	349.66***
SD (Marijuana use)		0.001	0.001	0.001	0.001
SD (intercept)		0.297	0.285	0.260	0.250
LR test		11.36***	9.94***	6.85***	5.92**
ICC (%)		2.6%	2.4%	2.0%	1.9%
N within		12,443	12,086	11,809	11,809
N between		149	149	149	149

*p<.10, **p<.05, ***p<.01

Table 4

3

Odds ratios from multilevel logistic models predicting property crimes among public high school students, 2009

	Bivariate	[1] NC	[2] NC + SC	[3] NC + SC + FP	[4] Full model
Marijuana use (IV)	1.517***	1.471***	1.414***	1.412***	1.361***
Neighborhood Characteristics (NC)					
Dirty	1.262***	1.193***	1.151**	1.142**	1.144**
Perceived safety	1.185***	1.001	0.955	0.946	0.940
Squabbles	1.207***	1.069	1.031	1.014	1.020
School characteristics (SC)					
Dirty	1.278***		1.106*	1.076	1.069
Perceived safety	1.399***		1.094	1.095	1.071
Drug dealing	2.199***		1.658***	1.651***	1.608***
Teacher bonding	0.886**		0.975	0.982	0.968
Teacher equality	0.855***		0.922*	0.936	0.927
Family and peers (FP)					
Parents live together	0.780**			0.834*	0.800**
Parent(s) drink daily	1.950***			1.654**	1.769**
Angry w/parents	1.089**			1.016	1.016
Hard to make friends	1.067*			1.029	1.292
Victim of bullying	1.520***			1.439***	1.292***
Personal demographics (PD)					
Male	2.526***				2.193***
Age	1.021				0.969
Wald´s Chi-square		105.13***	161.08***	195.14***	236.53***
SD (Marijuana use)		0.001	0.001	0.045	0.080
SD (intercept)		0.420	0.425	0.419	0.412
LR test		26.71***	26.64***	23.42***	21.09***
ICC		5.1%	5.2%	5.1%	4.9%
N within		9,100	9,000	8,683	8,654
N between		104	104	104	104

*p<.10, **p<.05, ***p<.01

Chart 1.

Full model multilevel logistic regression odds ratios with 95% confidence intervals, 2007 and 2009

Odd ratios (2009)

6
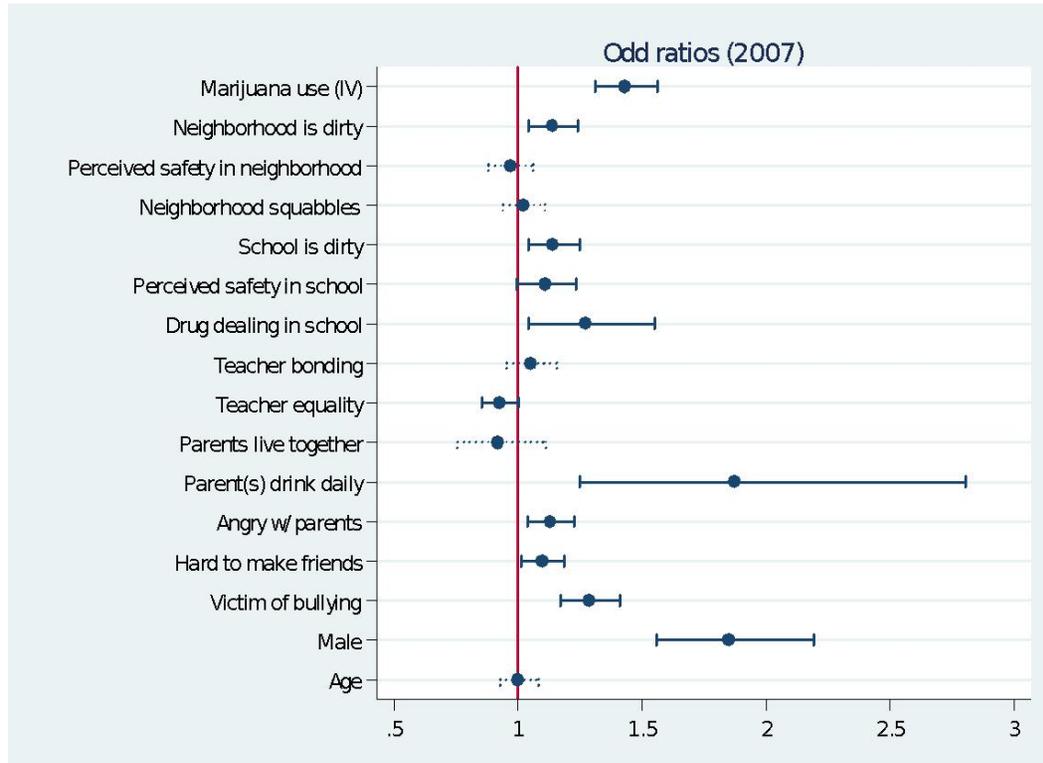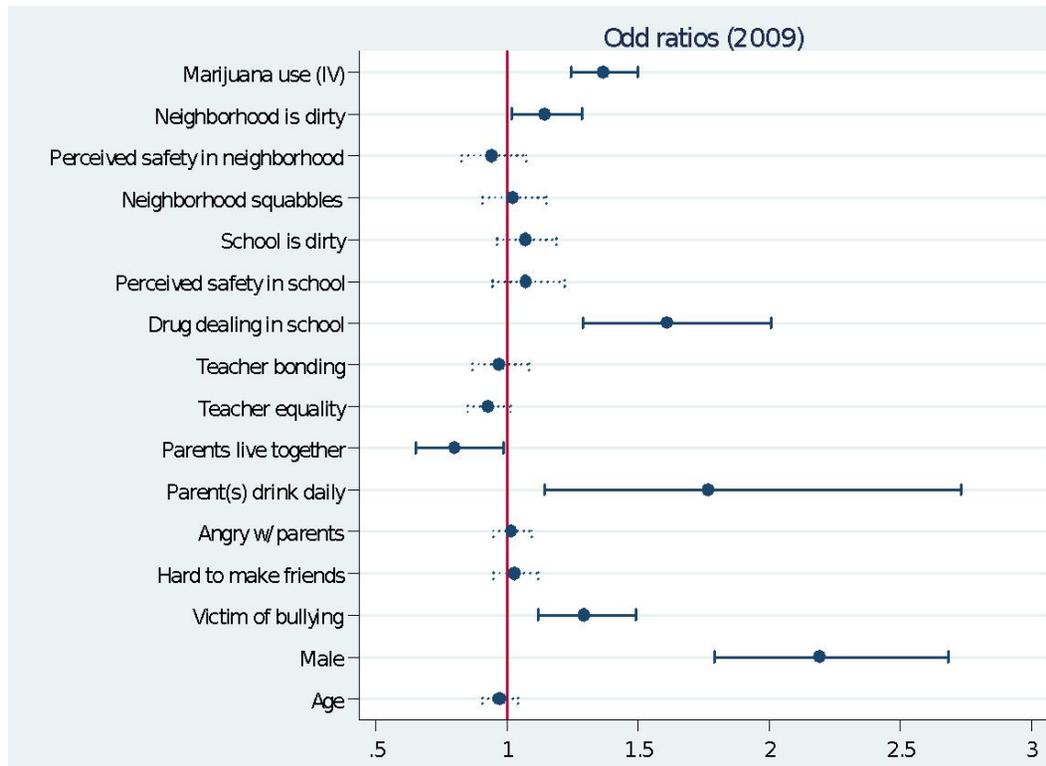
NOTES

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[i] For instance, Presidents Vicente Fox and Felipe Calderon. See: *The Wall Street Journal*, August 10, 2010.

[ii] See Victor Mayen´s piece on Drug Legalization Debate Heats Up. Source: Wikileaks 8.16.10

[iii] In Spanish: *Encuesta Nacional sobre Exclusión, Intolerancia y Violencia en Escuelas de Educación Media Superior.*

[iv] The survey distinguished in two different questions between thefts that were below or above 1,000 pesos of value; i.e. 80 USD approximately.

[v] Among other substances such as methamphetamine, cocaine, etc.

[vi] This was correctly pointed out by one of the reviewers.