Journal of Business Research 85 (2018) 317–324

Contents lists available at ScienceDirect

Journal of Business Research

journal homepage: www.elsevier.com/locate/jbusres

What I think I will do versus what I say I do: Mispredicting marijuana use among teenage drug users

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ARTICLE INFO

Keywords:
Mispredicting vice
Drug abuse
Teenagers' drug choices
Econometric modeling in absence of panel data

ABSTRACT

Past research examines factors that impact marijuana use. However, there is limited empirical evidence regarding the combined role of previous experience, attitudes and the situation in determining present and future marijuana use. We fill this gap by studying factors that affect misprediction of marijuana use among teenagers. Specifically, we study (1) whether individuals are able to correctly predict their future marijuana use, (2) the direction of misprediction (over versus under prediction) and (3) the factors that affect errors in prediction.

We use data from a federally sponsored survey about teenagers' marijuana consumption in the United States. We find that, teenagers under predict future marijuana use and that this inaccuracy is moderated by the extent of use. We also find that misprediction is affected by both attitudes and the situation through main and interaction effects. We outline some policy implications of our findings.

1. Introduction

We often engage in behavior contrary to our best predictions and intentions. We expect to eat less and exercise more than we really do. For example, the average gym member in the United States pays $55 per month (inside of a $30 billion industry) but only goes to the gym at most twice a week, and a full two-thirds of those purchasing a gym membership never use it at all. Exercise and diet companies routinely focus on sales around January 1 of each year in an attempt to cash in on our mispredictions.

One important reason for this misprediction is that one anticipates future decisions to occur under a "hot" state while presently being in a "cold" state (Loewenstein, 1996). That is, individuals often predict what they will do in the face of some powerful visceral influence on their behavior (i.e., a "hot state, e.g., hunger) while not currently experiencing that same state (i.e., being in a cold state, e.g., being full after a meal). Anecdotal evidence, however, may lead one to simplistically—and incorrectly—conclude that, like the perpetual dieter, individuals are always overly optimistic about their future behavior. In the present work, we use data on reported marijuana use by teenagers to explore the possibility that misprediction is neither random nor unidirectional and it depends on several predictable factors. Past research has provided valuable insights on what psychological factors affect consumption of addictive substances such as alcohol and cigarettes (Davis & Grier, 2015; Hwang & Yun, 2015). Yet what remains unknown is how a teenager's attitude *and* situation combine to affect her propensity to use marijuana in the future.

Marijuana is *the* most widely used drug today. According to the latest report from the National Institute on Drug Abuse (NIDA) in 2013, 19.8 million people had used marijuana in the past month, up from 14.5 million in 2007 (NIDA Report on Nationwide Trends, 2014). Forty percent of *all* teenagers had tried marijuana in 2012, up from 32% in 2008. This increase comes at a time when use of other drugs has remained the same or declined over the past decade. Further, using marijuana has become "normalized" behavior. What we will refer to as "perceived severity" (i.e., perceptions that using marijuana is serious) of marijuana use is low: 71% of teens said they have a close friend who uses marijuana regularly. However, Meier et al. (2012) show that a teenager who starts smoking marijuana loses much more of her brain power (measured as IQ) than does an adult who smokes just as much. This shows that marijuana use is not just harmful; it is particularly harmful to the developing mind. Therefore, studying marijuana use among teens is an important issue from multiple perspectives. Our interest is in answering these questions:

1. How do teenagers' predictions of future use compare with actual marijuana use?
2. Are these mispredictions systematic?

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https://doi.org/10.1016/j.jbusres.2018.01.026
Received 21 November 2016; Received in revised form 9 January 2018; Accepted 12 January 2018

3. What factors (external and internal) cause the mispredictions?
4. What are the public policy implications?

2. Theory development

We use several distinct, yet interrelated, research streams to develop our hypotheses. First, we incorporate prior research addressing behavior prediction accuracy. Second, we use research on expertise and prior use to examine how prior experience affects individuals' prediction accuracy. Third, we use research examining situational and attitudinal influences on behavior prediction. We proceed by examining each, developing hypotheses that build on each other.

2.1. Prediction accuracy

Prior evidence shows that, for a variety of reasons, people inaccurately predict their own future preferences (e.g., Loewenstein & Schkade, 1999). The most relevant framework for our paper comes from work on visceral factors and the *hot-cold empathy gap* (Loewenstein, 1996). According to this research, when individuals are in a "cold" state (i.e., not hungry, or, in our case, not craving a drug), they are unable to accurately predict how they will behave when they are aroused, generally tending to underestimate the likelihood that they will engage in the relevant behavior. Building on this research stream, we hypothesize that teens, on average, will underpredict their level of future drug consumption:

H1. Individuals will, on average, underpredict their level of future drug consumption.

2.2. Misprediction of future behavior and past experience

One important consideration when examining misprediction is the role of prior experience, that is, whether the teenager has used drugs in the past. The "traditional" learning perspective has been that forecasting improves with experience and feedback (Alba & Hutchinson, 1987; Cambridge Handbook, 2006), presumably due to improved memory and elaboration on similar past consumption occasions. On the other hand, other research (Kahneman & Klein, 2009) suggests subjective experience is often not a reliable indicator of judgment accuracy; that is, *expertise can sometimes be a liability rather than an asset with respect to accurate forecasting*. With respect to marijuana use, we hypothesize that more regular drug users may become overconfident about their ability to limit their drug use and underestimate future usage as a result, consistent with experience as a liability. This finding would suggest that higher levels of previous use (experience) lead to a greater level of underprediction:

H2a. The extent of prior use affects prediction accuracy. Specifically, underprediction of future use will increase with level of past use.

2.3. The role of attitudes and the situation

To understand the behavioral factors that could lead users to underpredict future use, we examine the possible effect of attitudes and situation on these users. Early attitude research assumed attitudes were the key to decoding human behavior (Watson, 1925). However, later research showed the relationship between attitudes and behavior is not as strong, or direct, as once assumed and that it plays a more central role in driving behavior (Mischel & Philip, 1982). In this paper, we examine the role of an external factor (situation) versus an internal factor (attitudes) on misprediction, and therefore examine each in turn.

2.3.1. Situation

We consider the situation to include both environmental and social elements. We explore whether users with more peers who use marijuana and those who have more access to it (i.e., our situational variables) will overpredict future marijuana use. In many circumstances in which the situational variables are not naturally salient at the time of prediction compared to usage, these conditions could lead to underprediction of use (e.g., Loewenstein, 1996). In our specific context, having greater access and more peers who use more often are likely to be relatively salient features at the time of prediction, and possibly more salient when predicting than at the time of usage. Thus, this would be associated with a greater over-prediction. We test this theory via the following hypothesis:

H2b. Greater presence of situational variables (having more peers and greater access) present at the time of prediction will lead to greater overprediction of future marijuana use.

2.3.2. Attitude

We explore whether users with more negative attitudes will underpredict their future use to greater extent. They may do so because their current negative attitude toward drugs will cause their expectation of future use to be low. However, at the time of actual use, they will be more influenced by the situation around them and the "hot state" they face at time of choice. Therefore, consistent with recent research using laboratory studies (Pronin, Olivola, & Kennedy, 2008), we hypothesize that having negative attitudes at the time of prediction will lead to a lower level of predicted use, thereby exacerbating the underprediction error:

H2c. More extreme negative attitudes toward drug use at the time of prediction will lead to greater underprediction of future marijuana use.

3. Empirical application: the data set and methodology

We develop an exploratory econometric model of drug use, tying the constructs above to individual choice behavior. The basis for the framework is a well-established economic model of individual behavior (Hanemann, 1984) and has been used previously in the context of drug-choice behavior (Block, Morwitz, Putsis Jr, & Sen, 2002). However, we make some important modifications to accommodate for the non-panel nature of our data set. Therefore, before attempting to understand the modeling approach, we turn to a discussion of the data set.

3.1. The data

The Partnership for Drug Free Kids (PDFK), formerly The Partnership for a Drug-Free America, is a nonprofit organization founded in 1985 to help curb increasing teenage drug use. To assess changing national attitudes toward illegal drug use and changes in drug consumption, the PDFK has established an annual research program. The first such research program, the Partnership Attitude Tracking Survey (PATS), began in 1987. Every year (from 1987 through 1996) the survey collected data in waves through multiple-site central-location sampling. The PATS data we use in our analysis are from 1995 and 1996 (we will refer to these as "Wave 1" and "Wave 2" throughout the paper). In the first stage, we selected a sample of counties to include in the study; we selected sampling sites to match the population of the contiguous United States. In the second stage, we drew schools from among all those in each selected county. In the third stage, we drew a sample of classes from grades 9 through 12, from each school, followed by a systematic random sample of these classes, drawn separately for each school. All students in these selected classes constituted the selected sample of students for the study. On the scheduled interviewing day, an interviewer visited each class in turn to administer the questionnaires. All interviewing was conducted with the teacher present in the room. Once the interviewer had introduced the study and explained the procedures, the students completed the questionnaires at their own pace.