

TITLE: Who receives cannabis use offers: A general population study of adolescents.

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Abstract

Background: Drug use is predicated on a combination of “willingness” and “opportunity”. That is, independent of any desire to use drugs, a drug use opportunity is required; be it indirect (i.e., being in a drug-use setting) or direct (i.e., receiving a direct drug offer). However, whether some youth are more likely to encounter such direct drug use opportunities is not fully known.

Aims: We examined whether certain characteristics placed adolescents at greater risk for being offered cannabis, after accounting for a number of demographic-, contextual-, interpersonal-, and personal-level risk factors.

Methods: We utilized data from a Norwegian school survey ($N=19,309$) where the likelihood of receiving cannabis offer in the past year was estimated using logistic regression models. Substantive focus was on the individual and combined effects of personal (i.e., delinquency) and interpersonal (i.e., cannabis-using close friend) risk factors. Separate models were fit for middle- and high-school students.

Results: Delinquency was a significant risk factor for receiving cannabis offers, as was a cannabis-using best friend. In addition, peer cannabis use increased the risk of cannabis offers mostly for adolescents on the lower delinquency spectrum, but less so for highly-delinquent adolescents. These interaction effects were primarily driven by the middle-school cohort.

Conclusions: Cannabis offers were more likely to be extended to youth of certain high-risk profiles. Targeted prevention strategies can therefore be extended to a general profile of younger adolescents with externalizing problems and cannabis-using peers.

Keywords:

Direct drug use opportunities; cannabis offers; delinquency; risk behaviors; high-risk peer groups

1. Introduction

Illicit drug use, like a number of other risky behaviors, is predicated on a combination of ‘willingness’ and ‘opportunity’. That is, irrespective of any individual desire to engage in drug use, opportunity -- be it indirect (i.e., being present in a situation where drugs are readily available) or direct (i.e., being directly offered drugs for purchase or sharing) -- to do so is necessary as well. However, although ‘drug exposure opportunity’ has been recognized as the initial stage in the natural history of drug use (Van Etten et al., 1997; Van Etten and Anthony, 1999; Wagner and Anthony, 2002), it is still relatively unknown if some youth are at greater risk than others for encountering such opportunities. This was the main question explored in this report.

Indeed, entry into drug use is only possible given the chance, and studies of young people in the USA (Kosterman et al., 2000; Pinchevsky et al., 2012; Van Etten et al., 1997) and in other countries (Caris et al., 2009; Delva et al., 1999; Wells et al., 2011) show that the likelihood of initiating drug use once the opportunity has occurred may be substantial. In fact, cannabis availability accounted for the majority of shared environmental risk for cannabis initiation (Gillespie et al., 2009), and the rate of transition from opportunity exposure to actual use tend to be higher for cannabis than for substances such as cocaine and amphetamines (Manning, 2001). Moreover, cannabis use is associated with an increased risk of progression to harder drugs (Fergusson et al., 2006; Wagner and Anthony, 2002), and some studies suggest that this in part may reflect a causal effect (Bretteville-Jensen et al., 2008; Bretteville-Jensen and Jacobi, 2011).

Exposure to cannabis use opportunities increases by age during adolescence, but the risk of progressing to cannabis use given the chance seems to be inversely related to age (Van Etten et al., 1997). There is also evidence that an early onset of cannabis use may be particularly detrimental, as it is linked to a range of adverse health and psychosocial outcomes (Fergusson and Horwood, 1997; Hall, 2015). Hence, from a preventive perspective, it is imperative to identify potential risk factors for encountering cannabis use opportunities at an early age. However, previous research has focused

mainly on the transition from drug use opportunity to actual drug use, and not on the opportunity itself and the associated risk factors.

Drug use opportunity has typically been operationalized as any situation in which individuals perceived that they had the chance to use drugs if they wished to (Van Etten et al., 1997; Wagner and Anthony, 2002), including receiving explicit drug offers or being present when others were using (Parker et al., 1998; Storr et al., 2011; Wells et al., 2011). Focusing specifically on cannabis, Storr and colleagues (2011) identified aggressiveness as a risk factor for early opportunity to try cannabis. Underage use of alcohol and tobacco were also noted as risk factors (Caris et al., 2009; Ellickson and Hays, 1992; Neumark et al., 2012; Wagner and Anthony, 2002). Moreover, youth with problem behaviors and with drug-using peers were more likely to encounter cannabis use opportunities (Neumark et al., 2012; Pinchevsky et al., 2012), while delinquent youth were more likely to receive offers to purchase illegal drugs (Rosenberg and Anthony, 2001). Overall, similar risk factors seem to operate for adolescent cannabis use opportunities as for the actual cannabis use (Brook et al., 2001; Coffey et al., 2000; Hawkins et al., 1992).

Early drug use opportunities may evidently comprise diverse phenomena, which might be differently related to individual characteristics and other potential risk factors. However, the existing research on these topics is scarce and somewhat unfocused. For instance, indirect opportunities (i.e., being in a situation where drugs are readily available) are often examined together with direct opportunities (i.e., being offered drugs for purchase or sharing). Also, although cannabis is the most commonly used illicit drug, and is often conceived as a gateway drug to harder drugs (Bretteville-Jensen and Jacobi, 2011), past research tended to lump 'illicit drug use' into a single category and to not examine specific factors which may increase the chances of early cannabis involvement. By analyzing data from a large population survey of Norwegian adolescents, the present study aimed to add to the limited body of research focusing specifically on direct opportunities (i.e., offers) for cannabis use.

1.1. The Norwegian Context

Compared to both the USA and to other European countries, the prevalence of adolescent cannabis use in Norway is low (Hibell, 2012; Romelsjo et al., 2014). The 2011 European School Survey Project on Alcohol and Other Drug (ESPAD) among 15-16 year-olds students showed that 5% of the Norwegian students reported any cannabis use. The prevalence was more than twice as high in 25 of the 36 participating countries (Hibell, 2012). The 2011 ESPAD study also showed that the proportion of Norwegian students that perceived cannabis to be easily obtained (25%) was close to the European average (29%) (Hibell, 2012). Finally, it may be noted that Norway prohibits any cannabis use and that the attitudes towards the drug are largely unfavorable: in a national survey from 2008, more than 90% of in the age group 15 and 20 years opposed legalization of cannabis, and almost as many reported that they would not use the drug even if there was no risk of arrest (Vedøy and Skretting, 2009).

1.2. Study Aims

Are some youth more likely to be offered cannabis than others? We explored this question in a large adolescent sample, by examining individual and combined contribution of risk factors potentially associated with cannabis offers. We hypothesized that there may be both visible individual characteristics signaling potential interest in drugs, as well as environmental factors increasing the chance of cannabis exposure: such personal and interpersonal characteristics may differentiate certain youth as likely targets for cannabis offers. Specifically, we focused on the previously identified unique roles of delinquency (Pedersen et al., 2001; Rosenberg and Anthony, 2001) and substance-using close friends (Neumark et al., 2012; Pinchevsky et al., 2012), while accounting for a range of demographic-, contextual, interpersonal-, and personal-level covariates.

In addition, we were interested in the combined effects of these risk factors, and consequently examined whether (and if so, how) having cannabis-using peers interacted with delinquency to influence the risk of being offered cannabis. Given the limited research on this topic, this question was largely exploratory. To the best of our knowledge, no previous reports examined combined effects of these risk factors in relation to direct cannabis offers among youth. Finally, we examined the same questions across the middle-school and high-school cohorts.

2. Material and Methods

2.1. Study Sample

In 2004–2006, the Norwegian Institute for Alcohol and Drug Research conducted annual cross-sectional school surveys in 16 municipalities across Norway. The initial purpose of the project was to evaluate a community-based prevention project targeting adolescent substance use (Rossow et al., 2011). Nine municipalities participated in the prevention project and seven were included as controls. The latter were selected in order to match the intervention municipalities with respect to factors such as population size and degree of urbanization (Pape, 2007). Complete cohorts of middle- and high-school students were recruited. There was a total of 91 schools from 16 municipalities, 82 of which participated in the survey. The response rate at participating schools was 84% and the final sample included approximately 20,000 students. This project was approved by the Norwegian Social Science Data Services, and the original study design, procedures, and data collection strategies have been described in detail elsewhere (Pape, 2014; Pape et al., 2009; Pape, 2007).

We used data from the most recent survey year (2006). We excluded cases with non-normative age ranges (i.e., middle-school students older than 16, and high-school students older than 19) and those with missing responses on the core cannabis-related items. The final sample consisted of 19,309 participants. Students were equally distributed across schools (49% middle-schools; 51% high-school) and gender (49% boys; 51% girls). The majority lived with both parents (62.5%) and were of Nordic background (91%). Due to the constraints imposed by the original project, all of the participants lived either in small towns (92.4%) or in rural areas (7.6%).

2.2. Instruments and Procedures

Participants anonymously completed paper-and-pencil questionnaires in schools during class time. Most of the measures included in the questionnaires were developed for this project.

Cannabis use offers: Offers were assessed through a single question (i.e., “Have you been offered cannabis or hash in past year?”), with yes/no response options.

Demographics: Students reported their age, gender, residence (living with both parents; living with at least one parent; other), ethnic background (Nordic vs. non-Nordic if at least one parent was born outside of Nordic countries), maternal education (college degree or greater; high-school degree; other) and own monthly disposable income (500 NOK or 80US\$/month vs. less/other).

Contextual characteristics: School-level cannabis use was computed as percent of students from each participating school who reported ever using cannabis. Residence communities were classified based on their size and proximity to major urban areas: rural areas, small towns, and small towns close to the capitol.

Interpersonal characteristics: Several parenting characteristics potentially conducive to the adolescents' risk of cannabis offers were considered. Specifically, *parental permissiveness* was assessed through a set of 5 items (e.g., "Are you usually allowed to stay out late at nights without saying where you are?"), where the individual yes/no responses were summed up such that the higher scores indicated greater permissiveness (i.e., greater risk, $\alpha = .70$). Further, *parental monitoring/knowledge* was assessed through a set of 5 items (e.g., "My parents usually know where I am and what I do in my free time.") with the 4-point Likert-type responses ranging from 1 ("quite agree") to 4 ("quite disagree"). All items were coded such that greater scores indicated lower parental monitoring (i.e., greater risk) and averaged to create a scale score ($\alpha = .80$). Finally, *conflict with parents* was assessed through a set of 3 items (e.g., "I argue with my parents a lot."), with the 4-point Likert-type scale coded 1 ("quite agree") to 4 ("quite disagree"). All items were recoded and averaged to compute the scale score ($\alpha = .80$), such that greater scores indicated greater conflict.

In addition, three yes/no items were used to assess *high-risk close friendships*. Specifically, participants reported whether they have a best friend who: a) gets drunk on average every week, b) has tried cannabis, and c) is 2 or more years older.

Personal characteristics: *Aggression* and *delinquency* were assessed through the sets of 5- and 6-items, respectively. All items assessed engagement (yes/no) in particular behaviors during the past year, and included examples of overtly aggressive (e.g. "Beaten or kicked someone.") and delinquent

(e.g. “Stole something worth less than 500 NOK.”) behaviors. By design, items related to substance use were excluded. Appropriate items were summed up to create index measures of aggression and delinquency, capturing the extent and diversity of such acts.

Finally, those youth overtly engaging in alcohol, tobacco, and certainly cannabis use could be perceived as being interested in illicit drugs in general, and in cannabis in particular. Because such existing behaviors could signal potential interest in drugs, youth displaying such behaviors may consequently be at greater risk for being targeted for cannabis offers. For this reason, we accounted for adolescents’ own *substance use history*. Participants reported their past year alcohol intoxication (coded as 0 times, less than once per month, once per month, and more than once per month), whether they ever used cannabis (yes/no), and whether they were a current smoker (yes/no).

2.3. Statistical Analyses

Logistic regression was the primary analytical tool, where the likelihood of receiving cannabis offer in the past year (“no” = 0, “yes” = 1) was estimated as a function of risk factors identified above. Univariate associations were explored first, followed by a series of multivariate models: a) the main effects model, and b) the statistical interaction model examining the combined effects, if any, between delinquent behaviors and cannabis-using peers. Next, identical models were fit separately for middle- and high-school students to explore putative developmental differences. Finally, because this sample contained a subset of adolescents who reported having used cannabis ($n = 1,455$, or 7.5%), the main analyses were repeated with these cases excluded. The effects of demographic and contextual characteristics were held constant in all multivariate models.

Given the considerable sample size, the conservative significance-level of .01 was selected. All analyses were performed using the STATA statistical package (StataCorp., 2013b), with *-logit*, (*or*) estimation command and *-margins* and *-marginsplot* commands for probing of interaction effects. All hereby reported tests and models were estimated accounting for the utilized survey design (*-svyset*) and the associated clustering at the school level (StataCorp., 2013a).

Some of the items contained response options of “don’t know”, were non-applicable, or had missing values due to skip patterns. For example, some children reported no disposable income, or no best friend at all. Univariate examination revealed that these groups were similar to the no-risk groups, and were consequently modeled as such to simplify the analyses and results interpretation. Because the total proportion of missing cases in multivariate models was negligible (295 cases, or 1.5%), we did not utilize any advanced missing values procedures.

3. Results

3.1. Sample characteristics

Sample characteristics are shown in Table 1. Shown are also unadjusted likelihoods (odds ratios, OR) of receiving cannabis offer during the previous year for all predictors. A total of 3,280 participants (or 17%) reported receiving cannabis offer(s) during the past year, while 1,455 (or 7.5%) reported ever using cannabis. All hypothesized risk factors were associated with cannabis offers in the expected direction (Table 1, all p 's < .001). In addition, high-school students were 4 times more likely to report receiving cannabis offer than the middle-school students (crude OR = 4.1, p < .001, 99% CI: 2.95 – 5.79). Finally, the two risk factors of substantive interest were associated with one another, such that delinquent adolescents were also more likely to report having a cannabis-using best friend (crude OR = 1.95, p < .001, 99% CI = 1.87 – 2.02).

3.2. Multivariate logistic regression estimating cannabis use offers

Results from the multivariate logistic regression model are reported in Table 2. The magnitude of crude associations was attenuated in the multivariate model (column 2). For example, parenting characteristics were no longer associated with cannabis offers. In contrast, interpersonal characteristics involving peers -- specifically, having a cannabis-using best friend -- remained significantly associated with cannabis offers (OR = 2.56, 99% CI: 1.09 – 1.43, p < .001). Externalizing behaviors also remained significant risk factors for cannabis offers. For example, each additional delinquent act was associated with a 29% increase in the odds of receiving cannabis offer. All of these effects remained statistically significant even after accounting for adolescents' own substance use,

including the strong effects of current smoking (OR = 1.87, 99% CI: 1.55 – 2.24, $p < .001$), past year alcohol intoxication (all OR > 2.5, p 's < .001), and any past cannabis use (OR = 9.73, 99% CI: 7.14 – 13.26, $p < .001$).

To investigate the putative combined effect of the two risk factors of substantive interest, a product term (delinquency x cannabis-using best friend) was added to the main model described above. The results are shown in Table 2 (column 3), and in Figure 1 (plotted predicted probabilities). This term was statistically significant, indicating that peer cannabis use increased the risk of cannabis offers predominantly for those adolescents on the lower-, but not so much for those adolescents on the higher-delinquency spectrum (*parameter estimate* = .85, 99% CI: .76 – .95, $p < .001$). As would be expected, youth with neither risk factor were the least likely targets for cannabis offers (Figure 1).

Identical set of models were fit separately for these two school cohorts to investigate putative age-related differences. While the overall pattern of results mirrored the results obtained from the entire sample, interaction effects differed across these two cohorts. Specifically, delinquency x cannabis-using best friend term was statistically significant for middle-school (*parameter estimate* = .72, 99% CI: .55 – .95, $p < .001$), but not for high-school cohort (*estimate* = .91, 99% CI: .82 – 1.01, *ns*). Figure 2 shows graphic representation of these results, where it is evident that the results obtained on the entire sample were primarily driven by the middle-school cohort.

3.3. Sensitivity Analysis

The main analyses included all respondents, including those ($n = 1,455$) who reported any lifetime cannabis use. These cannabis users were included, because: a) it is not known when this use was initiated and how frequent it was, and b) because actual cannabis use could signal interest in drugs and influence the risk of being offered cannabis. Nevertheless, as a sensitivity check, we repeated all of the analyses with cannabis users excluded. The pattern and magnitude of the results obtained on the entire sample (reported above) remained unchanged¹.

¹ For brevity, these results were not reported but can be obtained from the authors upon request.

This may not be surprising given that this was a youth sample unlikely to have had a long or extensive history of cannabis use. For example, of 1,455 participants who reported any lifetime use, 18% did not report any use during past year, and 26% reported having used cannabis only once during the same 12-month period. Further, given a generally low prevalence of cannabis use among youth in Norway (Hibell, 2012) and a relatively late initiation age (Sandøy, 2015) it is likely that most of the cannabis users from our sample initiated use recently, possibly even through hereby examined offers. If that was the case, and if cannabis use started as a result of the examined offers, majority of ‘users’ were targeted for offers not necessarily because of their prior use history, but because of identical risk factors as current non-users. However, this speculation could not be fully tested in this data set.

4. Discussion

Direct opportunity for cannabis use (i.e., being offered a drug for purchase and/or sharing) is often the first step in the chain of drug use (Benjet et al., 2007; Caris et al., 2009; Pinchevsky et al., 2012; Siegel et al., 2014; Storr et al., 2011). Nevertheless, this common precursor of actual drug use remains relatively poorly understood. Despite some limited research on cannabis use opportunities (Neumark et al., 2012; Pinchevsky et al., 2012; Siegel et al., 2014), little is known about whether some youth may be at greater risk for cannabis offers. We explored this question in a large adolescent sample, by examining individual and combined effects of risk factors potentially associated with direct cannabis offers.

Our results showed that both individual- and interpersonal-level characteristics were associated with being offered cannabis. Even after accounting for an extensive set of covariates (including substance use), adolescents’ own delinquency remained a salient risk factor for cannabis offers, as did having a cannabis-using best friend. Further, we observed differential effects of peer cannabis use across the delinquency strata and for different age groups. Specifically, the negative effect of peer cannabis use on cannabis offers was evident primarily for adolescents on the low-delinquency spectrum. This effect was most evident in the middle-school sample. Overall, this report replicates

and extends the limited literature concerning early drug use opportunities by underscoring yet again the salient role of early delinquency and high-risk peer groups, especially among younger adolescents.

4.1. Personal- and Interpersonal- Risk Factors, and Age-related Differences in Relation to Cannabis Offers

Early delinquency has long been recognized as a risk factor for substance use, including early drug initiation, use, and related problems (King et al., 2004; Pedersen et al., 2001; Stice et al., 1998; Wiesner and Windle, 2006). However, only recently has delinquency been investigated in relation to early drug use opportunities and not necessarily drug use per se (Chen et al., 2004; Neumark et al., 2012; Rosenberg and Anthony, 2001). Our results reiterated the importance of such early problems, as delinquent youth emerged as the likely targets for cannabis offers.

Consistent with the argument originally proposed by Rosenberg and Anthony (2001), we suggest that delinquency may indeed overtly signal the interest in other anti-social behaviors, such as drug use. As such, delinquency may consequently elicit 'offers' from peers and/or known drug dealers. This is an intriguing possibility, as the majority of those who were offered cannabis in our sample reported never having used cannabis at all – yet they in some way appeared to fit the profile of a (potential) user in the appraisal process of the individual(s) making the offer. Such a pattern would be consistent with an evocative interaction model (Scarr and McCartney, 1983), in which individuals through their behaviors and personal characteristics incite certain responses from their environment(s).

In addition, those environments may already be high-risk, exemplified by substance-using peer groups. Indeed, having a cannabis-using best friend also emerged as a strong risk factor in our sample, echoing previous findings on the role of peers in relation to early drug use exposure (Neumark et al., 2012; Pinchevsky et al., 2012). It is possible that the delinquent youth may have self-selected into these high-risk peer groups, thus actively seeking additional high-risk experiences such as drug use (Scarr and McCartney, 1983). This is certainly a possibility, especially because we observed that having a cannabis-using close friend did not additionally increase the risk for cannabis offers among highly delinquent youth.

Finally, there was a difference across school cohorts. First, high-school adolescents were simply more likely to be offered cannabis. Indeed, past research suggests that drug use opportunities become more common with age: for example, Arria et al. (2008) reported that more than 80% of college freshmen have been offered cannabis and 50% of those have had such an experience by the age of 16. In that respect, identifying youth who encounter drug use offers at an early age may point to the high-risk profile characterized by hazardous early onset. These age-related effects were also reiterated when we examined how the risk factors worked together (Kraemer et al., 2001). The results of the interaction models revealed that having cannabis-using best friends primarily placed lower-delinquent youth at risk for cannabis offers. These results were driven by middle-school cohort, suggesting differential risk processes where younger children may be more vulnerable to peer influences (McIntosh et al., 2006). Indeed, delinquency and peer-level risks operated in a simpler additive manner in our high-school cohort.

4.2. Strengths and Limitations

Even though these results advanced our understanding of early direct opportunities to engage in illicit drugs use, they are nevertheless limited by the cross-sectional nature of the original project and the somewhat unique sample. For example, it is possible that these risk processes would operate differently among much older youth (Arria et al., 2008) or urban youth where access to cannabis may be easier. Next, we could not fully explore complex causal or temporal processes (Kraemer et al., 2001), nor could we fully clarify social and/or psychological mechanisms linking adolescent characteristics and cannabis offers: our results are consistent with several plausible explanations, but to which extent each of those possibilities played a role cannot be fully ascertained from these cross-sectional data primarily because we could not rule out self-selection. Further, the social context of these cannabis offers was unknown (Moon et al., 1999) as information concerning the source and circumstances were not available. Similarly, we do not know if these were the first and the only cannabis offers experienced, nor do we know the number or the timing of all possible offers (Siegel et al., 2014). In addition, even though adolescents should theoretically provide the best information

about their own behaviors and experiences, veracity of such self-reports may still be questionable, as such responses may be influenced by adolescents' limited motivation, attention, or comprehension.

Nevertheless, we believe that a considerable sample size and a comprehensive set of covariates allowed us to examine the phenomenon of direct cannabis use offers among vulnerable youth populations, and provided more robust evidence as to the role of adolescent own risky behaviors and peer groups. We believe that the broad risk processes identified here generalize to youth outside Norway. It is our hope that these findings will guide future research in this area, including longitudinal research addressing causal risk and protective mechanisms (i.e., who are the youth who successfully resisted such offers), ultimately informing public health policy and prevention/intervention strategies.

5. Conclusions and Future Directions

This report replicated and extended prior, albeit limited, findings concerning the associations between adolescents' personal and interpersonal characteristics and the risk of being offered illicit drugs. Namely, delinquency and having a cannabis-using best friend remained strongly associated with receiving cannabis offers. Moreover, negative influence of cannabis-using peers was especially evident among younger, non-delinquent adolescents. Prevention efforts can therefore be extended to a general profile of youth with early externalizing problems and high-risk peer groups, and can be additionally tailored for middle- and high-school students.

Figure Legend

Figure 1.

Interaction between delinquency and cannabis-using best friend in relation to direct cannabis offers; entire sample.

Figure 2.

Interaction between delinquency and cannabis-using best friend in relation to direct cannabis offers; by school sub-samples.

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Table 1. Sample characteristics, and crude (unadjusted) odds ratios (OR) of receiving cannabis offer in the past year as a function of adolescent demographic-, contextual-, interpersonal-, and personal- characteristics.

Variables		Received cannabis offer past year		Unadjusted OR (99% C.I.)
		No n = 16,029 (83.0%)	Yes n = 3,280 (17.0%)	
Demographics and SES				
1. Age (Years)	19,309 (100%)	15.18 (1.71)	16.40 (1.44)	1.56 (1.51-1.61)***
2. Gender				
<i>Boy</i>	9,486 (49.1%)	48.5%	52.0%	--
<i>Girl</i>	9,823 (50.9%)	51.5%	48.0%	.86 (.78-96)***
3. Residence				
<i>With both parents</i>	12,075 (62.5%)	65.6%	47.4%	--
<i>With one parent</i>	5,504 (28.5%)	27.3%	34.6%	1.76 (1.57-1.96)***
<i>Other</i>	1,730 (9.0%)	7.1%	18.0%	3.52 (3.04-4.08)***
4. Ethnic background				
<i>Nordic background</i>	17,550 (91.4%)	91.8%	89.6%	--
<i>Non-Nordic background</i>	1,662 (8.6%)	8.2%	10.4%	1.28 (1.09-1.51)***
5. Maternal education				
<i>Less than HS/Other</i>	2,447 (12.7%)	12.1%	15.5%	--
<i>High School degree</i>	8,699 (45.0%)	45.3%	44.0%	.76 (.65-.88)***
<i>College or greater</i>	8,163 (42.3%)	42.6%	40.5%	.74 (.64-.86)***
6. Disposable income				
<i>Less than 500 NOK/month^a</i>	8,729 (45.2%)	50.1%	21.3%	--
<i>More than 500 NOK/month</i>	10,580 (54.8%)	49.9%	78.7%	3.69 (3.29-4.15)***
7. School cannabis use ^b	19,309 (100%)	7.6 (5.7)	11.5 (6.5)	1.12 (1.11-1.13)***
8. Community type				
<i>Small towns, close to Oslo</i>	3,634 (18.8%)	17.1%	27.4%	--
<i>Small towns</i>	14,193 (73.5%)	74.4%	69.2%	.58 (.51-.65)***
<i>Rural villages</i>	1,482 (7.7%)	8.5%	3.4%	.25 (.19-.33)***
Interpersonal characteristics				
9. Parental permissiveness	19,081 (98.2%)	1.47 (1.39)	2.55 (1.62)	1.58 (1.53-1.63)***
10. Low parental monitoring	19,166 (99.3%)	1.86 (.59)	2.12 (.72)	1.89 (1.75-2.04)***
11. Conflict with parents	19,105 (98.9%)	2.01 (.74)	2.24 (.82)	1.46 (1.37-1.56)***
12. Best friend drunk once/week				
<i>No^a</i>	15,827 (82.0%)	87.8%	53.5%	--
<i>Yes</i>	3,482 (18.0%)	12.2%	46.5%	6.25 (5.61-6.98)***
13. Best friend tried cannabis				
<i>No^a</i>	17,341 (89.8%)	95.9%	60.2%	--
<i>Yes</i>	1,968 (10.2%)	4.1%	38.8%	15.35 (13.38-17.62)***

14. Best friend 2+ years older				
<i>No</i> ^a	17,429 (92.2%)	93.7%	84.5%	--
<i>Yes</i>	1,516 (7.8%)	6.3%	15.5%	2.73 (2.35-3.17)***
<i>Personal characteristics</i>				
15. Aggressive behavior				
	19,284 (99.9%)	.83 (1.21)	1.58 (1.56)	1.46 (1.41-1.51)***
16. Delinquent behavior				
	19,291 (99.9%)	.68 (1.05)	2.27 (1.68)	2.18 (2.09-2.26)***
17. Ever used cannabis				
<i>No</i>	17,854 (92.5%)	98.8%	61.4%	--
<i>Yes</i>	1,455 (7.5%)	1.2%	38.6%	53.03 (42.97-65.44)***
18. Current smoker				
<i>No</i>	15,339 (79.4%)	87.3%	41.2%	--
<i>Yes</i>	3,970 (20.6%)	12.7%	58.8%	9.80 (8.78-10.94)***
19. Drunk past year				
<i>0 times</i>	10,942 (56.7%)	65.5%	13.6%	--
<i>Less than once per month</i>	5,043 (26.1%)	24.0%	36.5%	7.30 (6.28-8.49)***
<i>Once per month</i>	1,047 (5.4%)	4.1%	12.0%	14.05 (11.43-17.26)***
<i>More than once per month</i>	2,277 (11.8%)	6.4%	37.9%	28.27 (23.97-33.34)***

Note: *** $p \leq .001$

N (%) denotes proportion of the entire sample providing valid responses on examined predictors.

^a Some of the items contained response options of “don’t know”, were non-applicable, or had logical missing values. For example, some children did not report having any disposable income, or having a best friend at all -- they were consequently classified as ‘other’. Univariate examination of these variables revealed that these groups were similar to the no-risk groups, and were consequently classified as such for the simplification of analyses and ease of results interpretation.

^b School-level cannabis use reflects the proportion (%) of students who reported ever using cannabis in each participating school.

Table 2. Estimated likelihoods of receiving cannabis offer during past year, as a function of adolescents' interpersonal- and personal- characteristics.

<i>Variables</i>	Entire sample (n = 18,978)	
	<i>Main effects model</i>	<i>Interaction model</i>
	<i>OR (99% CI)</i>	<i>Parameter estimate</i>
Age (Years)	1.08 (1.01-1.15) ^{***}	--
Gender (Girl)	.88 (.77-1.01)	--
Parental permissiveness	1.01 (.96-1.06)	--
Low parental monitoring	1.00 (.89-1.12)	--
Conflict with parents	1.09 (.99-1.20)	--
Best friend drunk once/week	1.26 (1.07-1.47) ^{***}	--
Best friend tried cannabis	2.55 (2.11-3.08)^{***}	--
Best friend 2+ years older	1.07 (.85-1.33)	--
Aggressive behavior	1.14 (1.07-1.20) ^{***}	--
Delinquent behavior	1.28 (1.21-1.36)^{***}	--
Ever used cannabis	9.61 (7.54-12.23) ^{***}	--
Current smoker	1.87 (1.60-2.18) ^{***}	--
Drunk past year		
0 times	--	
<i>Less than once per month</i>	2.63 (2.17-3.19) ^{***}	--
<i>Once per month</i>	3.40 (2.58-4.48) ^{***}	--
<i>More than once per month</i>	3.63 (2.82-4.67) ^{***}	--
Best friend tried cannabis X Delinquency	--	.85 (.75-.95)^{***}
-2LL	10,445.6	10,432

Note: ^{***} $p \leq .001$

Results from the logistic regression estimating the likelihood of receiving cannabis offer(s) are reported in columns 2 and 3 (entire sample; main effects and interaction model).

All models accounted for residence, ethnic background, maternal education, adolescents' own disposable income, school-level cannabis use, and community type (see Table 1). Reported in this table are only the predictors of substantive interest relevant to personal- and interpersonal-characteristics, with specific risk factors (delinquency, cannabis-using best friend, and their interactions) bolded for emphasis.

Figure 1.

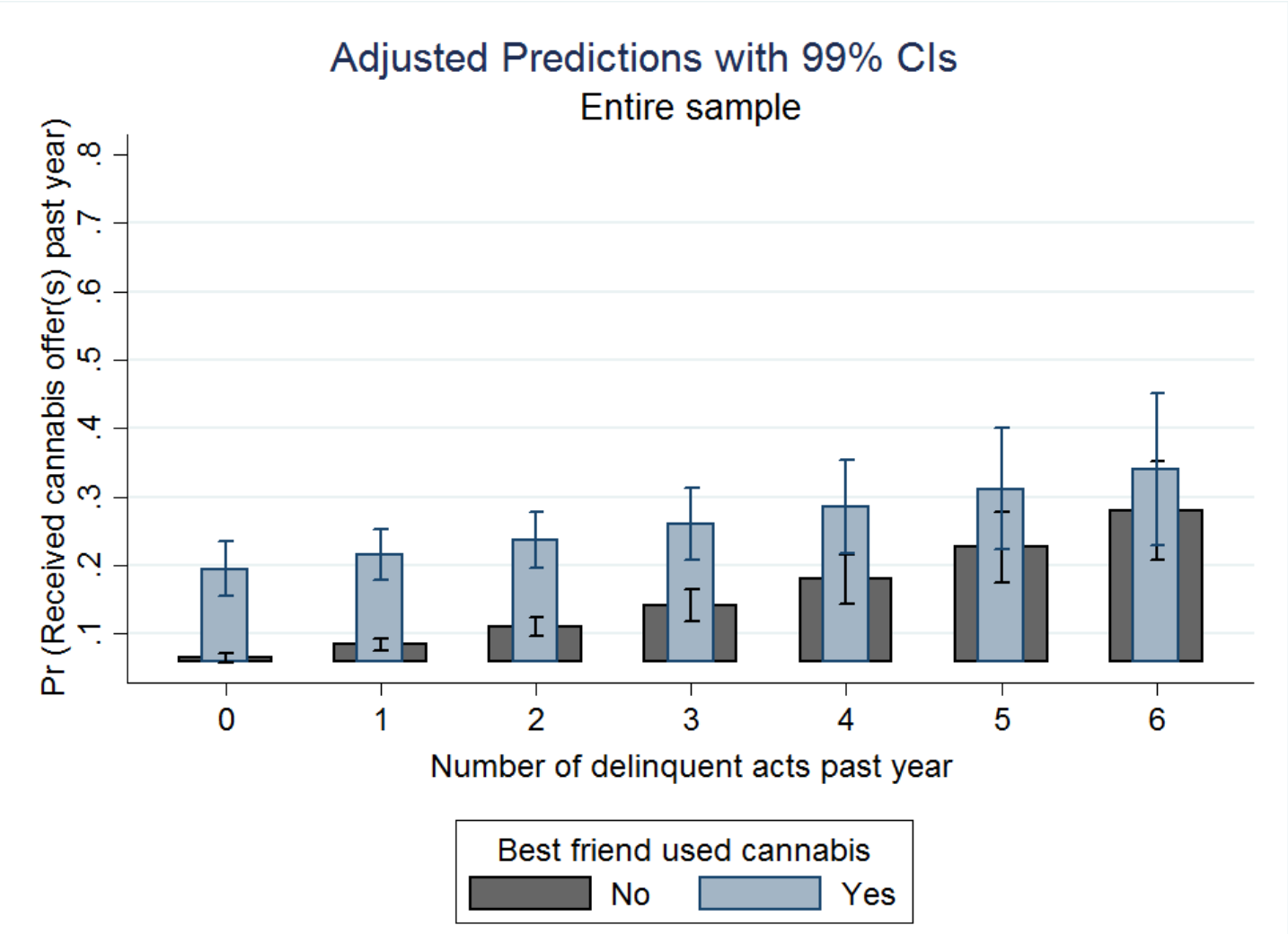


Figure 2.

