LIFE COURSE TRAJECTORIES OF SUBSTANCE USE AND CRIME

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The Executive Summary to the National Academy of Sciences report, Informing America's Policy on Illegal Drugs: What We Don't Know Keeps Hurting Us, Manski, et al. (2001, p. 1) begins ominously:

> The consumption of illegal drugs and the design of efforts to control drug use pose some of the most difficult and divisive problems confronting the American public. As a public health and social problem, illegal drugs are responsible for numerous ills, including the premature death of some drug users. The country has borne the weight of the violence and crime that seem to inevitably accompany illegal drug distribution. As a practical problem, recurring drug epidemics have overwhelmed the nation's treatment resources and plagued police forces and a judicial system struggling to maintain order and credibility.

Without question, a crucial public health problem is not only the consumption of illegal substances but also the violence and crime that "seem to inevitably accompany illegal drug distribution." This concern is echoed in the National Institute of Justice special report, Toward a Drugs and Crime Research Agenda for the 21st Century, in which the key concern is determining whether the drugs-crime link is a "matter of cause and effect" or "something far more complex" (Brownstein and Crossland 2003).

We propose a project that addresses this public health concern by conducting basic research into substance use and crime. We argue that previous epidemiological and causal research on individual levels of substance use and crime may have missed important scientific and policy-relevant information contained in trajectories of substance use and crime. For example, early child interventions that alter variables we measure, such as parenting, schooling, or peer relations may have important long-term effects on the shape of individual trajectories through the life course that are hidden in short-term models. Similarly, intervention policies that improve jobs or schooling may have few short-term effects, but strong effects on the long-term shape of individual trajectories of substance use and offending. Clearly, this is an empirical question, and one we plan to pursue. Furthermore, we will also examine the link between drugs and crime in two ways. First, we will assess comorbidity, testing whether the levels and trajectories of substance use and offending covary. Second, we will examine the question raised by the NIJ special report: Are drugs and crime causally linked or related in a more complex way? Finally, we will examine whether distinct latent classes of trajectories exist, defining for example, groups of chronics, non-users, desisters, or increasers. We will then model the latent classes to identify variables that distinguish groups and also whether the effects of variables, such as parenting or schooling, affect substance use and offending in some groups but not others. This will shed light on whether we can expect interventions into the family or school may work on some subgroups but not others.

We will develop an integrated theoretical model that combines key risk factors from social contexts (e.g., neighborhood disadvantage, family structure) and stable individual characteristics (parent substance abuse, impulsivity, alienation from families) with pathways to substance abuse drawn from social learning theories (coercive parenting, delinquent peers, delinquent identity), rational choice theories (risk of arrest, psychic rewards of drug use) and life course theories (transition from school to work, marriage). The theoretical model will generate hypotheses about developmental trajectories of substance-using youth. To estimate our models, we will use three different data sets, the Denver Youth Survey, National Youth Survey, and Add Health Survey, which each provides distinct strengths in research design, population sampled, and measures included. We use different statistical methods and models, each of which provides different strengths and weaknesses, to address our research questions, and look for findings that hold up under slightly different theoretical and statistical assumptions.

SPECIFIC AIMS

Our project has four specific aims, which build upon each other. We first estimate models of growth curves of substance use and offending. We model the growth parameters in two steps: (1) estimating effects of

demographics, and other time-invariant covariates (early parenting, impulsivity) and (2) introducing time-varying covariates that correspond to theoretical concepts (rational choice and peers), and to life course changes (work, schooling, marriage):

Aim 1. Estimate and model individual trajectories using growth curve analysis.

Our second aim estimates latent class models of trajectories. We first estimate latent class models of substance use and offending, identifying the key classes underlying our trajectories (across the three data sets). We first model group membership by demographics, any substance use disorder, and impulsivity. We model the effects of life course changes, such as schooling, work, marriage, on the trajectories.
Then, building upon our individual growth curve results, we test for interaction effects: do predictors of trajectories differ by latent class?

Aim 2. Estimate and model latent classes of trajectories.

Our third aim takes up the question of comorbidity: Do substance use and offending covary cross-sectionally and over time? We do this in two ways. First, we estimate separate trajectories for substance use and offending and estimate correlations in the intercepts and slopes, then test for spuriousness by adding covariates. Second, we estimate latent classes of trajectories and estimate correlations in growth parameters within each class. Here we can examine whether comorbidity is greater for chronic offenders than for other groups. We then test for spuriousness in comorbidity estimates by controlling for covariates.

Aim 3. Estimate comorbidity and test for spuriousness.

Our fourth aim examines the relationship between drugs and crime, and tests for spuriousness in a cross-lagged panel model. Here we examine the possibility that a causal structure underlies the trajectories we examine earlier. Of course, these models do not identify causal effects as one would estimate in a controlled experiment, but rather treat conditional probabilities in a well-specified model as approximations to causality.

Aim 4. Estimate models of causality between drugs and crime.

SIGNIFICANCE AND IMPLICATIONS

Our project will fill a gap in the literature at the intersection of theoretical issues and developmental or life course trajectories of substance use and offending. Our proposed analyses will improve upon existing research in five ways. First, we will examine the implications of theory for trajectories of substance use and offending. A substantial body of research has found support for the theoretical mechanisms that we outline above, but very little has applied the perspectives in a systematic way to the study of trajectories of substance use and crime. We will develop explicit hypotheses from our theoretical framework and explore their implications for trajectories of substance use and offending. Although a sizeable literature on growth curves of alcohol use has accumulated, few have examined multiple substances, and even fewer included criminal outcomes.

Second, we will examine latent classes of trajectories of substance use and offending. There has been a lot of research on latent classes using arrest and conviction data of crimes, measures of aggression, and alcohol use, but fewer on other substances and self-reports of crime. We will extend this to multiple outcomes, including different forms of crime, marijuana use, smoking, and other drugs, as well as alcohol. Here we will estimate the number of substantively meaningful groups underlying our trajectories, and then test theoretical predictions of group membership. Third, we will examine the implications of discovered latent classes for models of substance use and crime. Here we will examine whether the latent classes

interact with our theoretical variables in conventional models of substance use and offending. Fourth, we will examine the question of comorbidity or co-occurrence of various drugs and crimes within a trajectory framework and a latent trajectory framework. Here we will examine co-occurrence of various substances with each other and with different forms of crime within a trajectory framework, and within a latent class trajectory framework. The latter will follow Nagin and Tremblay's (2001) approach. Fifth, our analyses will use three excellent and complementary datasets that will improve considerably on much of the research. Each dataset is based on a stratified random sample of an important population and follows respondents over time with excellent completion rates. In contrast, many of the analyses of trajectories of substance use cited above use samples drawn through self-selection, either through recruitment through advertisements in newspapers and flyers (Duncan et al. 1996a, 1996b), mail-back questionnaires (Duncan et al. 1999), or through multiple methods (Curran et al. 1997). Analyses of such samples must make the strong assumption that the process of selection into the sample, which is typically unknown, is not related to independent variables and outcomes. Such sample selection bias could affect conclusions drawn (e.g., Heckman 1976; Berk 1983). It is important to replicate such analyses with probability samples. Moreover, the DYS and NYS cover extended portions of the life course, with nine waves and respondents into their late twenties and early thirties. We can examine full trajectories and life course events from childhood to adulthood, whereas most previous studies are limited to a few longitudinal points in time and a small slice of the life course.

Of most significance, our study has important implications for policies intended to reduce substance abuse and crime. Our trajectory analyses of very long panel data allow us to identify long-term effects that are amenable to intervention. Such effects remain hidden in most research using short panels. For example, we can tell whether coercive parenting alters the shape of long-term trajectories rather than merely the level at any give time. Such models have implications for whether interventions, such as teaching parenting skills and child social skills, have effects on trajectories of antisocial behavior, as shown by Lacourse et al. (2002). Our models of time-varying covariates may reveal when important events, such as peer influences, risk of arrest, or employment have stronger effects on shaping trajectories, which has implications for the timing of specific interventions. Our models involving the interaction of substantive variables, such as parenting, school failure, or drug opportunities, with latent classes of trajectories, may suggest specific groups to target for intervention. Finally, our causal analyses of the drugs-crime connection may reveal whether policies intervening into the economics of drug markets may promise to affect not only drug abuse but crime as well.