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Adolescent drug use and the deterrent effect of school-imposed penalties

G.R. Waddell[a,b,*,1]

[a] Department of Economics, University of Oregon, Eugene, OR 97403-1285, USA
[b] IZA, P.O. Box 7240, Bonn 53072, Germany

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ABSTRACT

Estimates of the effect of school-imposed penalties for drug use on a student's consumption of marijuana are biased if both are determined by unobservable school or individual attributes. Reverse causality is also a potential challenge to retrieving estimates of the causal relationship, as the severity of school sanctions may simply reflect the need for more-severe sanctions. Using the National Longitudinal Study of Adolescent Health, I offer an instrumental-variables approach to retrieving an estimate of the causal response of marijuana use to sanctions and thereby demonstrate the efficacy of school-imposed penalties as a deterrent to adolescent drug use. This suggests that school sanctions may have important long-run benefits.

1. Introduction

There is a large literature that documents the long-run costs associated with drug use, and the implied gains to lowering adolescent drug use are not difficult to establish from existing research. For example, in an instrumental-variables design, DeSimone (2002) shows that employment probabilities are substantially reduced by marijuana and cocaine consumption. Considering the relationship between marijuana use in high school and future earnings, Ringel, Ellickson, and Collins (2006) suggest that a significant part of the negative relationship between substance use and earnings reflects an indirect mechanism by which early marijuana use affects human capital accumulation, which in turn affects earnings. The focus of this analysis is on the role of school policy in determining student's consumption of marijuana—the most common illicit substance used by adolescents.

Of course, the consequences of substance use are not restricted to labor-market outcomes. For example, Kaestner (1995) shows that drug users tend to delay marriage and, conditional on marriage, experience shorter marriage durations. Markowitz (2000) suggests that marijuana may also cause increased engagement in physical fights. Substance use has also been identified as a leading causal factor in suicidal thoughts and behaviors (Markowitz, Chatterji, Kaestner, & Dave, 2002). Clearly, there is the potential for a significant down side associated with adolescent drug use, which should motivate policy makers in their stewardship of adolescents.

* Correspondence address: Department of Economics, University of Oregon, Eugene, OR 97403-1285, USA. Tel.: +1 541 346 1259; fax: +1 541 346 1243.
E-mail address: waddell@uoregon.edu

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Somewhat surprisingly, however, the role of school policy in a student's choice to consume drugs has largely been ignored in the economics literature. Yet, among the established results in the literature, there are several empirical patterns that raise particular concern around this shortcoming. For example, Chatterji (2006) shows that marijuana use in high school is associated with lower levels of educational attainment, and concludes with an appropriate conjecture that "public policies that are effective in reducing substance use during high school should have some impact on educational attainment." Based on a relationship between marijuana use and lower high-school graduation rates, Yamada, Kendix, and Yamada (1998) also conclude with the suggestion that "high-school-based preventive programs which discourage alcohol consumption and marijuana use are highly recommended." The literature has also documented that the earlier one starts using a particular drug the less likely one is to stop using that drug (van Ours, 2006), which further supports considering the role of schools in influencing drug use. To the extent one believes that marijuana is a gateway to other (harder) substances, the benefits to curbing adolescent marijuana use also include mitigating this potential escalation and any costs associated with such escalation.[2]

In the end, the existing literature leaves us largely uninformed about the relationship between school policy and the substance use of youth.[3] Yet, there is reason to consider the influence of school policy in this regard, as educational institutions are well positioned to influence adolescent choices.[4]

Moreover, beginning with the Regan-Bush era drug-enforcement policies, although not without controversy, there are still growing numbers of schools moving toward "zero tolerance" policies with respect to drugs and alcohol, so much so that the application of zero tolerance is now quite common (Heaviside, Rowand, Williams, & Farris, 1998).[5] This analysis contributes to this area of policy by introducing estimates of the causal relationship between use and the severity of drug-related policy—the potential for school policy to influence a student's consumption of marijuana.

Specifically, I will model one's marijuana use as a function of the the penalty one's school would impose if one were to be caught consuming an illegal drug. In proceeding toward a preferred specification, I will be transparent about the empirical regularities in the data and report simple OLS specifications that highlight the potential endogeneity of penalties in such an environment.

For example, OLS estimates of the effect of school-imposed penalties for drug use on a student's consumption of marijuana would be biased if both are determined by unobservable school or individual attributes. That the severity of school sanctions may simply reflect the need for more-severe sanctions (i.e., drug use is high) is also a challenge to OLS estimates as this imparts positive bias. Alternatively, schools with well-behaved students and little marijuana use may have severe penalties because they so seldom need to follow through on them. This would introduce negative bias in OLS regressions.

Given the likely endogeneity of punishment levels, I will adopt an instrumental-variables approach to retrieving an estimate of the causal influence of sanctions on student behavior and, in the end, demonstrate the efficacy of school-imposed sanctions—stiffer sanctions for drug use cause students to be less likely to consume marijuana. In particular, the preferred estimates are identified off of variation in penalties imposed on second-time drug offenders across schools that issue the same penalties to first-time offenders. In this scenario, I instrument for the second-offence penalty with measures of how much the school *escalates* its penalties between first- and for second-time offences in non-drug areas of discipline.

In Section 2, I detail the data used in this analysis. In Section 3, I develop the empirical model and formally define the instrumental variables to be used to recover causal estimates of school-imposed penalties on marijuana use. I offer some discussion in Section 4 followed by concluding remarks in Section 5.

2. Data

2.1. Source

For our purpose, the National Longitudinal Study of Adolescent Health is a particularly fitting collection of information on adolescent behaviors as it is designed to investigate adolescent health and risk behaviors. The "Add Health" project is widely considered to be the largest and most comprehensive survey of adolescents ever undertaken, with a stratified sample of 80 high schools collectively representative of the U.S. school system with respect to region of country, urbanicity, school size, school

[2] Although, Bretteville-Jensen and Jacobi (2008) considers an alternative to a causal link between cannabis and subsequent hard-drug use, offering non-causal explanations for the observed "staircase" pattern.

[3] As an exception to the dearth of evidence on the role of institutions in drug use, although somewhat removed from the focus here, Mehay and Pacula (1999) exploits a drug-testing policy implemented by the military in 1981 and documents that rates of illicit-drug use among military personnel are significantly lower than civilian rates in years after the implementation of the program but not before, which they interpret as a sizable deterrence effect. Some 30 years have past since this policy change was initiated, though, and the nature of the policy change does not necessarily map into us learning about the implications of school policy toward drug use. Exploiting transaction-level data, Pacula, Kilmer, Grossman, and Chaloupka (2007) does find that changes in sanctions that lower the legal risks for users are associated with higher marijuana prices in the short-run. Anderson (2009) also offers some evidence that demand-side interventions to curbing drug use may be ineffective at changing consumption behavior, although this is focussed on methamphetamine use.

[4] In a related consideration, while the emphasis is more broadly on school crime (e.g., violent incidents), Cook, Gottfredson, and Na (2009) argues that crime in school is not a simple sum of students' criminal propensities—"that the organizational characteristics of the school have considerable influence."

[5] Zero tolerance polices are an outgrowth of the Reagan–Bush era drug enforcement policy, and such disciplinary measures are largely seen as attempts to send a message by punishing both major and minor incidents severely. For additional background on the history, philosophy, and effectiveness of zero tolerance school disciplinary strategies, see Skiba (2000).