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TESTING DRUGS VERSUS TESTING FOR DRUG USE: PRIVATE RISK MANAGEMENT IN THE SHADOW OF CRIMINAL LAW

*Robert J. MacCoun**

INTRODUCTION

The rule of law is often seen as a formal, governmental alternative to informal, social mechanisms for regulating conduct.¹ In this Article, I examine a more indirect manifestation of the rule of law: the indirect effect that criminal law can have on private risk management efforts by individuals and corporations. Formal law can encourage private risk regulation, but it can also distort it.

This Article examines the chemical testing of psychoactive drugs. Trained technicians in commercial laboratories routinely employ a common technology—gas chromatography/mass spectrometry (GC/MS)—to test samples for the presence of illicit psychoactive substances as well as for dangerous or benign adulterants. One of these laboratories, LabCorp, provides occupational testing services for corporate clients.² Another, Drug Detection Laboratories (DDL), conducts GC/MS screening of samples provided by DanceSafe, EcstasyData.org, and the Multidisciplinary Association for Psychedelic Studies (MAPS).³ LabCorp's samples are obtained from corporate clients' random or systematic urine testing of their prospective and existing employees. DDL's samples come from anonymous Ecstasy consumers who seek information on the potential presence of adulterants in samples they have purchased illicitly.

This Article explores the remarkably different normative and behavioral consequences that follow from the use of the same basic labo-

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1. See, e.g., DONALD BLACK, *THE BEHAVIOR OF LAW* 107 (1976) ("Law varies inversely with other social control." (emphasis omitted)).

2. LabCorp Solutions: Toxicology Frequently Asked Questions, <http://www.labcorpsolutions.com/toxicfaq.html> (last visited Feb. 5, 2007).

3. EcstasyData.org: Data Frequently Asked Questions, http://www.ecstasydata.org/about_data_faq.php#gcms (last visited Feb. 5, 2007).

ratory protocol to test for illicit drug use (use testing)⁴ and for illicit drug safety (safety testing).⁵ My primary interest is in testing practices conducted by private citizens rather than agents of the legal system. At first glance, one might think that safety testing and use testing have little shared relevance. I do not contend that they are mutually exclusive alternatives. Both use testing and safety testing are intended to reduce harms, and each presumes to do so indirectly, by influencing the decision to ingest a drug. But these practices exemplify two distinctly different strategies for thinking about the management of risky behaviors—*prevalence reduction* and *harm reduction*. Prevalence reduction seeks to reduce the number of people engaging in a given behavior, while harm reduction seeks to reduce the harmful consequences of engaging in such behavior.⁶ Practices and concepts most readily identified with prevalence reduction include abstinence, prevention, deterrence, and incapacitation. Practices and concepts most readily identified with harm reduction include safe-use and safe-sex educational materials, needle exchanges, and the free distribution of condoms to students. Prevalence reduction may be employed in the hope of reducing drug-related harms, but because it directly targets use, any influence on harm is indirect. Harm reduction directly targets harms; any influence on use is indirect.

This Article focuses on the private use of these methodologies. These private uses occur in the shadow of the law, thus criminal law influences—and, to some extent, distorts—their consequences. Criminal law facilitates the intrusive exercise of use testing in workplaces and schools that might otherwise have difficulty implementing it; this is illustrated by the greater prevalence of drug testing than of alcohol testing.⁷ Criminal law also hinders the effective implementation of safety testing, making it easier for sellers to distribute adulterated and often dangerous products. More subtly, criminal law frames the issue of drug use as one of criminal deviance, which encourages some solutions but obscures others. For example, the focus on use testing overlooks the potential benefits of psychomotor testing, which may be

4. I refer to “use testing” as testing an individual’s urine, blood, hair, or saliva for the presence of illicit drugs.

5. I refer to “safety testing” as testing purchased drugs to determine their purity and to detect the presence of adulterants.

6. See ROBERT J. MACCOUN & PETER REUTER, *DRUG WAR HERESIES: LEARNING FROM OTHER VICES, TIMES, AND PLACES* tbl.15.1 at 386 (2001) [hereinafter MACCOUN & REUTER, *DRUG WAR HERESIES*]; Robert J. MacCoun, *Toward a Psychology of Harm Reduction*, 53 *AM. PSYCHOLOGIST* 1199, 1199 (1998) [hereinafter MacCoun, *Psychology of Harm Reduction*].

7. Alcohol testing, however, does occur, which shows that criminal prohibition is not a prerequisite for testing.

more effective in reducing harms.⁸ Thus, both practices are constrained by the criminal laws prohibiting these drugs. This is not an argument for ending drug prohibition, nor do I argue for the superiority of safety testing over use testing, or harm reduction over prevalence reduction.⁹ But this Article suggests a less moralistic, more pragmatic approach to drug policy—an approach that is less speculative than legalization because it has been pursued for decades in the Netherlands, and increasingly in the United Kingdom, Australia, and elsewhere.¹⁰

II. USE TESTING

Part II of this Article presents an empirical review of several studies of use testing. Use testing is examined in several different contexts: in the workplace, in schools, and in the criminal justice system. The results of these studies are surveyed, and the effects of use testing on both prevalence reduction and harm reduction are analyzed.

A. Prevalence of Testing

1. Testing in the Workplace

Workplace drug testing is now fairly common, as exhibited in the 1994 and 1997 versions of the National Household Survey on Drug Abuse (NHSDA).¹¹ These surveys show that 49% of workers in 1997, and 44% in 1994, reported that their workplaces conducted drug testing; testing was more common in large firms (74%) than in medium (58%) or small (28%) firms.¹² According to the American Management Association, the proportion of its members using drug testing rose from 21% to 81% between 1987 and 1996.¹³ The NHSDA study

8. Psychomotor testing involves various tools for assessing physical performance of tasks—e.g., reaction time testing, speed-accuracy trade-offs, and hand-eye coordination. See *infra* Part II.D.

9. See generally MACCOUN & REUTER, *DRUG WAR HERESIES*, *supra* note 6.

10. See Robert MacCoun & Peter Reuter, *Preface: The Varieties of Drug Control at the Dawn of the Twenty-First Century*, 582 *ANNALS AM. ACAD. POL. & SOC. SCI.* 7, 10–11 (2002); Robert J. MacCoun & Peter Reuter, *Does Europe Do It Better?: Lessons from Holland, Britain and Switzerland*, *NATION*, Sept. 20, 1999, at 28.

11. The 1994 and 1997 NHSDA reports each included a special module of items assessing respondents' workplace characteristics. See SAMHSA, DEP'T OF HEALTH & HUMAN SERVS., *WORKER DRUG USE AND WORKPLACE POLICIES AND PROGRAMS: RESULTS FROM THE 1994 AND 1997 NATIONAL HOUSEHOLD SURVEY ON DRUG ABUSE (1999)*, available at <http://www.oas.samhsa.gov/NHSDA/A-11/WrkplcPly2.htm> [hereinafter *NHSDA RESULTS*].

12. *Id.* §§ 5.1, 5.3.

13. NAT'L RESEARCH COUNCIL, *INFORMING AMERICA'S POLICY ON ILLEGAL DRUGS: WHAT WE DON'T KNOW KEEPS HURTING US* 198 (Charles F. Manski et al. eds., 2001) [hereinafter *INFORMING AMERICA'S POLICY*].

found that pre-employment testing was more common (39%) than either testing for cause (30%) or random testing (25%).¹⁴ Similarly, a National Institute on Drug Abuse (NIDA) survey of workplace drug testing data in the early 1990s found that pre-employment testing was more common (44% of testing firms) than random testing (27% of testing firms).¹⁵

In the NHSDA study, about 8% of full-time workers reported using illicit drugs during the month; a similar share reported heavy alcohol use.¹⁶ Full-time workers accounted for 70% of current illicit drug users aged 18 to 49.¹⁷ Because the household survey likely excluded a sizeable fraction of the addicted population, the true employment rate among current drug users is surely lower.¹⁸ Nevertheless, this suggests an upper-bound estimate that a third (viz., 49% x 70% = 34%) of current adult drug users are subject to drug-testing surveillance.

2. *Testing in Schools*

In the 1998 Monitoring the Future survey of high school seniors, 14% of schools and 16% of students reported having some form of drug testing.¹⁹ Similar testing rates (16% of schools and 16% of students) were found in 2001.²⁰ A somewhat lower rate was reported by the National Study of Delinquency Prevention in Schools (NSDPS), which relied on administrative rather than student respondents. It found that from 1997 to 1998, “approximately 9 percent of secondary schools conduct[ed] some sort of testing program, presumably focused on athletes.”²¹ This estimate covers a time period just after the Supreme Court held in *Vernonia School District 47J v. Acton*²² that mandatory drug testing of student athletes is legal under the Fourth

14. NHSDA RESULTS, *supra* note 11, fig.5.1.

15. NAT'L ACAD. OF SCIS., UNDER THE INFLUENCE?: DRUGS AND THE AMERICAN WORK FORCE 77 (Jacques Normand et al. eds., 1994) [hereinafter UNDER THE INFLUENCE].

16. NHSDA RESULTS, *supra* note 11, tbl.1.1.

17. *Id.*

18. See Peter Reuter, *Drug Use Measures: What Are They Really Telling Us?*, NAT'L INST. JUST. J., Apr. 1999, at 13 (discussing the underrepresentation of hard-core users in household surveys).

19. Ryoko Yamaguchi et al., *Relationship Between Student Illicit Drug Use and School Drug-Testing Policies*, 73 J. SCH. HEALTH 159 tbl.1 at 160 (2003).

20. *Id.*

21. INFORMING AMERICA'S POLICY, *supra* note 13, at 203. The NSDPS final reports do not appear to present any results on drug testing. See GARY D. GOTTFREDSON ET AL., U.S. DEP'T OF JUSTICE, NATIONAL STUDY OF DELINQUENCY PREVENTION IN SCHOOLS (2000), available at <http://www.ncjrs.org/pdffiles1/nij/grants/194129.pdf>; U.S. DEP'T OF JUSTICE, TOWARD SAFE AND ORDERLY SCHOOLS—THE NATIONAL STUDY OF DELINQUENCY PREVENTION IN SCHOOLS (2004), available at <http://www.ncjrs.gov/pdffiles1/nij/205005.pdf>.

22. 515 U.S. 646 (1995).

and Fourteenth Amendments. A later opinion by Justice Clarence Thomas in *Board of Education of Independent School District No. 92 of Pottawatomie County v. Earls*²³ further established student drug testing by holding that it “is a reasonably effective means of addressing the School District’s legitimate concerns in preventing, deterring, and detecting drug use” among schoolchildren.²⁴

3. *Testing in the Criminal Justice System*

Most of what we know about drug use among arrestees comes from urinalyses conducted for research purposes, rather than for criminal processing. Drug testing of arrestees is rare, except in Washington, D.C. and jurisdictions participating in the Treatment Alternatives for Special Clients (TASC)²⁵ program or the recently cancelled Arrestee Drug Abuse Monitoring (ADAM) program. Most probationers and parolees are technically subject to testing, but it is very infrequent.²⁶ Based on his recent study in Los Angeles, San Diego, and Santa Cruz Counties, Professor Mark Kleiman and his colleagues argue that testing of probationers is an inadequate means of surveillance and monitoring:

Once-a-week testing produces about a 35% chance of detecting any given incident of drug use; twice a week pushes that figure above 80%. By contrast, a probationer tested once a month—a far more typical pattern in the three departments studied—has less than one chance in ten of being detected for any given incident of use.²⁷

One might assume that the criminal justice system occupies the most intrusive and punitive end of the drug testing spectrum, but Eric Wish and Bernard Gropper of the National Institute of Justice note that in such settings “a single positive test result will seldom have the drastic consequences it can have in the employment setting.”²⁸ They argue that “[t]he level of recent drug use in the offender population is so high that it would be counterproductive to attempt to revoke pro-

23. 536 U.S. 822 (2002).

24. *Id.* at 837.

25. TASC originally stood for the “Treatment Alternatives to Street Crimes,” but now stands for the “Treatment Alternatives for Special Clients.”

26. See Adele Harrell & Mark Kleiman, *Drug Testing in Criminal Justice Settings*, in TREATMENT OF DRUG OFFENDERS: POLICIES AND ISSUES 149 (Carl G. Leukefeld et al. eds., 2002); Eric D. Wish & Bernard A. Gropper, *Drug Testing by the Criminal Justice System: Methods, Research, and Applications*, 13 CRIME & JUST. REV. RES. 321, 354 (1990); D. Alan Henry & John Clark, *Pretrial Drug Testing: An Overview of Issues and Practices*, BUREAU JUST. ASSISTANCE BULL., July 1999, at 1.

27. Mark A.R. Kleiman et al., *Opportunities and Barriers in Probation Reform: A Case Study of Drug Testing and Sanctions*, 14 CAL. POL’Y RES. CTR. BRIEF, June 2002.

28. Wish & Gropper, *supra* note 26, at 334.

bation or parole or incarcerate all persons who tested positive.”²⁹ Instead, a positive test is usually “used to trigger more assessment, testing, or supervision and not to punish people or deprive them of their liberty.”³⁰

B. Testing Results

Quest Diagnostics, “the leading provider of employer drug testing services in the United States,” publishes a regular *Drug Testing Index* summarizing its results.³¹ Between January 2005 and June 2005, Quest conducted over 3.6 million drug tests; the positivity rate was 5% for the general U.S. workforce and 2% for federal workers in safety-sensitive positions.³² The results show a general decline in positivity rates in recent years, particularly for marijuana. An early 1990s NIDA survey of workplace drug testing found that almost 4% of samples were positive for an illicit substance: 2% for marijuana, 1% for cocaine, and less than 1% for opiates and benzodiazepines.³³ Positive rates were highest in the construction sector at 6%, compared to only 3% for the retail sector and 2% for both the manufacturing and transportation sectors.³⁴

Not surprisingly, positive drug test rates are dramatically higher among criminal justice arrestees. The National Institute of Justice began collecting systematic drug testing data from arrestees with its Drug Use Forecasting (DUF) program in 1988. An improved methodology, the ADAM program, was implemented in 2000.³⁵ The most recent data available are from 2000.³⁶ In that year, more than half of thirty-five sites reported that 64% or more of their male arrestees tested positive for either cocaine, opiates, marijuana, methamphetamine, or PCP (the NIDA-5).³⁷ The most common drugs present were marijuana (40%) and cocaine (30%).³⁸

Any consideration of drug test results should be qualified by the serious limitations of existing testing methods. Blood testing is the

29. *Id.* (citation omitted).

30. *Id.* at 335.

31. Quest Diagnostics Drug Testing Index: Employer Solutions, http://www.questdiagnostics.com/employersolutions/DTI_11_2005/dti_index.html (last visited Feb. 5, 2007).

32. *Id.*

33. UNDER THE INFLUENCE, *supra* note 15, at 75.

34. *Id.* fig.3.10 at 79.

35. The program ended on January 29, 2004, depriving criminologists of one of the few systematic tools available for tracking the links between drug use and criminality.

36. U.S. DEP'T OF JUSTICE, 2000 ARRESTEE DRUG ABUSE MONITORING: ANNUAL REPORT (2003), available at <http://www.ncjrs.gov/pdffiles1/nij/193013.pdf>.

37. *Id.* at 1.

38. *Id.*

most accurate method for identifying drug influences at the moment of testing, but it is intrusive, expensive, and rare.³⁹ Urine testing, which is also intrusive, is far more common. But it is a poor indicator of immediate drug status because drugs cannot be detected in urine until they have been metabolized, often many hours after consumption.⁴⁰ Urine testing is particularly sensitive to cannabis use, and can detect use dating back several months for a heavy user, but it is far less likely to detect other “hard” drugs. Saliva and hair testing are less intrusive and are becoming more common. In fact, hair testing can detect use dating back two to three months, and can even date the use with some accuracy.⁴¹

Use testing is vulnerable to false positives due to contaminants (for urine testing), as well as false negatives due to temporary abstention (for blood, urine, and saliva testing), “water loading” (for urine testing), and even a haircut (for hair testing). Detailed advice on defeating a drug test is available on various websites.⁴² For example, false positives for marijuana can be triggered by many different prescription and over-the-counter medications.⁴³

Another reason to be wary of the accuracy of use testing results is problems with sampling. “Random testing” may sound a lot like “random sampling,” but there is selection into and out of the sample, because users and others who object to testing may avoid the testing

39. Erowid Drug Testing Vaults: The Basics, http://www.erowid.org/psychoactives/testing/testing_info1.shtml (last visited Feb. 5, 2007).

40. OFFICE OF NAT'L DRUG CONTROL POLICY, WHAT YOU NEED TO KNOW ABOUT DRUG TESTING IN SCHOOLS 9 (2002), available at http://www.whitehousedrugpolicy.gov/pdf/drug_testing.pdf.

41. For a detailed review of hair testing accuracy, see R. Wennig, *Potential Problems with the Interpretation of Hair Analysis Results*, 107 FORENSIC SCI. INT'L 5 (2000).

42. See, e.g., The Drug Testing FAQ (v.4.11), <http://cocaine.org/drugtestfaq/index.html> (last visited Feb. 5, 2007); Drug Tests Facts & Frequently Asked Questions, http://www.ipassedmydrugtest.com/drug_test_faq.asp (last visited Feb. 5, 2007) [hereinafter Drug Test Facts].

43. According to www.ipassedmydrugtest.com, these drugs include several readily available medications:

Over-the-counter NSAIDS: Ibuprofen; Advil, Nuprin, Mediprim, Motrin, Bayer Select Pain Relief Formula, Excedrin IB Caplets, Genpril, Haltran, Ibuprin, Midol 200, Pamprin, Trendar Cramp Relief Formula, Cramp End Tablets, Medipren, Ruffin, Naproxen, Aleve, Ketoprofen, Orudis KT. Prescription NSAIDS: Anaprox, Tolectin, ifenoprofen, flurbiprofen, oxaprozin, Ansaid, Clinoril, Dolobid, Feldene, Indocin, Lodine, Meclomen, Motrin, Nalfon, Naprosyn, Orudis, Relafen, Voltaren. Over-the-counter allergy preparations, sleep aids and anti-nausea medications that contain promethazine: Phenergan, Promethegan, Riboflavin (vitamin B2), Dronabinol, [and] Edecrin.

Drug Tests Facts, *supra* note 42.

organization altogether—whether it be the military, a workplace, or a school sports program.⁴⁴

C. *Effects on Drug Use*

From a deterrence perspective, use testing should be an effective way to reduce drug use. Aggregate econometric analyses and individual-level “perceptual deterrence” studies suggest four generalizations about drug offenses, drunk driving, and various income-generating crimes: (1) the certainty of punishment has a modest but reliable causal impact on offending rates, even for offenses with very low detection probabilities; (2) the severity of punishment has no reliable impact, either in isolation or in interaction with certainty; (3) the celerity or speed of punishment is important, but post-arrest criminal sanctioning is probably too slow to be effective; and (4) an arrest can trigger informal social sanctions, even in the absence of incarceration.⁴⁵

Use testing increases the certainty of sanctioning, and even when it does not lead to arrest, the consequences of a positive test are effectively punitive, because it damages one’s reputation with family, friends, and colleagues. Nevertheless, support for a general deterrent effect of drug testing is mixed.

The available studies are correlational and hence subject to a variety of inferential problems. It is astonishing that such an intrusive intervention is being implemented so widely in the absence of a carefully controlled experiment group, with random assignment to testing condition either at the individual, site, or organizational level.⁴⁶

On the basis of the special workplace modules, the NHSDA 1994/1997 project noted the effect of information availability in the workplace:

There is evidence that workplace policies matter. Employees in three of the four occupations with the lowest rates of drug use (protective service, extraction and precision production, and administration support) were also among employees in the four occupations

44. For a discussion of the possible consequences of this selection process, see *infra* Part II.D.

45. See NAT’L INST. OF JUSTICE, U.S. DEP’T OF JUSTICE, PERSPECTIVES ON CRIME AND JUSTICE: 1998–1999 LECTURE SERIES 6, 22 (1999), available at <http://www.ncjrs.gov/pdffiles1/nij/178244.pdf>; Robert J. MacCoun, *Drugs and the Law: A Psychological Analysis of Drug Prohibition*, 113 PSYCHOL. BULL. 497, 498–99, 501, 505 (1993) [hereinafter MacCoun, *Drugs and the Law*]; Daniel S. Nagin & Greg Pogarsky, *Integrating Celerity, Impulsivity, and Extralegal Sanction Threats into a Model of General Deterrence: Theory and Evidence*, 39 CRIMINOLOGY 865, 865–66, 873–74 (2001).

46. This complaint applies more generally to most drug policy interventions, with the exception of classroom prevention programs. See INFORMING AMERICA’S POLICY, *supra* note 13, at 188, 198–99.

with the highest rates of drug information and policies in the workplace.⁴⁷

In 1981, the U.S. military implemented a tough “zero-tolerance” drug policy, which imposed mandatory drug testing and threatened job termination for violations. Two studies have examined the effects of the policy. Professor Jerald Bachman and his colleagues used the Monitoring the Future cohort data from young adults who graduated from high school between 1976 and 1995.⁴⁸ They found declining rates of drug use among active duty military personnel and nonmilitary cohort members in the two years after graduation, but beginning in 1981, the rate of decline was steeper for the military group, at least for illicit drugs. This is a pattern “strongly suggestive of causal relationships.”⁴⁹ In a separate study, economists Stephen Mehay and Rosalie Pacula compared NHSDA and Department of Defense health survey data collected before and after the military adopted the zero-tolerance policy.⁵⁰ They estimated a 16% drop in the prevalence of past-year drug use in the military, with a lower bound estimate of 4%.⁵¹

Dr. W. Robert Lange and his colleagues examined the effects of a decision at Johns Hopkins hospital to shift from “for cause” employee testing in 1989 to universal pre-employment testing in 1991.⁵² In 1989, 10.8% of 593 specimens were positive—55% of them for marijuana—and there were seven “walkouts” who refused to be tested.⁵³ In 1991, 5.8% of 365 specimens tested positive—28% for marijuana—with no walkouts.⁵⁴ The authors interpreted these results as evidence of the deterrent effect of drug testing.⁵⁵ But Professors M.R. Levine and W.P. Rennie offer a variety of alternative explanations, including the fact that in 1991 users had advance warning of the test and could ab-

47. NHSDA RESULTS, *supra* note 11, § 7.1.

48. Jerald G. Bachman et al., *Changing Patterns of Drug Use Among US Military Recruits Before and After Enlistment*, 89 AM. J. PUB. HEALTH 672 (1999).

49. *Id.* at 675.

50. Stephen L. Mehay & Rosalie Liccardo Pacula, *The Effectiveness of Workplace Drug Prevention Policies: Does “Zero Tolerance” Work?* (Nat’l Bureau of Econ. Research, Working Paper No. 7383, 1999), available at <http://www.nber.org/papers/w7383>.

51. *Id.* at 21.

52. W. Robert Lange et al., *Preemployment Drug Screening at the Johns Hopkins Hospital, 1989 and 1991*, 20 AM. J. DRUG & ALCOHOL ABUSE 35, 36–38 (1994).

53. *Id.* at 40–41.

54. *Id.*

55. *Id.* at 44–45.

stain, water load, or ingest legal substances that would confound the test.⁵⁶

The most comprehensive study of the effects of school testing on student drug use comes from analyses of data from the Monitoring the Future survey.⁵⁷ This analysis found no measurable association between either random or “for cause” drug testing and students’ self-reported drug use.⁵⁸ The study is cross-sectional, rather than prospective, and is somewhat limited by the relative rarity of exposure to testing.

A more focused test was provided by the “pilot test” of the Student Athlete Testing Using Random Notification (SATURN) project.⁵⁹ During the 1999–2000 academic year, the authors compared two Oregon schools using mandatory drug testing with another school that did not.⁶⁰ Neither students nor schools were randomly assigned to drug testing versus nontesting.⁶¹ The authors reported a significant treatment effect; though statistical details were not presented, the conclusion is apparently based on a difference-in-difference estimate of changes from pre- to post-test in the control versus treatment schools.⁶² But caution is warranted for several reasons. First, although there was a slight decrease in drug use at the treatment schools (33% to 31% for past-month use), the effect is largely attributable to an increase in drug use at the control schools (34% to 42%).⁶³ Because assignment to condition was not random, there is little reason to believe that a similar increase would have occurred at the treatment schools absent testing. Second, most drug use risk factors, including drug use norms, belief in lower consequences of drug use, and negative attitudes toward school, actually *increased* among the target group—athletes at the treatment school.⁶⁴ These puzzling results may

56. M.R. Levine & W.P. Rennie, *Pre-employment Urine Drug Testing of Hospital Employees: Future Questions and Review of Current Literature*, 61 OCCUPATIONAL & ENVTL. MED. 318, 322 (2004).

57. For an initial study, see Yamaguchi et al., *supra* note 19. For an extended analysis adding the 2002 data, see Ryoko Yamaguchi et al., *Drug Testing in Schools: Policies, Practices, and Association with Student Drug Use* (Inst. for Soc. Research, Univ. of Mich. Occasional Paper No. 2, 2003).

58. Yamaguchi et al., *supra* note 19.

59. Linn Goldberg et al., *Drug Testing Athletes to Prevent Substance Abuse: Background and Pilot Study Results of the SATURN (Student Athlete Testing Using Random Notification) Study*, 32 J. ADOLESCENT HEALTH 16 (2003).

60. *Id.* at 17.

61. *Id.* at 24 (“Although there is an experimental and control school, they were not randomized, but rather self-selected.”).

62. *See id.* tbl.3 at 22.

63. *Id.*

64. *Id.* at 22–24.

explain why the study was labeled a pilot test, and why a more ambitious and rigorous follow-up study was launched. Unfortunately, the study was terminated by the Federal Office for Human Research Protection due to human protection concerns.⁶⁵

At present, the evidence suggests that the military's testing program had a deterrent effect, but no such effect was found in workplaces or in schools. Still, the absence of evidence is not evidence of absence. There are very few rigorous studies; low statistical power, noisy measurement, and other factors may hide genuine effects. Alternatively, the military program may be more effective as a deterrent due to differences in its implementation, its target population, its consequences for users, or its institutional setting.

D. Effects on Drug-Related Harm

Proponents of use testing see both use reduction (deterrence) and harm reduction (safety) benefits of testing. In the courts, the harm reduction rationale has generally trumped the use reduction rationale. For example, in *Vernonia*, the Court held that the importance of deterring drug use among schoolchildren "can hardly be doubted."⁶⁶ But the Court focused on the harm reduction benefits of use testing: "[I]t must not be lost sight of that this program is directed more narrowly to drug use by school athletes, where the risk of immediate physical harm to the drug user or those with whom he is playing his sport is particularly high."⁶⁷ The D.C. Circuit has ruled that random testing is an unreasonable invasion of employee privacy except for safety-sensitive positions.⁶⁸ Based on its reading of three Supreme Court decisions,⁶⁹ the Substance Abuse and Mental Health Services Administration has identified four classes of presumptive testing—employees who carry firearms, motor vehicle operators carrying passengers, aviation flight crew members and air traffic controllers, and railroad operating crews—"that are to be included in every plan if such positions exist in the agency."⁷⁰

65. The authors of the SATURN study defended it against these criticisms. Gary T. Chiodo et al., *Orbiting SATURN: Countering Politically-Charged Misinformation with Facts*, 4 AM. J. BIOETHICS 43 (2004).

66. 515 U.S. 646, 661 (1995).

67. *Id.* at 662.

68. *Harmon v. Thornburgh*, 878 F.2d 484 (D.C. Cir. 1989).

69. See *Vernonia*, 515 U.S. 646; *Nat'l Treasury Employees Union v. Von Raab*, 489 U.S. 656 (1989); *Skinner v. Ry. Labor Executives' Ass'n*, 489 U.S. 602 (1989).

70. *Federal Drug-Free Workplace Programs: Guidance for Selection of Testing Designated Positions (TDP's)* (Aug. 2, 1999), <http://dwp.samhsa.gov/FedPgms/Files/TDPs.aspx>.

The National Research Council (NRC) took a comprehensive look at the evidence for a safety-promoting benefit of drug testing in the workplace. They concluded that the evidence linking alcohol and drug use to workplace accidents was largely inconclusive,⁷¹ partly because both workplace accidents and workplace intoxication were relatively rare events:

Despite the wide variety of research in the studies reviewed above, few definitive statements can be made about the impact of using alcohol and other drugs on job performance. The abundance of evidence presented here indicates that the relationship between use and job behaviors and outcomes is clearly negative. However, the magnitude of the relationships found is generally small, and causal spuriousness and direction are problems that have not been adequately addressed in the literature.⁷²

The intuition that drug testing might prevent accidents involves an implicit causal chain: drug use impairs psychomotor functioning, which in turn enhances accident risk. Drug testing is designed to detect drug use, the earliest link in the chain, and hopefully to deter or prevent it. But the model also explicitly demonstrates some of the drawbacks of relying on drug use to prevent accidents. This point is illustrated by the statistical logic of "path analysis," first articulated by mathematician Sewall Wright in 1934.⁷³ In a causal chain (for example, $A \rightarrow B \rightarrow C$) where the effect of a variable at one end (A) on the other end (C) is "mediated" by a variable in the middle (B), the distal $A \rightarrow C$ correlation equals the product of the two intermediate correlations, and will thus be smaller than either one.⁷⁴ Figure 1 demonstrates the consequences for prediction. The percentage of variance in accident risk due to drug use will drop rapidly with less than perfect correlation in the two intermediate links in the chain. At every point,

71. UNDER THE INFLUENCE, *supra* note 15, at 144.

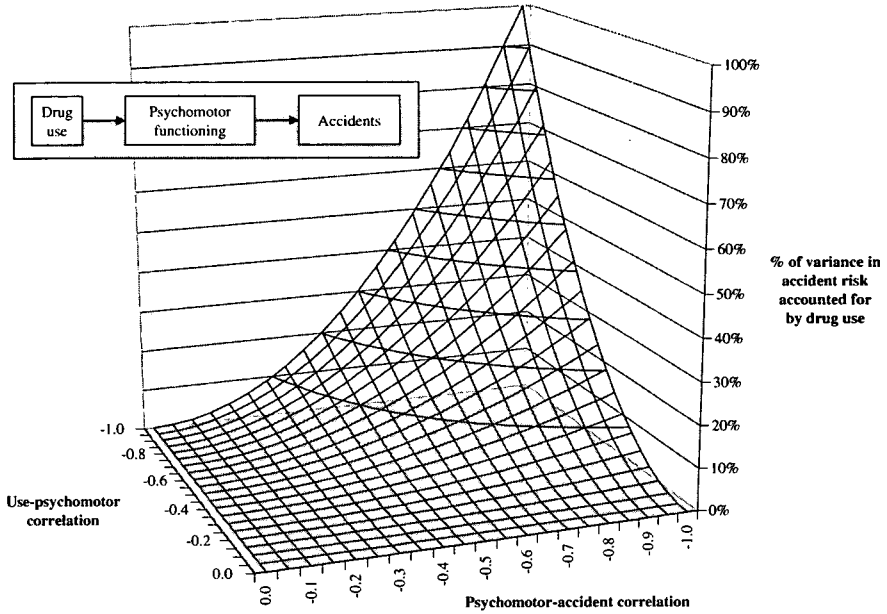
72. *Id.* at 158.

73. Sewall Wright, *The Method of Path Coefficients*, 5 ANNALS MATHEMATICAL STAT. 161 (1934).

74. See generally HERBERT B. ASHER, CAUSAL MODELING (1976); JOHN C. LOEHLIN, LATENT VARIABLE MODELS: AN INTRODUCTION TO FACTOR, PATH, AND STRUCTURAL ANALYSIS (1987); JUDEA PEARL, CAUSALITY: MODELS, REASONING, AND INFERENCE (2000); Reuben M. Baron & David A. Kenny, *The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations*, 51 J. PERSONALITY & SOC. PSYCHOL. 1173 (1986). The use of path analysis to infer causal structure is problematic because of various statistical threats to validity, involving bidirectional association, omitted variables, and measurement error. But my argument is about the actual causal structure among latent constructs, not about the observed relationships among measured indicator variables.

the psychomotor functioning variable will be a better predictor of accidents than the drug use variable.⁷⁵

FIGURE 1: VARIANCE IN ACCIDENT RISK ACCOUNTED FOR BY DRUG USE, IF PSYCHOMOTOR FUNCTIONING MEDIATES THE DRUG-ACCIDENT RELATIONSHIP



A potential objection to this causal chain model is that drug use might have an additional indirect association with accident risk through some common cause, such as poor self-control skills. The NRC committee noted that any observed link between drug use and accidents or work behavior could be spurious, due to common causation by a third variable. The committee offered this hypothesis: “[D]eviance may be a better explanation than impairment of the links between alcohol and other drug use and undesirable work behavior. If so, confronting deviant behaviors and attitudes may be a more effective strategy than narrow antidrug programs for both preventing workplace decrements and treating poorly performing workers.”⁷⁶

From a prediction standpoint, one might argue that drug tests can serve as a double proxy for drug use and low self-control. But psychometrically, a better strategy would be to directly assess low self-con-

75. It is significant to note that the picture is even more bleak because drug tests are an imperfect proxy for drug use.

76. UNDER THE INFLUENCE, *supra* note 15, at 133.

trol and psychomotor functioning, as illustrated in Figure 2. Psychologists and ergonomic specialists have developed a wide variety of valid psychomotor tests, and many are already in use in the military and other "mission-critical" organizations.⁷⁷ The private sector has also begun to recognize the potential advantages of directly testing impaired psychomotor performance.⁷⁸ There are a variety of psychometrically reliable and valid measures of impulsivity, sensation-seeking, and self-control.⁷⁹ More controversially, there are paper-and-pencil "integrity tests" that allow corporations to assess drug and alcohol use, honesty, and other behavioral factors.⁸⁰

Psychomotor testing and integrity testing need not replace drug testing; they can complement it. They may be less intrusive⁸¹ and, in the case of psychomotor testing, more diagnostic of accidents. Of

77. See generally FED. MOTOR CARRIER SAFETY ADMIN., U.S. DEP'T OF TRANSP., *INDIVIDUAL DIFFERENCE AND THE "HIGH RISK" COMMERCIAL DRIVER* (2004); Rebecca S. Spicer et al., *Worker Substance Use, Workplace Problems and the Risk of Occupational Injury: A Matched Case-Control Study*, 64 J. STUD. ON ALCOHOL 570 (2003); R.S. Kennedy et al., *Application of a Computerized Battery of Mental Tests for Driving and Workplace Safety* (presented at the Int'l Conference on Alcohol, Drugs & Traffic Safety, 2000), <http://www.icadts.org/proceedings/2000/icadts2000-149.pdf>.

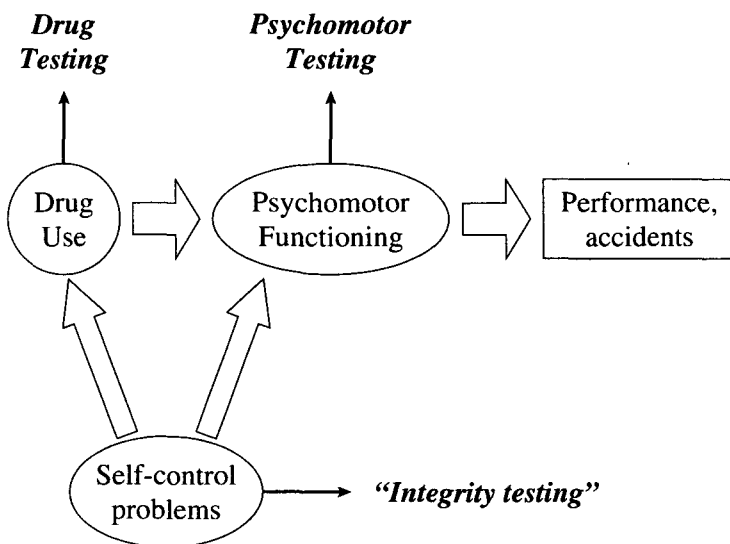
78. See *Vendors Promote Performance Testing as Better Way to Measure Impairment*, NAT'L REP. ON SUBSTANCE ABUSE, Mar. 12, 1993, at 4; National Workrights Institute Impairment Testing, http://www.workrights.org/issue_drugtest/dt_impairment_testing.html (last visited Feb. 5, 2007). In 1995, only 7% of worksites used performance testing. Tyler D. Hartwell et al., *Workplace Alcohol-Testing Programs: Prevalence and Trends*, 121 MONTHLY LAB. REV. 27 tbl.4 at 32 (1998).

79. See G. Scott Acton, *Measurement of Impulsivity in a Hierarchical Model of Personality Traits: Implications for Substance Use*, 38 SUBSTANCE USE & MISUSE 67 (2003); Jeffrey Arnett, *Sensation Seeking: A New Conceptualization and a New Scale*, 16 PERSONALITY & INDIVIDUAL DIFFERENCES 289 (1994); Paula Horvath & Marvin Zuckerman, *Sensation Seeking, Risk Appraisal, and Risky Behavior*, 14 PERSONALITY & INDIVIDUAL DIFFERENCES 41 (1993); Alex R. Piquero & Andre B. Rosay, *The Reliability and Validity of Grasmick et al.'s Self-Control Scale: A Comment on Longshore et al.*, 36 CRIMINOLOGY 157 (1998).

80. See Wayne J. Camara & Dianne L. Schneider, *Integrity Tests: Facts and Unresolved Issues*, 49 AM. PSYCHOLOGIST 112 (1994). In a meta-analysis of 665 estimates, integrity tests had validity coefficients of 0.41 and 0.52 for supervisory ratings of job performance and predicting job accidents, respectively. Deniz S. Ones et al., *Comprehensive Meta-analysis of Integrity Test Validities: Findings and Implications for Personnel Selection and Theories of Job Performance*, 78 J. APPLIED PSYCHOL. 679 (1993). While integrity test performance can be faked, the resulting bias does not eliminate its usefulness. In one study, the predictive validity of the test was 0.26 among fakers. Ronald D. Pannone, *Predicting Test Performance: A Content Valid Approach to Screening Applicants*, 37 PERSONNEL PSYCHOL. 507, 511-12 (1984). This is lower than the validity for nonfakers (0.55), but still higher than typical estimates for the validity of the most popular screening method: the job interview. *Id.* Integrity tests also predict drug and alcohol use, with validity coefficients around 0.30. Frank L. Schmidt et al., *Validity of Integrity Tests for Predicting Drug and Alcohol Abuse: A Meta-analysis*, in NAT'L INST. ON DRUG ABUSE, *META-ANALYSIS OF DRUG ABUSE PREVENTION PROGRAMS* 69, 69 (William J. Bukoski ed., 1997).

81. But one study found that some workers preferred urinalysis testing to personality testing. See Joseph G. Rosse et al., *Personality and Drug Testing: An Exploration of the Perceived Fairness of Alternatives to Urinalysis*, 10 J. BUS. & PSYCHOL. 459 (1996).

FIGURE 2: EXPANDED CAUSAL CHAIN



course, psychomotor testing will pick up impaired performance due to factors other than drug use—alcohol consumption, age, lack of sleep, depression, and so on. Some of these other factors are preventable. Hence, a program of random psychomotor testing may well be an effective deterrent against drug use, but also against alcohol use, sleep deprivation, and other factors that impair safety. At the same time, not everyone who is using a psychoactive drug will show impaired performance on such tests. The NRC notes that “many employees who do work under the influence may be able to compensate for their impairment, and there is a substantial amount of variation across individuals as to how a specific drug at a given dose affects performance.”⁸²

As discussed below, this illustrates the tension between the “criminal deviance” and “safety regulation” framings of the problem. It also calls into question the relative importance of the stated motives for use testing: deterring drug use and preventing accidents. A preference for drug testing over psychomotor testing suggests that use testing is really about drug control rather than safety. This is also shown by the fact that drug testing is more common than alcohol testing,⁸³ even though the link between alcohol and accidents is better estab-

82. UNDER THE INFLUENCE, *supra* note 15, at 145.

83. One article presented these statistics:

Clearly, drug testing is still more prevalent than alcohol testing. For example, 36.0 percent of worksites with more than 50 employees conduct alcohol testing for applicants or current employees or both, while the corresponding prevalence for drug testing is 53.7 percent. . . . By contrast, 20.2 percent of worksites test for drugs, but do not test

lished.⁸⁴ Granted, it may be easier to consume alcohol without intoxication than cannabis or other drugs.⁸⁵ And alcohol is far more prevalent, meaning far more positive test results—though from a safety perspective that is not much of an argument at all.

Use testing may also have some unintended consequences. Theoretically, it could encourage users to substitute less detectable intoxicants. In 1995, 20% of worksites tested for illicit drugs but not for alcohol.⁸⁶ The most commonly tested substances are the NIDA-5: marijuana, cocaine, PCP, opiates, and amphetamines. Thus, users might shift from the NIDA-5 to other illicit drugs like MDMA (Ecstasy) and barbiturates, or from illicit drugs to alcohol. I am unaware of studies examining such substitution effects,⁸⁷ but these effects have been linked to other policies. There is some evidence that users substitute marijuana for hard drugs when marijuana is decriminalized,⁸⁸ and that users substitute marijuana for alcohol when the legal drinking age is raised⁸⁹ or beer prices increase.⁹⁰ Because marijuana has the longest window of detectability in urinalysis, one might see a shift toward less readily detectable substances like MDMA, amphetamines, and barbiturates.

A related concern is that use testing will drive users away from testing organizations—workplaces, schools, sports teams, and the military. This might make those particular organizations safer, but it displaces the harm to other settings where use might even escalate. Professor Robert Taylor offers a formal model of this mechanism, ar-

for alcohol. . . . [T]he prevalence of drug testing for applicants is more than twice that of alcohol testing (45.9 percent, versus 21.7 percent).

Hartwell et al., *supra* note 78, at 30 (citation omitted).

84. See WAYNE HALL & ROSALIE LICCARDO PACULA, *CANNABIS USE AND DEPENDENCE: PUBLIC HEALTH AND PUBLIC POLICY* 39–45 (2003).

85. On the other hand, some illicit drugs (for example, cocaine and amphetamines) in modest doses *improve* psychomotor functioning, as American and other militaries have long known.

86. Hartwell et al., *supra* note 78, exhibit 1 at 29.

87. One study presents evidence consistent with a shift from marijuana and cocaine use to increased alcohol use among tested athletes relative to nontested athletes, although the authors did not draw such a conclusion, and the design precludes causal inference. See Robert H. Coombs & Frank J. Ryan, *Drug Testing Effectiveness in Identifying and Preventing Drug Use*, 16 *AM. J. DRUG & ALCOHOL ABUSE* 173 (1990).

88. See Karyn E. Model, *The Effect of Marijuana Decriminalization on Hospital Emergency Room Drug Episodes: 1975–1978*, 88 *J. AM. STAT. ASS'N* 737 (1993).

89. See John DiNardo & Thomas Lemieux, *Alcohol, Marijuana, and American Youth: The Unintended Consequences of Government Regulation* (Nat'l Bureau of Econ. Research, Working Paper No. 4212, 1992).

90. Frank J. Chaloupka & Adit Laixuthai, *Do Youths Substitute Alcohol and Marijuana? Some Econometric Evidence*, 23 *E. ECON. J.* 253, 273 (1997) (“[T]he results presented here imply that the combination of higher full prices for alcoholic beverages and a lower full price for marijuana will reduce the probability of youth motor vehicle accidents, both fatal and non-fatal.”).

guing that random testing of student athletes will have offsetting effects:

1. Use will decrease among those inframarginal athletes who continue to participate.

2. Use will likely increase among those marginal athletes who cease to participate.

The net effect on overall student drug use is ambiguous in sign—overall student drug use may fall or rise after the imposition of testing, and any reduction achieved will likely be smaller than expected.

....

... Holding overall use fixed, redistributing drug use from low-level users to high-level users may be considered undesirable, especially if the negative health effects are very small for low-level use but extremely large for high-level use.⁹¹

A similar argument is suggested by “labeling theory” in criminology.⁹² Labeling theory predicts that legal controls can actually enhance the likelihood of future offenses if the stigma associated with criminal sanctioning alienates the individual from conventional society. Alienation encourages contact with criminally involved referent groups, and weakens the reputational costs that may restrain deviance—thus creating a self-fulfilling prophecy.

Evidence supports this prediction, but the results are not conclusive. Neither Mehay and Pacula nor Bachman found any evidence linking past drug use to self-selection into the military.⁹³ On the other hand, using the 1994 NHSDA survey, John Hoffmann and Cindy Larison of the National Opinion Research Center found that those using marijuana or cocaine at least weekly were more likely to work for companies that had no testing program.⁹⁴ And the NHSDA 1994/1997 workplace analysis suggested that current users were more likely than nonusers to say they would avoid working for an employer who conducts pre-employment screening (22% versus 4%), random drug testing (29% versus 6%), or “for cause” testing (24% versus 10%).⁹⁵

III. SAFETY TESTING

Part III of this Article presents a review of several studies of safety testing. Safety testing is examined from its initial use in the 1970s to

91. Robert Taylor, *Compensating Behavior and the Drug Testing of High School Athletes*, 16 CATO J. 351, 353–62 (1997).

92. See generally JOHN BRAITHWAITE, *CRIME, SHAME AND REINTEGRATION* (1989).

93. See generally Bachman et al., *supra* note 48; Mehay & Pacula, *supra* note 50.

94. John Hoffmann & Cindy Larison, *Drugs and the Workplace* 9 (Nat'l Opinion Research Ctr. at the Univ. of Chi., 1998), available at <http://www.norc.org/new/drugwork.pdf>.

95. NHSDA RESULTS, *supra* note 11, tbl.5.4.

its current use in the so-called Rave era. The results of these studies are surveyed, and the effects of safety testing on both prevalence reduction and harm reduction are analyzed.

A. *Prevalence of Testing*

1. *The Seventies*

Even in its heyday, safety testing of illicit drugs was extremely rare. Between roughly 1972 and 1984, safety testing was conducted by independent local laboratories run by universities, nonprofits, and health centers.⁹⁶ These laboratories tested anonymous samples dropped off at street locations or submitted through the mail. The samples included a wide variety of illicit substances, including cannabis products, amphetamines, barbiturates, opiates, and various psychedelic drugs. Although these laboratories were scattered around the country, relatively few communities had a local center, and the utilization of national services was sparse. For example, PharmChem's national testing program—the largest such program in the 1970s—analyzed a total of 10,778 samples alleged to be cocaine between 1973 and 1983.⁹⁷ In 1982, PharmChem's busiest year of cocaine testing, they received 1385 samples.⁹⁸ But there were at least 3 million U.S. cocaine users in 1973, and at least 12 million in 1983.⁹⁹ Under the most optimistic assumption that each sample came from a different user, only 0.012% of all users participated in their testing. Even if PharmChem accounted for only 1% of the national market for street testing—almost certainly far below their actual share—that would still imply that only 1% of all users had samples tested that year.

2. *The Rave Era*

The picture is similar for the late 1990s and early 2000s. DanceSafe is the major source of samples for the EcstasyData.org testing operation.¹⁰⁰ EcstasyData.org tested only 1521 samples alleged to be

96. See John K. Brown & Marvin H. Malone, *Some U.S. Street Drug Identification Programs*, NS13 J. AM. PHARMACEUTICAL ASS'N 670, 670–71 (1973); Edward R. Kealy & Randall Webber, *An Interpretation of Trends in Street Drug Analysis Programs: Whom Do They Serve?*, 7 J. PSYCHEDELIC DRUGS 281 (1975).

97. Charles L. Renfroe & T.A. Messinger, *Street Drug Analysis: An Eleven Year Perspective on Illicit Drug Alteration*, 1 SEMINARS ADOLESCENT MED. 247 tbl.1 at 248 (1985).

98. *Id.*

99. SUSAN S. EVERINGHAM & C. PETER RYDELL, *MODELING THE DEMAND FOR COCAINE* xi–xiii (1994).

100. DanceSafe: Local Chapters, <http://www.dancesafe.org/localchapters.php> (last visited Feb. 5, 2007).

MDMA between 1996 and 2006.¹⁰¹ To put this in perspective, in 2001 an estimated 3.2 million Americans used MDMA at least once¹⁰²—1.7 million of them for the first time.¹⁰³ In that year, DanceSafe tested only 332 samples, which accounted for at most 0.01% of users, and this time their operation nearly cornered the market.

At present, use testing is far more common than safety testing. While safety testing may have an important impact on the lives of those who submit samples, they account for only a negligible fraction of users. Thus, any aggregate impact of safety testing must be due to the diffusion of this information and its use by rave organizers and harm reduction activists.

The low prevalence of safety testing is not difficult to explain. The legal risk to participants is the most obvious factor,¹⁰⁴ but there are others. Volunteering a useable sample means giving away a valuable commodity. And the test results, once publicized, are a public good, and hence subject to free riding by nonparticipants. Another consideration is the high cost. Most of the 1970s testing programs appear to

101. EcstasyData.org: Ecstasy Lab Testing Simple Statistics, <http://www.ecstasydata.org/data-stats.php?row=summary&col=year&percent=0> (last visited Feb. 5, 2007).

102. SAMHSA, U.S. Dep't of Health & Human Servs., Illicit Drug Use Table H.1, http://www.oas.samhsa.gov/NHSDA/2k1NHSDA/vol2/appendixh_1.htm (last visited Feb. 5, 2007):

103. SAMHSA, U.S. Dep't of Health & Human Servs., Incidence Table 4.8A, <http://www.oas.samhsa.gov/NSDUH/2k4nsduh/2k4tabs/Sect4peTabs1to50.htm#tab4.8a> (last visited Feb. 5, 2007).

104. I have found surprisingly little discussion of the legal status of anonymous testing. By definition, the samples are illegal, and I presume that only those laboratories with a specific DEA license to handle illicit drugs may do so without legal risk. A website discussion of Ecstasy test kits offered the following frequently asked question and response:

There is some question as to the legal status of testing kits in the U.S. Many states include wording in their paraphernalia laws which include[s] anything which "identify, analyze, or test" scheduled substances. This wording is not included in the federal paraphernalia laws. Arguably, the ecstasy testing kits do not fit within this category as they only verifiably test for the absence of MDMA or other controlled substances. (i.e. if a sample does not turn a color, we can be reasonably sure that there is no MDMA present, however if the sample turns black it could mean that [MDMA] is present or it could indicate the presence of another completely unrelated substance).

These kits have been widely available for over a year and we have heard of no legal problems either with their sale or possession. We know this isn't a very satisfactory answer, but the U.S. legal system is often confusing on points like this. As a general rule, if people aren't being prosecuted for it, it's unlikely that you will be.

Because it's not federally illegal, importation should not cause any legal problems, but many people choose to avoid having to deal with customs by order [sic] from a vendor on their own continent. We do not currently have any information about the legality of testing kits in countries other than the United States.

Erowid MDMA Vault: Ecstasy Testing Kit FAQ, http://www.erowid.org/chemicals/mdma/mdma_faq_testing_kits.shtml (last visited Feb. 5, 2007).

have collapsed due to loss of funding rather than legal intervention, and few users can or will pay the high cost of screening.¹⁰⁵

B. Testing Results

1. The Seventies

Table 1 shows variations in the purity of amphetamine and cocaine samples at several testing centers from 1973 to 1983. The results cover different time spans and geographic locations, so the lack of convergence is not meant to indicate the reliability of the estimates. But the data suggest that street drug buyers were extremely vulnerable to fraudulent sales. For three of five laboratories, a majority of samples alleged to be amphetamines contained adulterants; at two sites, 50% to 67% of the tested samples contained *only* substances other than amphetamines. For cocaine, the quality was more predictable, but in the three laboratories for which data are available, at least 33% of the tested cocaine samples were adulterated, and about 20% contained no cocaine at all.

TABLE 1: PERCENT OF AMPHETAMINE AND COCAINE SAMPLES THAT WERE ADULTERATED, VARIOUS LABORATORIES, 1971-1983.¹⁰⁶

PROGRAM	Amphetamine				Cocaine			
	#	Same as alleged	Alleged + adulterants	Adulterants only	#	Same as alleged	Alleged + adulterants	Adulterants only
Analysis Anonymous (PharmChem), 1973-1983	2018	12%	21%	67%				
LA County Street Drug Identification Program, 1971-1980	473	27%	23%	50%	614	58%	23%	19%
Univ. of the Pacific, early 1970s	68	54%	18%	28%	27	67%	19%	15%
LAC-USC Med. Ctr., early 1970s	123	18%	45%	37%	100	57%	23%	20%
Metro Drug Awareness, early 1970s	46	72%	4%	24%				

105. The EcstasyData.org website currently addresses the excessive costs:

Ecstasy Testing Project Currently Out Of Funds (Aug 1, 2005). The Ecstasy Testing Program has run out of funds. Testing costs \$1,700 per month in laboratory fees for 15 pills / month with a \$30 co-pay. If you would like to pay for the entire lab cost for the pill (\$115 USD), you can have your pill tested.

EcstasyData.org: Ecstasy Lab Testing & Analysis Results, <http://www.ecstasydata.org/> (last visited Feb. 5, 2007).

106. J.K. Brown & M.H. Malone, *Status of Drug Quality in the Street-Drug Market—An Update*, 9 CLINICAL TOXICOLOGY 145 tbls.5-6 at 154-55 (1976); Renfroe & Messinger, *supra* note 97, tbl.3 at 251; Edward C. Klatt et al., *Misrepresentation of Stimulant Street Drugs: A Decade of Experience in an Analysis Program*, 24 CLINICAL TOXICOLOGY 441 (1986).

Table 2 shows data from the national testing program of PharmChem's Analysis Anonymous for 1973 to 1983. The likelihood of adulteration varied considerably across years. This reflects small sample sizes; it may also be influenced by variations in the geographic origin of the samples. But the data suggest that cocaine and MDMA were less likely than amphetamines and methamphetamine to be adulterated with other drugs. But unadulterated samples never exceeded 80% (60% across the full period), and in only one year could users have had a better than 50% chance of buying cocaine without sugar added.

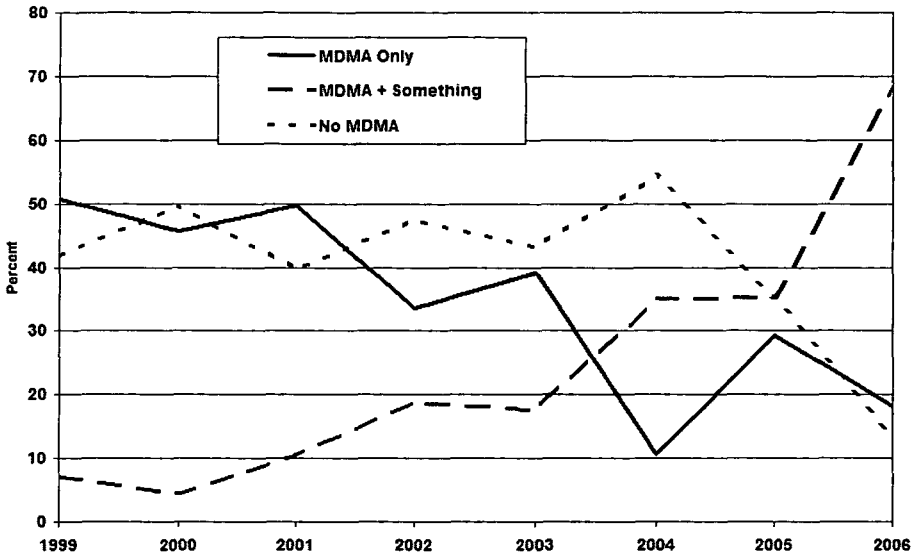
TABLE 2: PERCENT OF UNADULTERATED SAMPLES IN ANALYSIS ANONYMOUS TESTS, 1973-1983¹⁰⁷

	Amphet- amine	Metham- phetamine	Cocaine	Cocaine (no sugar)	MDMA
1973	48%	40%	70%	—	—
1974	25%	33%	63%	25%	—
1975	6%	36%	63%	5%	0%
1976	8%	51%	56%	12%	100%
1977	9%	38%	55%	28%	20%
1978	6%	32%	56%	25%	17%
1979	7%	30%	48%	25%	58%
1980	1%	12%	47%	30%	25%
1981	5%	25%	53%	36%	78%
1982	18%	22%	54%	38%	93%
1983	6%	37%	77%	61%	57%
1984	0%	78%	80%	—	100%
1985	0%	63%	59%	—	52%
Averages	11%	38%	60%	29%	55%

2. *The Rave Era*

Figure 3 plots trends in MDMA samples collected by DanceSafe and other organizations and tested by EcstasyData.org. Over this period—1999 to 2005—sample sizes ranged from 69 to 333. A fairly constant 40% to 50% of the samples contained no MDMA; they instead contained some other stimulant (30%), some near-analogue of MDMA (15%), or a dissociative drug (12%). The rate of pure MDMA dropped from around 50% in 1999-2001 to a low near 10% in 2004, as an increasing number of samples contained MDMA mixed with adulterants. In 2005, samples were equally likely to contain pure MDMA, adulterated MDMA, or no MDMA.

107. Charles L. Renfroe, *MDMA on the Street: Analysis Anonymous*®, 18 J. PSYCHOACTIVE DRUGS 363 fig.2 at 365 (1986).

FIGURE 3: ECTASYDATA.ORG LAB RESULTS 1999–2005¹⁰⁸

Dr. Matthew Baggott and his colleagues published a more systematic analysis of 107 Ecstasy street samples in the *Journal of the American Medical Association* in 2000.¹⁰⁹ They found that 29% “contained identifiable drugs but no MDMA or analogue.”¹¹⁰ Twenty-three pills contained the antitussive dextromethorphan, which can be dangerous in high doses or in combination with MDMA.¹¹¹ Other pills contained caffeine, ephedrine, pseudoephedrine, and salicylates; nine contained no drugs at all.¹¹²

There are two reasons to expect any given test result to be far more accurate for safety testing than for use testing. First, with safety testing, samples come from intended users who label what the sample is alleged to be (MDMA, etc.). Thus, there is no risk of falsely identify-

108. Figure 3 is the plot of EcstasyData lab results for 1999–2005. EcstasyData.org: Ecstasy Lab Testing Sample Statistics—Ecstasy Pill Reports, <http://www.ecstasydata.org/datastats.php?row=summary&percent=1> (last visited Feb. 5, 2007).

109. Matthew Baggott et al., Research Letter to the Editor, *Chemical Analysis of Ecstasy Pills*, 284 J. AM. MED. ASS’N 2190 (2000).

110. *Id.*

111. *Id.*

112. *Id.* A recent literature review paints a different picture; it argues that “non-MDMA tablets are now very infrequent, with purity levels between 90% and 100%” and that “[t]he [E]cstasy purity problem was predominantly a phenomenon of the mid to late 1990s, when many tablets contained substances other than MDMA.” A.C. Parrott, *Is Ecstasy MDMA? A Review of the Proportion of Ecstasy Tablets Containing MDMA, Their Dosage Levels, and the Changing Perceptions of Purity*, 173 PSYCHOPHARMACOLOGY 234, 234 (2004). But most of Professor Parrott’s data come from European and Australian sources, where the higher purity rates may be attributable to less vigorous law enforcement. *Id.* at 235–36.

ing a person as a user, and the tester knows what to look for. Second, use testing is necessarily distorted by the fact that the samples come from the body, and are therefore vulnerable to contaminants, water loading, and other factors.

At an aggregate level, test results would seem to be less accurate for safety testing than for use testing, at least for random use testing. Because safety testing is voluntary, there is no coercion or threat to civil liberty, but the samples are also unlikely to be statistically representative. The direction of any selection bias is hard to identify. Safety testing volunteers may be more cautious, wealthier, or better educated, and their samples may disproportionately represent the results of suspicious transactions and dealers. Still, tests of drugs seized by law enforcement agents often show high levels of impurity, despite a very different set of sampling biases.¹¹³

The remarkably low and variable purity rates in the safety testing data have implications for the interpretation of use testing data, as well as other sources of drug indicator data. Typically, use testing targets a specific set of illicit drugs and does not attempt to detect or identify adulterants. Because the samples are not volunteered as drugs or labeled with street names, use testing samples may test negative even when the source was using street drugs. As noted above, such false negatives will occur due to the presence of nontested street drugs, or because the critical sampling periods of the target drugs have passed.¹¹⁴ But the safety testing data suggest that false negatives will also occur because tested individuals who were trying to use a NIDA-5 drug unwittingly used something else. On the other hand, the Drug Abuse Warning Network (DAWN) annual series,¹¹⁵ which records emergency room “drug mentions,” may overstate the link between the mentioned drugs and acute health crises, because someone who mentions a drug may have actually consumed something entirely different.

C. *Effects on Drug Use*

To date, I have not been able to locate any empirical study of the effects of safety testing on levels of drug use. This is hardly surprising; safety testing has always been rare and research on safety testing is

113. Seized samples of heroin and cocaine base in the DEA's System to Retrieve Information from Drug Evidence (STRIDE) database are typically at or below 50% purity. Joel L. Horowitz, *Should the DEA's STRIDE Data Be Used for Economic Analyses of Markets for Illegal Drugs?*, 96 J. AM. STAT. ASS'N 1254, 1257 (2001).

114. See *supra* notes 42–44 and accompanying text.

115. See Jonathan P. Caulkins et al., *Describing DAWN's Dominion*, 22 CONTEMP. DRUG PROBS. 547 (1995).

even rarer.¹¹⁶ Moreover, safety testing is not intended to influence the prevalence of drug use per se; it is intended to prevent harmful consequences and make users more cautious about their behavior.

Still, there are good reasons to consider the question. From a hawkish perspective, one may reasonably ask whether safety testing encourages drug use, either wittingly or unwittingly. Put another way, does safety testing send the wrong message? I have analyzed this question elsewhere and suggested two plausible answers.¹¹⁷

One is a rhetorical mechanism; a harm reduction intervention may encourage use by implying that drug use is acceptable or even desirable. What messages does safety testing send? DanceSafe's statement of purpose describes its goal as harm reduction—protecting the health and safety of “non-addicted, recreational drug users”:

DanceSafe is a nonprofit, harm reduction organization promoting health and safety within the rave and nightclub community. . . .

Our volunteers staff harm reduction booths at raves, nightclubs and other dance events where they provide information on drugs, safer sex, and other health and safety issues concerning the electronic dance community (like driving home safely and protecting one's hearing).

We also provide adulterant screening or pill testing services for [E]cstasy users. Pill testing is an important harm reduction service that saves lives and reduces medical emergencies by helping [E]cstasy users avoid fake and adulterated tablets that often contain substances far more dangerous than real [E]cstasy.

Our information and services are directed primarily towards non-addicted, recreational drug users. Non-addicted drug users are an under-served population within the harm reduction movement, despite the fact that they comprise the vast majority of drug users in our society. While many organizations exist that provide services to drug-dependent individuals, few groups address the needs of the majority of non-addicted, recreational users. We hope to fill this gap. When needed, we will always refer people to appropriate treatment programs.¹¹⁸

They also provide a disclaimer:

Disclaimer: This website provides health and safety information only. We neither condemn nor condone the use of any drug.

116. I would like to note that the entire published literature regarding this topic fits on my desk.

117. See generally MACCOUN & REUTER, *DRUG WAR HERESIES*, *supra* note 6; Robert J. MacCoun, *Anticipating Unintended Consequences of Vaccine-Like Immunotherapies and Depot Medications for Addictive Drug Use*, in *NEW TREATMENTS FOR ADDICTION: BEHAVIORAL, ETHICAL, LEGAL, AND SOCIAL QUESTIONS* 241 (Henrick J. Harwood & Tracy G. Myers eds., 2004); MacCoun, *Psychology of Harm Reduction*, *supra* note 6.

118. About DanceSafe, <http://dancesafe.org/documents/about/index.php> (last visited Feb. 5, 2007).

Rather, we recognize that recreational drug use is a permanent part of our society, and that there will always be people who use drugs, despite prohibition. The drug information we provide, therefore, is meant to assist users in making informed decisions about their use. We do not make the claim, nor do we imply, that the use of any drug can ever be completely safe. All drug use contains inherent risks. We assume no responsibility for how the information on this site is used.¹¹⁹

But it is possible that consumers infer tacit messages from DanceSafe and related organizations. Psycholinguistic theory and research suggest that people readily draw additional inferences that are implied by an actor's conduct, regardless of whether those inferences were endorsed, or even intended, by the actor.¹²⁰ The very way that test results are framed implies that safety testing treats drug use in a less stigmatizing way than use testing does. In safety testing, a positive test is pure, and a negative test denotes failure and contamination. In use testing, it is the positive test that connotes failure; the user is the contaminant.

Second, safety testing may encourage use by changing perceptions of risk. At the margin, a harm reduction mechanism might change a person's assessment of the expected value of taking drugs. If an intervention reduces harm, then at the margin it should increase the attractiveness of the activity for most people. In my earlier treatment of this topic, I reviewed evidence of this mechanism, much of it appearing under the labels "compensatory behavior," "offsetting behavior," or "risk homeostasis."¹²¹ For example, there is strong evidence that people drive faster when they have seat belts and airbags, both in econometric analyses and in controlled experiments on driving test tracks.¹²² People smoke more when they have filters and low-tar cigarettes.¹²³ There is also some evidence that improved HIV treatments are associated with increases in risky sexual behavior.¹²⁴

119. DanceSafe: Parents, <http://www.dancesafe.org/parents/> (last visited Feb. 5, 2007).

120. See generally Richard J. Harris & Gregory E. Monaco, *Psychology of Pragmatic Implication: Information Processing Between the Lines*, 107 J. EXPERIMENTAL PSYCHOL. 1 (1978); Robert S. Wyer, Jr. & Deborah H. Gruenfeld, *Information Processing in Social Contexts: Implications for Social Memory and Judgment*, in 27 ADVANCES IN EXPERIMENTAL SOCIAL PSYCHOLOGY 49 (Mark P. Zanna ed., 1995).

121. MacCoun, *Psychology of Harm Reduction*, *supra* note 6, at 1203.

122. Robert S. Chirinko & Edward P. Harper, Jr., *Buckle up or Slow down? New Estimates of Offsetting Behavior and Their Implications for Automobile Safety Regulation*, 12 J. POL'Y ANALYSIS & MGMT. 270 (1993).

123. INST. OF MED., *CLEARING THE SMOKE: ASSESSING THE SCIENCE BASE FOR TOBACCO HARM REDUCTION* 51 (Kathleen Stratton et al. eds., 2001).

124. Mitchell H. Katz et al., *Impact of Highly Active Antiretroviral Treatment on HIV Seroprevalence Among Men Who Have Sex with Men: San Francisco*, 92 AM. J. PUB. HEALTH 388 (2002); David E. Ostrow et al., *Attitudes Towards Highly Active Antiretroviral Therapy Are Asso-*

How might safety testing have such effects? Conceivably, users who were worried about drug quality in the illicit market may become less worried if they learn through safety testing that drugs are generally pure in the local market. For better or worse, the purity rates presented above suggest little cause for this concern. A somewhat different concern is that the very presence of a safety testing organization, like DanceSafe, might make people feel more comfortable about using MDMA. One survey has examined this possibility.¹²⁵ At McDaniel College in Maryland, 719 students were asked whether they had ever used Ecstasy, and “whether the presence of [DanceSafe] would affect their decision to try [Ecstasy] for the first time or use it (again).”¹²⁶ Among the 75% who had never used, 69% said they would not use under any condition, while 19% said they might be more likely to use under such conditions, and 12% said that if they did decide to use they would not be influenced by the presence of DanceSafe.¹²⁷ Students that had previously used Ecstasy were equally divided between those who thought they might be influenced (51%) and those who did not (49%).¹²⁸

But there are also reasons to think that safety testing, with its discouraging purity statistics, might scare off some drug users. Some fraction of participants who submit samples that turn out “dirty” presumably quit using, scale back their use, or at least delay their use while seeking better samples. And to the extent that other potential users see these statistics, the deterrent effect might be much broader than the limited participation rates indicate.

Do current and potential users consider health risks—and the risk of being ripped off—when they consider drug use? The health risks of illicit drugs have long been a major focus of prevention campaigns, and various studies show that current users worry about these risks.¹²⁹ One such study reported that users and nonusers of MDMA frequently relied on the Internet for information about MDMA (about

ciated with *Sexual Risk Taking Among HIV-Infected and Uninfected Homosexual Men*, 16 AIDS 775 (2002).

125. See Lauren Dundes, *DanceSafe and Ecstasy: Protection or Promotion?*, 17 J. HEALTH & SOC. POL'Y 19 (2003).

126. *Id.* at 23.

127. *Id.* tbl.3 at 26.

128. *Id.* These results should be interpreted cautiously, not only because of the limited sample coverage, but also because people are not accurate judges of how they will behave in a hypothetical situation. See generally Richard E. Nisbett & Timothy DeCamp Wilson, *Telling More Than We Can Know: Verbal Reports on Mental Processes*, 84 PSYCHOL. REV. 231 (1977).

129. See, e.g., Robert G. Carlson et al., *Perceived Adverse Consequences Associated with MDMA/Ecstasy Use Among Young Polydrug Users in Ohio: Implications for Intervention*, 15 INT'L J. DRUG POL'Y 265 (2004).

50% of each group).¹³⁰ Users were more likely to seek information from nongovernment sites (25% of all users) than from government sites (less than 10% of users), and the nongovernment sources were perceived to be more accurate (58% very or mostly accurate) than the government sources (36% very or mostly accurate).

This Article makes no claim that health fears matter more than legal fears. It is surprisingly difficult to find surveys comparing the relative importance of fear of legal risk and fear of health risk. The Monitoring the Future survey conflates the two dimensions by asking, "How much do you think people risk harming themselves (physically or in other ways), if they [try marijuana]." ¹³¹ In the vast literature on drug prevention and on the application of attitudinal theories—reasoned action, planned behavior, and the health belief model—to drug use, there is almost no research directly reporting perceived fear or risk of arrest or other legal sanctions.¹³² On the other hand, the smaller "perceptual deterrence" literature assesses perceived legal risk (mostly for marijuana), but does not examine health concerns.¹³³ A few studies do suggest that health concerns are at least as important as legal risks. An Australian survey by Professors Don Weatherburn and Craig Jones found that those not using cannabis were more likely to cite "worried about your health" (41%) than "[c]annabis is illegal" (29%), "[y]ou are afraid you will be caught by the police" (10%), or "[y]ou have drug testing in your workplace" (13%) as a reason for not using.¹³⁴ And the aforementioned McDaniel College survey, which suggested that people might be influenced by DanceSafe, found that

130. Russel S. Falck et al., *Sources of Information About MDMA (3,4-methylenedidymethamphetamine): Perceived Accuracy, Importance, and Implications for Prevention Among Young Adult Users*, 74 *DRUG & ALCOHOL DEPENDENCE* 45, 48 (2004).

131. Monitoring the Future Data Tables and Figures tbl.7, <http://www.monitoringthefuture.org/data/05data/pr05t7.pdf> (last visited Feb. 5, 2007).

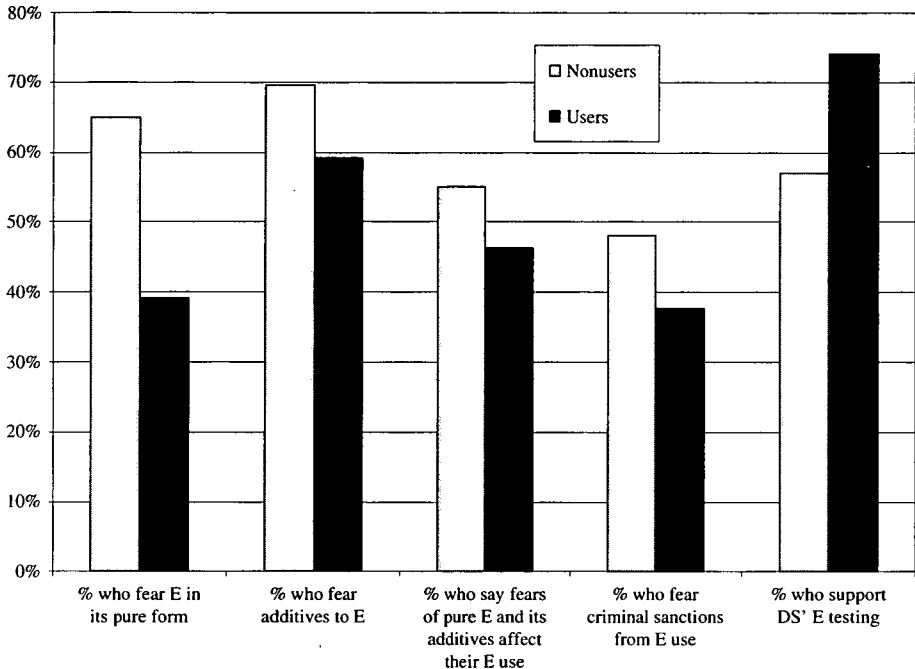
132. Two prominent examples use this approach. Jerald G. Bachman et al., *Explaining Recent Increases in Students' Marijuana Use: Impacts of Perceived Risks and Disapproval, 1976 Through 1996*, 88 *AM. J. PUB. HEALTH* 887 (1998); J. David Hawkins et al., *Risk and Protective Factors for Alcohol and Other Drug Problems in Adolescence and Early Adulthood: Implications for Substance Abuse Prevention*, 112 *PSYCHOL. BULL.* 64 (1992).

133. See generally MacCoun, *Drugs and the Law*, *supra* note 45; Raymond Paternoster, *The Deterrent Effect of the Perceived Certainty and Severity of Punishment: A Review of the Evidence and Issues*, 4 *JUST. Q.* 173 (1987).

134. Don Weatherburn & Craig Jones, *Does Prohibition Deter Cannabis Use?*, 58 *BUREAU CRIME STAT. & RES.*, Aug. 2001, at 1 tbl.2 at 5, available at <http://www.cannabislegal.de/studien/nsw/b58.htm>. This survey was conducted in New South Wales, Australia, a state that retains marijuana criminalization at a time when several other Australian states have decriminalized possession. However, enforcement is still more lax in Australia than in the United States.

both users and nonusers worried more about the purity of Ecstasy than about legal sanctions.¹³⁵

FIGURE 4: SURVEY OF COLLEGE STUDENTS BY DUNDES
E = ECSTASY (MDMA); DS = DANCE SAFE¹³⁶



D. Effects on Drug-Related Harm

Surprisingly, there is no direct evidence on the harm reduction benefits of anonymous safety testing. It is reasonable to assume that those who voluntarily submit samples care about the results, and that the testing allows them to avoid ingesting dangerous or addictive adulterants. If so, we can say that the aggregate impact is small, but the impact on individual participants is meaningful.

But a broader harm reduction benefit occurs through the testing messages posted by safety testing organizations. These messages can be quite specific. For example, DanceSafe and EcstasyData.org post photographs of contaminated or adulterated “brands” of MDMA, together with the date and geographic region of the purchase. I have already reviewed evidence that a sizeable fraction of MDMA users

135. See fig.4.

136. See Dundes, *supra* note 125, tpls.3-4 at 26-27. Both factors were significantly associated with drug use, with $\eta^2(1) = 4.11$ ($p < 0.05$) and 5.95 ($p < 0.02$), respectively.

say they read such information on the web, that they view the information as credible, and that their health and safety matter to them.¹³⁷ So it is possible that for every anonymous sample provider who is helped, there are many more potential users who are also helped. But again, I am not aware of direct evidence of the harms averted by safety testing.

As with use testing, there may be other, less direct consequences, some of which may be undesirable. There may be a substitution from one type of drug to another; for example, users may come to distrust MDMA and seek out other substances. Some of those substances are arguably more benign (e.g., psilocybin); others may be more unhealthy (e.g., alcohol, methamphetamine).

In theory, widespread safety testing could improve the quality of illicit drugs in the marketplace. This provides a stark illustration of the tension between harm reduction and use reduction, because better drug quality should increase demand. But it is difficult to make firm predictions here. In an ordinary market, sellers should charge more for higher quality goods, and buyers should be willing to pay more. In the long run, sellers of low-quality goods can expect to lose customers to sellers offering higher quality goods at the same price. But illicit drugs are not an ordinary market. Professors Jonathan Caulkins and Rema Padman found that prices rose with purity for white and brown heroin and powder cocaine, but surprisingly, they were unable to detect an effect of purity on the prices of crack, methamphetamine, or black tar heroin.¹³⁸ To help explain this puzzle, Professors Peter Reuter and Caulkins detail a number of distinctive features of illicit drug markets, including the multistage distribution networks connecting producers and consumers, uncertainty about quality, turnover of buyers and sellers, and a limited ability to signal quality through consistent branding.¹³⁹ Many of these features produce the kind of informational problems discussed in Professor George Akerlof's classic paper on "the market for lemons."¹⁴⁰ A lemons market occurs when there is an informational asymmetry such that sellers know more than buyers about a good's quality. This asymmetry increases the supply of low-quality goods, and can even collapse the market if potential buyers refuse to make new purchases. One major difference

137. See *supra* notes 130–131 and accompanying text.

138. Jonathan P. Caulkins & Rema Padman, *Quantity Discounts and Quality Premia for Illicit Drugs*, 88 J. AM. STAT. ASS'N 748, 752–53 & tbl.4 (1993).

139. P. Reuter & J.P. Caulkins, *Illegal "Lemons": Price Dispersion in Cocaine and Heroin Markets*, 56 BULL. ON NARCOTICS 141 (2004).

140. George A. Akerlof, *The Market for "Lemons": Quality Uncertainty and the Market Mechanism*, 84 Q.J. ECON. 488 (1970).

from the classic lemons model is the higher likelihood of repeat buyer-seller transactions in drug markets; the retail seller also has imperfect knowledge of and control over quality.

From a use reduction standpoint, the highly variable quality of drugs probably reduces the demand for illicit drugs. But from a harm reduction standpoint, this feature of illicit markets is quite troubling. First, it creates a high risk of overdose and illness, because adulterants have a toxic effect and also because customers have difficulty calibrating their dosage. Second, it encourages disputes between sellers and buyers, and given the illicit nature of their transactions, these disputes cannot be taken to legal authorities and thus frequently result in violence.¹⁴¹

IV. CONCLUSION

In laboratories throughout the United States, technicians in white lab coats are scanning samples with GC/MS equipment. Some of these samples have not yet entered a human body; others come from a body's hair, blood, or urine. The laboratory protocols are similar, but they reflect very different ways of thinking about the control of drug-related harms. Both are shaped—and in some ways distorted—by criminal law and the way it frames the act of drug use as criminal deviance.

Though it still receives heavy criticism,¹⁴² use testing has a far less malevolent public image than it did in 1972, when a piece in the *New England Journal of Medicine* called it “Chemical McCarthyism.”¹⁴³ Today, opinion surveys show that most citizens generally accept drug testing, at least if it is done fairly,¹⁴⁴ and it continues to spread into

141. For a review of evidence, see Robert MacCoun, Beau Kilmer & Peter Reuter, *Research on Drugs-Crime Linkages: The Next Generation*, in NAT'L INST. OF JUSTICE, U.S. DEP'T OF JUSTICE, TOWARD A DRUGS AND CRIME RESEARCH AGENDA FOR THE 21ST CENTURY: SPECIAL REPORT 65 (2003). For a theoretical analysis, see Jonathan P. Caulkins et al., *Can Supply Restrictions Lower Price? Violence, Drug Dealing and Positional Advantage*, 5 CONTRIBUTIONS TO ECON. ANALYSIS & POL'Y 1 (2006).

142. See, e.g., American Civil Liberties Union, Drug Policy: Drug Testing: Press Releases, <http://www.aclu.org/drugpolicy/testing/index.html> (last visited Feb. 5, 2007); Drug Policy Alliance: Drug Testing, <http://www.drugpolicy.org/law/drugtesting/> (last visited Feb. 5, 2007); National Organization for the Reform of Marijuana Laws (NORML), Drug Testing, http://www.norml.org/index.cfm?Group_ID=3406 (last visited Feb. 5, 2007).

143. George D. Lundberg, Letter to the Editor, *Urine Drug Screening: Chemical McCarthyism*, 287 NEW ENG. J. MED. 723 (1972).

144. See INFORMING AMERICA'S POLICY, *supra* note 13, at 198 (“For-cause testing is controversial because it is generally perceived as fair and most likely helps to deter workers from becoming intoxicated on the job.”); Mary A. Konovsky & Russell Cropanzano, *Perceived Fairness of Employee Drug Testing as a Predictor of Employee Attitudes and Job Performance*, 76 J. APPLIED PSYCHOL. 698 (1991); Paul M. Mastrangelo & Paula M. Popovich, *Employees' Attitudes*

more and more schools and workplaces. Use testing advocates try to avoid the undesirable connotations of the criminal deviance framing. In his 2004 State of the Union address, President George W. Bush offered this justification: "Tonight I proposed an additional \$23 million for schools that want to use drug testing as a tool to save children's lives. The aim here is not to punish children, but to send them this message: We love you, and we don't want to lose you."¹⁴⁵ Similarly, a website run by Robert DuPont's Institute for Behavioral Health states that "[s]tudent drug testing programs are designed to prevent drug use, not to *punish* use."¹⁴⁶

Still, it seems clear that criminal law shapes the way use testing has spread. Operating in the shadow of criminal law, use testing has been able to overcome the resistance of those employees and students who resent its intrusive surveillance. The criminal law framing creates a rhetorical asymmetry favoring testing advocates. Those who oppose testing can be covertly or even overtly portrayed as advocates for drug use rather than advocates for civil liberties. And the criminal law framing also makes any nonpenal consequences of a positive test look more benevolent and less intrusive than they might otherwise seem. The criminal deviance framing also distorts thinking about the effective management of risk. It focuses attention on use, but it distracts us from more direct ways of identifying safety risks, like routine psychomotor testing and mental health screening. Finally, the fear of use testing and its social and legal sanctions may drive users away from schools, activities, and jobs that might otherwise benefit them. It may deter some drug use, while displacing other drug use to different settings.

Criminal law has an equally powerful effect on safety testing. In a prohibition regime, there are few incentives for sellers to participate in safety testing—indeed, there are incentives for adulterating drugs—and significant legal risks for users who wish to test their street purchases. Yet a remarkably high number of tested samples are full of adulterants. In 2005, almost 20% of American high school students

Toward Drug Testing, Perceptions of Organizational Climate, and Withdrawal from the Employer, 15 J. BUS. & PSYCHOL. 3 (2000); Bernadette M. Raciot & Kevin J. Williams, *Perceived Invasiveness and Fairness of Drug-Testing Procedures for Current Employees*, 23 J. APPLIED SOC. PSYCHOL. 1879 (1993); Rosse et al., *supra* note 81.

145. President George W. Bush, State of the Union Address (Jan. 20, 2004), available at <http://www.whitehouse.gov/news/releases/2004/01/20040120-7.html>.

146. Prevention Not Punishment: Background, www.preventionnotpunishment.org (last visited Feb. 5, 2007).

used an illicit drug other than marijuana;¹⁴⁷ 12% of eighth graders and 27% of twelfth graders have done so in their lifetimes.¹⁴⁸ Those drugs are already risky, and because those drugs are obtained in an illicit market, their consumers face the additional risk of unknown adulterants. Safety testing not only protects participants from those adulterants, it also provides credible information about the risks of the market in a way that may discourage more use than it encourages.

The expressive and crime-controlling functions of criminal law are often in tension with other social goals, including distributive justice, restorative justice, and risk regulation. The tension is often framed as a contrast between an *ex ante* signal and an *ex post* situation, as in Professor Meir Dan-Cohen's analysis of conduct versus decision rules,¹⁴⁹ or Professor John Braithwaite's analysis of deterrence versus reintegrative shaming.¹⁵⁰ But the contrast between use testing and safety testing involves a tension between three *ex ante* goals: moral expression, deterrence, and consumer safety. Criminal law tells potential users *ex ante* that our society disapproves of drug use, and that we will punish it when it occurs. But empirically, it is clear that the fear of legal sanctions plays only a small role in citizens' decisions about intoxicants. Many will use drugs despite the law and its messages. We routinely provide consumer safety information for a wide variety of risks—cold medicines, lawn mowers, breakfast cereals, and alcoholic beverages. But because MDMA, cocaine, and heroin are illegal, if we provide safety information, we make them less risky but also risk making them more popular.

This tension isn't insurmountable; it is simply a challenge. As with needle and syringe exchanges and free condoms in high schools, the tension between use reduction and harm reduction is a matter of degree. The tension can and should be assessed empirically, and it can be managed skillfully. But it requires us to accept some ambivalence and ambiguity.

147. Monitoring the Future Data Tables and Figures tbl.2, <http://www.monitoringthefuture.org/data/05data/pr05t2.pdf> (last visited Feb. 5, 2007).

148. Monitoring the Future Data Tables and Figures tbl.1, <http://www.monitoringthefuture.org/data/05data/pr05t1.pdf> (last visited Feb. 5, 2007).

149. Meir Dan-Cohen, *Decision Rules and Conduct Rules: On Acoustic Separation in Criminal Law*, 97 HARV. L. REV. 625 (1984).

150. BRAITHWAITE, *supra* note 92.