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Scholastic Steroids: Is Generation Rx Cognitively Cheating?

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“The desire for cognitive enhancement is very strong, maybe stronger than for beauty, or athletic ability.”

Benedict Carey¹

I. INTRODUCTION

Brains + drugs = fried eggs, right?² Not always. Cognitive enhancers are drugs designed to boost mental powers and stamina without turning your brain into runny, white edibles.³ These enhancers affect the brain’s neural processes that trigger memory, attention, learning, and decision making by altering the balance of chemical neurotransmitters.⁴ While America’s favorite cognitive enhancer is caffeine,⁵ other study drugs are the “higher-tech equivalents of NoDoz” or the two pots of coffee that students and professionals otherwise consume to pull all-nighters for presentations, term papers, or final exams.⁶ Such modern caffeine substitutes range from stimulants to narcolepsy pills and are enticingly attractive for an overworked twenty-four-seven society.⁷

In 2008, as cognitive enhancement increasingly became a household name among scientists and academics, Henry Greely, Barbara Sahakian, and

1. Benedict Carey, *Smartening Up: Brain Enhancement is Wrong, Right?*, N.Y. TIMES (Mar. 9, 2008), http://www.nytimes.com/2008/03/09/weekinreview/09carey.html?_r=1&ref=todayspaper&pagewanted=2 (quoting Dr. Barbara Sahakian of Cambridge University); *see also infra* notes 8–9 and accompanying text.

2. See Partnership for a Drug-Free America, *Your Brain on Drugs*, YOUTUBE (Sept. 16, 2008), <http://www.youtube.com/watch?v=3FtNm9CgA6U> (depicting a well-known anti-drug commercial from the 1980s). Drugs can be defined as any chemical agents that affect “living processes that may be ingested through the mouth, the rectum, by injection, or by inhalation.” DAVID A. J. RICHARDS, SEX, DRUGS, DEATH, AND THE LAW: AN ESSAY ON HUMAN RIGHTS AND OVERCRIMINALIZATION 158 (1982).

3. See *Cognitive Enhancement, All on the Mind: Prepare for Drugs That Will Improve Memory, Concentration and Learning*, ECONOMIST, May 22, 2008, at 103 [hereinafter *Cognitive Enhancement, All on the Mind*]; *see also* Joanne Chen, *Can a Pill Make You Smarter? A Series of New Drugs Promises to Increase Our Productivity and Focus*, MARIE CLAIRE (Dec. 15, 2008), <http://www.marieclaire.com/career-money/jobs/pill-for-productivity-focus> (referring to cognitive enhancers as “[c]rack for nerds”).

4. *Cognitive Enhancement, All on the Mind, supra* note 3, at 103.

5. Karen J. Winkler, *Pill-Popping Profs*, CHRON. HIGHER EDUC., Jan. 11, 2008, at B4 (describing the demand for and daily use of caffeine as staggering despite its side effects and addictive qualities).

6. Henry T. Greely, *Remarks on Human Biological Enhancement*, 56 U. KAN. L. REV. 1139, 1143–44 (2008) (discussing the future of cognitive enhancement).

7. Chen, *supra* note 3, at 169; *see, e.g.*, Jason Kirby, *Going to Work on Smart Drugs: Will Employers Pressure Staff to Take Brain Boosters?*, MACLEAN’S (Oct. 1, 2008), http://www.macleans.ca/science/health/article.jsp?content=20081001_98115_98115 (interviewing an aviation operations manager who takes narcolepsy medication as “part of a growing throng of otherwise healthy individuals popping high-powered pharmaceuticals to add some zing to their grey matter”).

several of their colleagues aroused mainstream media attention⁸ when they published a commentary in a prominent science journal that supported the use of cognitive-enhancing medications as a way for healthy adults to boost their mental capabilities.⁹ While they lobbied for general consumption by society, they warned that certain settings warranted closer ethical scrutiny.¹⁰ Specifically, the authors mentioned the two most traditionally worrisome categories for medicinal brain boosting—military personnel¹¹ and school children.¹² Another area of concern, but one far less scrutinized, is the higher-education setting of medical and law schools, where graduate students intensely compete for grades in an environment designed to prepare them for their professional responsibilities.¹³

8. See, e.g., *Go Brain-Boosters*, NEW SCIENTIST, Dec. 13, 2008, at 6; Ginger Rough, *Popularity of Brain-Boost Pills Drives Debate*, ARIZ. REPUBLIC (July 5, 2009), <http://www.azcentral.com/arizonarepublic/news/articles/2009/07/05/20090705braindrugs0705.html>; Judith Warner, *Living the Off-Label Life*, N.Y. TIMES (Dec. 27, 2008), <http://www.nytimes.com/2008/12/27/opinion/27warner.html>. George Annas, Chair of the Department of Health Law, Bioethics, and Human Rights at Boston University, contended that Greely and his co-authors had presented a rather idyllic view of cognitive enhancement that ignored the safety implications. Bernadette Tansey, *Experts Urge Wider Use of Brain-Boosting Drugs*, S.F. CHRON. (Dec. 8, 2008), <http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2008/12/07/MNHG14I85V.DTL>. Annas questioned, “[W]hat were they smoking when they wrote this article?” *Id.*

9. Henry Greely et al., *Towards Responsible Use of Cognitive-Enhancing Drugs by the Healthy*, 456 NATURE 702, 702 (2008); see also *Brain Boosters: How Should We Deal with Cognitive-Enhancing Drugs?*, STAN. MAG., Mar.–Apr. 2009, at 24, 25 [hereinafter *Brain Boosters*], available at <http://www.stanfordalumni.org/news/magazine/2009/marapr/farm/news/greely.html> (in a question-and-answer session, Professor Henry Greely argued that “[e]nhancement is not a dirty word”).

10. Greely et al., *supra* note 9, at 703. Their ethical concerns centered on safety, freedom, and fairness. *Id.* “[M]ore of this [is] coming down the road, and we’re just not prepared as a society yet for how we should deal with good, safe, cognitively enhancing drugs that will almost certainly be available in the next 10 to 20 years.” *Brain Boosters*, *supra* note 9, at 24.

11. See Greely et al., *supra* note 9, at 703; see also Catherine L. Annas & George J. Annas, *Enhancing the Fighting Force: Medical Research on American Soldiers*, 25 J. CONTEMP. HEALTH L. & POL’Y 283, 291 (2009).

12. See Greely et al., *supra* note 9, at 703; see also Ann Chiumino, *Class Action Suits Prompt Governmental Action to Examine Ritalin Use and Regulation*, 13 LOY. CONSUMER L. REV. 380, 388 (2001). However, Greely also contended that scholastic cognitive-enhancement use that enhanced long-term learning is acceptable in non-zero-sum school environments. Greely et al., *supra* note 9, at 704.

13. See *infra* notes 16, 192–93 and accompanying text. Medicinal brain boosting in higher education has barely generated any scrutiny or attention because medical and law school drug users are “driven, healthy A-plus students,” not the traditional cocaine or alcohol abusers. See Nicholas W. Schieffelin, *Maintaining Educational and Athletic Integrity: How Will Schools Combat Performance-Enhancing Drug Use?*, 40 SUFFOLK U. L. REV. 959, 972 (2007). More importantly, their drugs may be legal substances validly obtained through doctors’ prescriptions. Maxwell J. Mehlman, *Cognition-Enhancing Drugs*, 82 MILBANK Q. 483, 492 (2004); see also *infra* notes 122–24 and accompanying text.

In this higher-education context, students who consume cognitive enhancers may be like pupils who are allowed to use calculators on math tests, while others are forced to struggle with paper and pen.¹⁴ Notably, medical and law school students' use of scholastic steroids generates more ethical implications than the rest of society because these students labor within unique ethical frameworks.¹⁵ Their prospective professions embrace values that set them apart from the general public.¹⁶ These students and their professional counterparts work under ethical codes and restrictions promulgated by their respective national associations—the American Medical Association (AMA) produces the *Principles of Medical Ethics*,¹⁷ and the American Bar Association (ABA) publicizes the *Model Rules of Professional Conduct*.¹⁸ These codes govern students' actions throughout the entire educational process.¹⁹ First, applicants must demonstrate integrity

14. See Greely et al., *supra* note 9, at 703–04 (asking educators, academic admissions officers, and credentials evaluators to ensure validity and integrity of examinations by formulating policies addressing cognitive-enhancement drug use).

15. See Linda A. McGuire & Julie Phye, *The Hidden Curriculum in Medical and Law Schools: A Role for Student Affairs Professionals*, 115 *NEW DIRECTIONS STUDENT SERVICES* 59, 63 (2006); see also *infra* notes 16–19 and accompanying text.

16. McGuire & Phye, *supra* note 15, at 63 (explaining that doctors and lawyers are expected to be contributors to the community and role models of service); see also SHAUN D. PATTINSON, *MEDICAL LAW AND ETHICS 2* (1st ed. 2006) (“Medical practice and the law regulating medical practice play out in an overtly moral arena.”). In their education and employment, medical and law school students aim for professionalism, a term used to describe “adherence to a set of values beyond intellectual capacity that is common to the professions and gives practitioners the exclusive right to engage in the profession’s activities.” McGuire & Phye, *supra* note 15, at 63. Professionalism encompasses honor, integrity, accountability, altruism, and respect for others. *Id.* at 63, 65 (noting that medical and legal clinics permit students to practice hands-on professionalism). The melding of professionalism and ethics into professional ethics forms guidelines on how to integrate actions, commitments, and traits of character typical of the professions so as to acquire a life well-lived. DANIEL MARKOVITS, *A MODERN LEGAL ETHICS: ADVERSARY ADVOCACY IN A DEMOCRATIC AGE 1* (2008).

17. See CODE OF MEDICAL ETHICS OF THE AMERICAN MEDICAL ASSOCIATION (2010). The *Code of Medical Ethics* has been the “authoritative ethics guide for practicing physicians” for more than 160 years. *History of AMA Ethics*, AM. MED. ASS’N, <http://www.ama-assn.org/ama/pub/about-ama/our-history/history-ama-ethics.page> (last visited Feb. 25, 2012) (providing a general history of the *Code of Medical Ethics*); see also *Principles of Medical Ethics*, AM. MED. ASS’N, <http://www.ama-assn.org/ama/pub/physician-resources/medical-ethics/code-medical-ethics/principles-medical-ethics.page?> (last visited Feb. 25, 2012) (tasking physicians to “uphold standards of professionalism,” “respect the law,” and “regard responsibility to the patient as paramount”).

18. See MODEL RULES OF PROFESSIONAL CONDUCT (2010). The *Model Rules of Professional Conduct*, which specifically requires lawyers to maintain the integrity of their profession, serves as a model for the ethical rules of forty-nine states and the District of Columbia. See generally *State Adoption of the ABA Model Rules of Professional Conduct*, AM. BAR ASS’N, http://www.americanbar.org/groups/professional_responsibility/publications/model_rules_of_professional_conduct/alpha_list_state_adopting_model_rules.html (last visited Feb. 25, 2012) (conspicuously, California is absent from the list of states that have adopted the *Model Rules*).

19. See Elizabeth Gepford McCulley, *School of Sharks? Bar Fitness Requirements of Good Moral Character and the Role of Law Schools*, 14 *GEO. J. LEGAL ETHICS* 839, 867 (2001)

and adherence to ethical conduct when they apply to medical²⁰ or law schools.²¹ Second, once they officially become students, they must take mandatory ethics or professional responsibility courses within their medical²² or law school curriculum.²³ After students graduate, entry into their professional practices mandates that they pass licensure exams, as well as moral fitness and character inquiries.²⁴ Finally, after achieving

(suggesting methods to enforce ethical standards); *see also infra* notes 20–25 and accompanying text.

20. ROBERT H. MILLER & DANIEL M. BISSELL, *MED SCHOOL CONFIDENTIAL* 74 (2006) (discussing requirements for prospective medical students). For medical school applications, good ethical conduct is usually assumed but, if an application reveals lapses in ethical conduct, the applicant must specifically address this in a letter of explanation. *Id.* (“Any sort of criminal record, especially one involving substance abuse, will be a matter of serious concern to admissions committees.”). When medical students transfer to other medical schools, applications for transfer should include a letter of evaluation from the current school’s Dean or Associate Dean of Student Affairs that specifically addresses any infractions of the school’s code of ethical conduct. ASS’N OF AM. MED. COLLS., *HANDBOOK FOR ADMISSIONS OFFICERS* 88 (GSA Nat’l Comm. on Admissions Members eds., 2004).

21. *See, e.g.*, LAW. SCH. ADMISSION COUNCIL & AM. BAR ASS’N, *ABA-LSAC OFFICIAL GUIDE TO ABA-APPROVED LAW SCHOOLS: 2012 EDITION* 13–15 (2011). Law school applicants must comply with the Law School Admission Council’s ethical standards—*LSAC Rules Governing Misconduct and Irregularities in the Admission Process*—or face serious sanctions and possible barring from the admission process. *Id.* (explaining that a later finding of misconduct may lead to the closing of an admission file, the revocation of an offer of admission, dismissal from a law school, or disbarment). Most law schools also inquire into applicants’ past criminal records on their admission applications. Keith Swisher, *The Troubling Rise of the Legal Profession’s Good Moral Character*, 82 ST. JOHN’S L. REV. 1037, 1044 (2008).

22. McGuire & Phye, *supra* note 15, at 64. In medical school, students also learn the Hippocratic Oath, a declaration stating students and physicians’ intentions to practice medicine justly and ethically. Raphael Hulkower, *The History of the Hippocratic Oath: Outdated, Inauthentic, and Yet Still Relevant*, 25/26 *EINSTEIN J. BIOLOGY & MED.* 41, 41 (2010). Medical students may actually first recite this oath after their new student orientation and before beginning their formal education. McGuire & Phye, *supra* note 15, at 65 (explaining that such a procedure alerts students to their professional responsibility for others’ well-being). Most medical students also recite the oath during their graduation ceremonies. Hulkower, *supra*, at 41.

23. McCulley, *supra* note 19, at 862 (“The ABA requires accredited law schools to provide education in the responsibilities of the legal profession as well as education covering the *Model Rules*.”); *see also* PATTINSON, *supra* note 16, at 3 (noting that “morality is sometimes explicitly incorporated into legal doctrine”). Law schools enforce ethical conduct with honor codes and ethics committees. McCulley, *supra* note 19, at 858 (describing honor codes as promoting honesty, integrity, and fairness). These honor codes are self-regulated and ask students to report suspected violations. *Id.* at 858–60 (noting that some codes even allow sanctioning of witnesses who fail to disclose infractions).

24. McGuire & Phye, *supra* note 15, at 63 (“[B]ecause lawyers and physicians take on the responsibility for their clients’ or patients’ health, lives, livelihoods, and liberty, entry into professional practice requires more than earning the terminal academic degree.”); *see, e.g.*, Swisher, *supra* note 21, at 1043 (noting that every state requires applicants to prove “good moral character” before admission to the legal bar). Bar committees screen applicants by inquiring into conduct such as illegal acts, academic misconduct, dishonesty, and drug abuse. McGuire & Phye, *supra* note 15,

certification as physicians or lawyers, they “face lifelong regulation by governmental and professional entities and, in many areas, a requirement of annual continuing education.”²⁵

Because medical and law schools are such ethically-governed settings, the fundamental question then becomes whether scholastic use of cognitive-enhancement medications is actually a form of cheating.²⁶ If answered affirmatively, this question requires action from the AMA, ABA, and respective educational institutions for the formulation of ethical guidelines and policies that would address and limit such cheating.²⁷ This Comment attempts to answer whether medicinal brain boosting within medical and law schools is cognitive cheating by addressing the issue through pertinent ethical concerns.

Part II of this Comment provides a scientific overview of the four most common cognitive enhancers and their FDA-approved uses.²⁸ Part II also discusses the off-label exploitation of these medications.²⁹ Part III analyzes medicinal neurocognitive enhancement within medical and law schools through three ethical categories—safety concerns, social implications, and fairness issues—to determine if such use is cognitive cheating.³⁰ Part IV presents possible steps that university administrators may implement to prevent or monitor consumption of cognitive enhancers.³¹ Part IV further suggests new AMA and ABA guidelines that would directly address this issue.³² Part V concludes.³³

II. POPPING SMART PILLS: USE AND ABUSE OF COGNITIVE ENHANCERS

The question of whether medicinal cognitive enhancement is cheating in a higher-educational environment requires understanding both the science behind cognitive enhancers and their resulting uses. This Comment will

at 63. For example, prospective lawyers must meet standards of fitness and demonstrate moral traits—including honesty, responsibility, and truthfulness. McCulley, *supra* note 19, at 842, 850 (explaining that one highly offensive act or pattern of minor offensive behavior can cause denial of admission to the state legal bar). In most jurisdictions, they also must take and pass the Multistate Professional Responsibility Examination. *Bar Admissions Basic Overview*, AM. BAR ASS’N, http://www.americanbar.org/groups/legal_education/resources/bar_admissions/basic_overview.html (last visited Feb. 25, 2012).

25. McGuire & Phye, *supra* note 15, at 63.

26. *See infra* notes 114–16 and accompanying text. Cheating may be defined as an intentional violation of an explicit or implicit rule to gain an unfair advantage over others. *See* M. Schermer, *On the Argument that Enhancement Is “Cheating,”* 34 J. MED. ETHICS 85, 85 (2008).

27. *See infra* notes 291–92 and accompanying text.

28. *See infra* notes 34–67 and accompanying text.

29. *See infra* notes 70–111 and accompanying text.

30. *See infra* notes 116–287 and accompanying text.

31. *See infra* notes 290–364 and accompanying text.

32. *See infra* notes 367–86 and accompanying text.

33. *See infra* notes 387–92 and accompanying text.

begin with a technical overview of the four main cognitive enhancers. It will then contrast their FDA-approved applications with their increasingly off-label, brain-boosting exploitation.

A. Brain Therapy: The FDA-Approved Uses of Cognitive Enhancers

Many medications prescribed to treat neurological conditions also boost the cognitive performances of healthy individuals because of these drugs' distinctive effects on the human biological system.³⁴ The most popular cognitive enhancers are Adderall, Ritalin, Provigil, and beta blockers³⁵ because of their individual chemical functions.

1. Adderall and Ritalin

Adderall and Ritalin are psychostimulant medications used in the treatment of AD/HD.³⁶ Physicians prescribe both for children,³⁷ but only Adderall is FDA-approved for the treatment of adult AD/HD.³⁸ These medications work to lessen associated behavioral problems, such as

34. Greely et al., *supra* note 9, at 702.

35. See *infra* notes 73–74 and accompanying text.

36. Nick Szufliita, *Ritalin Abuse is Increasing*, JOHNS HOPKINS NEWSL. (Nov. 22, 2002), http://www.jhunewsletter.com/sports/ritalin-abuse-is-increasing-1.1144049#.T011Y_HOW5I. AD/HD is the accepted acronym for two behavioral disorders—Attention Deficit Disorder (ADD) and Attention Deficit Hyperactivity Disorder (AD/HD). *Id.* These neurodevelopment disorders, or “processing deficit[s],” are lifelong and result from the underdevelopment of the area in the brain that stops inappropriate behavior and regulates attention. Praveen Madhiraju, *R.I.P. Ritalin in Proportion! The Eighth Circuit’s Restriction on a Parent’s Right to Have Schools Accommodate the Needs of Their Disabled Children*: Debord and Davis, 95 NW. U. L. REV. 1661, 1664–65 (2001) (explaining that children with AD/HD cannot control themselves and often disrupt class).

37. *What We Know: Managing Medication for Children and Teenagers with AD/HD*, NAT’L RES. CTR. ON AD/HD, 2, <http://www.help4adhd.org/documents/WWK3s.pdf> [hereinafter *Managing Medication*]. While physicians usually first diagnose AD/HD during childhood, it commonly lasts into adulthood. *ADHD: Fact Sheet*, CTRS. FOR DISEASE CONTROL & PREVENTION, http://www.cdc.gov/ncbddd/actearly/pdf/parents_pdfs/ADHDFactSheet.pdf; see also Lawrence Scahill et al., *Methylphenidate: Mechanism of Action and Clinical Update*, 17 J. CHILD & ADOLESCENT PSYCHOL. NURSING 85, 85 (2004) (stating that in 60% to 80% of cases, AD/HD persists into adolescence, and in 30% to 40% of cases, it persists into adulthood).

38. See *Ritalin for Adults: An Overview*, EMEDTV, <http://adhd.emedtv.com/ritalin/ritalin-for-adults.html> (last visited Feb. 25, 2012). Nonetheless, doctors still prescribe Ritalin to adults for off-label purposes. *Id.* (explaining that off-label use occurs when a medication is taken to treat a disease or age group the FDA has not approved to use that drug). Actually, Ritalin is the most common medication used in the treatment of AD/HD. Christina Pancheri & Mary Anne Prater, *What Teachers and Parents Should Know About Ritalin*, TEACHING EXCEPTIONAL CHILD., Mar.–Apr. 1999, at 20; see also Szufliita, *supra* note 36 (“[O]ver 7 million children consume over eight tons of Ritalin every year in the United States . . .”).

inattention, hyperactivity, and impulsivity.³⁹ On a chemical level, they stimulate the frontal parts of the brain by increasing and balancing the levels of two neurotransmitters—dopamine⁴⁰ and norepinephrine.⁴¹ While this brain stimulation helps individuals with AD/HD behave normally, it allows individuals without AD/HD to focus and concentrate better than normal.⁴²

Adderall is available in two commercial versions—standard Adderall⁴³ and Adderall XR.⁴⁴ Both of these medications are mixtures of l-amphetamine and d-amphetamine.⁴⁵ Ritalin, or methylphenidate

39. See *ADHD: Fact Sheet*, *supra* note 37 (listing the symptoms of AD/HD). These medications lessen AD/HD symptoms in 70% to 80% of the children who take the stimulants. *Managing Medication*, *supra* note 37, at 2 (“Medications are not used to control behavior. Instead, they are used to make the symptoms of AD/HD better.”).

40. See *Managing Medication*, *supra* note 37, at 4. The brain contains at least five different types of dopamine receptors, but dopamine is linked primarily to the brain’s pleasure system that motivates individuals to proactively perform certain tasks. See Karl Harrison, *Dopamine*, <http://www.3dchem.com/molecules.asp?ID=289> (last visited Feb. 25, 2012); see also Scahill et al., *supra* note 37, at 86 (explaining that stimulants enhance dopamine function by promoting dopamine release and blocking reuptake). Dopamine tends to promote mood elevations and “feelings of alertness, well-being and superiority.” Szufliuta, *supra* note 36.

41. Karl Harrison, *Norepinephrine*, <http://www.3dchem.com/molecules.asp?ID=288> (last visited Feb. 25, 2012). Norepinephrine is a stress hormone that affects the part of the brain that controls attention and responding actions. *Id.* Although stimulants are the most common medications for AD/HD treatment, their “mechanism of action is not completely understood.” Scahill et al., *supra* note 37, at 85. Studies show that the hyperactivity and impulsivity of AD/HD is primarily associated with the reduced effectiveness of dopamine functions in the brain, while inattention is connected with the reduced effectiveness of norepinephrine, a neurotransmitter in the nervous system. Terje Sagvolden & Tong Xu, *L-Amphetamine Improves Poor Sustained Attention While D-Amphetamine Reduces Overactivity and Impulsiveness as Well as Attention-Deficit/Hyperactivity Disorder (ADHD)*, BEHAV. & BRAIN FUNCTIONS 10 (Jan. 23, 2008), available at <http://www.behavioralandbrainfunctions.com/content/pdf/1744-9081-4-3.pdf>; see also Harrison, *supra*.

42. See James Pavisian, *The Case for Human Ingenuity: How Adderall Has Sullied the Game*, 48 WASHBURN L.J. 175, 179–80 (2008); see also Craig S. Lerner, “Accommodations” for the Learning Disabled: A Level Playing Field or Affirmative Action for Elites?, 57 VAND. L. REV. 1043, 1069 (2004) (explaining that dopamine imbalances in the brain will increase an individual’s energy and concentration).

43. Pavisian, *supra* note 42, at 177–78. Standard Adderall is an immediate-acting tablet that lasts for four to six hours. *Managing Medication*, *supra* note 37, at 5.

44. Pavisian, *supra* note 42, at 177–78. Half of every Adderall tablet consists of amphetamine. Ann P. Fenton & John M. Wunderlich, *Mental Doping: The Untold Story of Modern Law School Exams*, STUDENT LAW., Jan. 2010, at 17. Adderall XR, as the longer-lasting version, is “chemically designed ‘to give a double-pulsed delivery of amphetamines, which prolongs the release of amphetamine . . . compared to the conventional (immediate-release) tablet formulation.’ By allowing you to stay high longer, a single dose of Adderall is almost like two for the price of one.” *Id.* at 17–18.

45. Pavisian, *supra* note 42, at 178 n.17 (“When amphetamines are synthesized it creates two molecules known as d-amphetamine and l-amphetamine.”). Because of this mixture, Adderall is called mixed-salts amphetamine or dl-amphetamine. John E. Owen, Jr., *The Influence of DL-, D-, and L-Amphetamine and D-Methamphetamine on a Fixed-Ratio Schedule*, 3 J. EXPERIMENTAL ANALYSIS BEHAV. 293, 294 (1960). D-amphetamine is 1.5 to two times more potent than dl-amphetamine and three to four times more potent than l-amphetamine. *Id.* D-amphetamine and l-amphetamine also are different in how they affect the release of dopamine and norepinephrine. See Sagvolden & Xu, *supra* note 41. Studies show that d-amphetamine—which increases wakefulness,

hydrochloride, comes in three commercial versions—standard Ritalin, Ritalin LA, and Ritalin SR.⁴⁶ Ritalin LA and Adderall XR are longer-lasting medications, available as extended release capsules.⁴⁷

The United States Food and Drug Administration (FDA) has approved Adderall solely for use as an AD/HD medication and Ritalin both as an AD/HD medication and in the treatment of adult narcolepsy.⁴⁸ These stimulant medications are federally controlled substances because they can engender abuse or lead to dependence.⁴⁹ For example, Ritalin abuse creates almost the same adverse effects as those caused by cocaine use.⁵⁰

energy, and self-confidence, and decreases fatigue and appetite—is twice as potent as l-amphetamine in reducing hyperactivity and impulsivity. *Id.* at 7; Karl Harrison, *Dextroamphetamine*, 3DCHEM.COM, <http://www.3dchem.com/molecules.asp?ID=401> (last visited Feb. 25, 2012). However, both amphetamines improve sustained attention. Sagvolden & Xu, *supra* note 41.

46. *Managing Medication*, *supra* note 37, at 4. Standard Ritalin is an immediate release tablet that lasts three to four hours, while Ritalin SR is a sustained release tablet that works for six to eight hours. *Id.* at 7–8.

47. *Id.* at 4–5 (explaining that Ritalin LA works for eight to ten hours and Adderall XR lasts for eight to twelve hours).

48. U.S. FOOD & DRUG ADMIN., MEDICATION GUIDE: ADDERALL XR (2011) [hereinafter MEDICATION GUIDE: ADDERALL XR], available at <http://www.fda.gov/downloads/Drugs/DrugSafety/ucm085819.pdf>; U.S. FOOD & DRUG ADMIN., MEDICATION GUIDE: RITALIN (2010) [hereinafter MEDICATION GUIDE: RITALIN], available at <http://www.fda.gov/downloads/Drugs/DrugSafety/ucm089090.pdf>; see also *supra* notes 37–38 and accompanying text (explaining that Adderall and Ritalin are both FDA-approved for adolescent AD/HD, but only Adderall is approved for adult AD/HD).

49. MEDICATION GUIDE: ADDERALL XR, *supra* note 48, at 1; MEDICATION GUIDE: RITALIN, *supra* note 48, at 1; see also *Prescription Drug Abuse: Hearing Before the Subcomm. on Crim. Just., Drug Pol’y, & Hum. Res. Comm. on Gov’t Reform*, 109th Cong. (2006) [hereinafter *Prescription Drug Abuse: Hearing*], available at <http://www.hhs.gov/asl/testify/t060726a.html> (statement of Nora D. Volkow, Director, Nat’l Inst. on Drug Abuse) (“[T]hese classes of psychotherapeutic drugs have a real potential for leading to addiction, especially if abused repeatedly, at high doses, and/or by susceptible individuals.”). Federal law classifies drugs that are popular for recreational or addictive use into “schedules” and “imposes special handling and paperwork requirements for their use.” Henry T. Greely, *Disabilities, Enhancements, and the Meanings of Sports*, 15 STAN. L. & POL’Y REV. 99, 115 (2004). The U.S. Drug Enforcement Administration (DEA) has categorized Adderall and Ritalin as Schedule II drugs based on their potential for abuse. U.S. DRUG ENFORCEMENT ADMIN., DRUGS OF ABUSE: 2011 EDITION: A DEA RESOURCE GUIDE 18–19 (2011) [hereinafter DRUGS OF ABUSE], available at http://www.justice.gov/dea/pubs/drugs_of_abuse.pdf (listing Schedules I–V, with I encompassing drugs with the highest addictive qualities). Abuse of Schedule II drugs may cause severe psychological or physical dependence. *Id.* at 9. Other Schedule II drugs include morphine, methadone, and cocaine. *Id.*

50. Madhiraju, *supra* note 36, at 1667. Ritalin abuse causes increased heart and respiratory rates, dilated pupils, elevated blood pressure, dry mouth, perspiration, and feelings of superiority. Chiumino, *supra* note 12, at 386; see also Szufliita, *supra* note 36 (noting that Ritalin and cocaine also generate aggression, hostility, and strange behavior in severe cases). Ritalin and cocaine both block the reuptake of dopamine and actually compete for binding sites in the brain regions responsible for reward and pleasure-related behaviors. Szufliita, *supra* note 36; see also *supra* note 40 and accompanying text. A person who injects either drug intravenously will experience a rush or

2. Provigil

The second type of cognitive enhancer is Provigil, a psychostimulant medication that is FDA-approved to improve wakefulness in adults diagnosed with narcolepsy,⁵¹ obstructive sleep apnea,⁵² or shift-work sleep disorder.^{53,54} Provigil keeps individuals awake and alert regardless of the underlying causes for their sleepiness.⁵⁵ On a chemical level, recent studies conclude that Provigil works in a similar fashion as Adderall and Ritalin by increasing dopamine and blocking dopamine transporters.⁵⁶ Provigil also is

high because the drugs will cause a rapid and large increase in dopamine. *Prescription Drug Abuse: Hearing, supra* note 49; *see also* CYNTHIA KUHN ET AL., BUZZED: THE STRAIGHT FACTS ABOUT THE MOST USED AND ABUSED DRUGS FROM ALCOHOL TO ECSTASY 230 (3d ed. 2008) (warning that the injection of Ritalin is extremely dangerous because components of the pills can lodge in the tiny blood vessels of the lungs or eyes and create severe damage). The oral administration of Ritalin does not produce this same rush since it elicits a gradual and sustained increase in dopamine. *Prescription Drug Abuse: Hearing, supra* note 49. For this reason, abusers sometimes snort or inject Ritalin by crushing Ritalin tablets into a fine powder or dissolving the tablets into liquid. Chiumino, *supra* note 12, at 388 (comparing such methods to cocaine and heroin administration).

51. Narcolepsy is a sleep disorder characterized by a “sudden uncontrollable disposition to sleep occurring at irregular intervals” *STEDMAN’S MEDICAL DICTIONARY* 923 (23d ed. 1976).

52. Obstructive sleep apnea is a breathing disorder defined by recurring interruptions of breathing during sleep. *See id.* at 99.

53. Shift-work sleep disorder is a constant or recurrent pattern of sleep interruption commonly found in people who work nontraditional hours or frequently alternate shifts. Michael J. Thorpy, *Managing the Patient with Shift-Work Disorder*, 59 *SUPP. J. FAM. PRAC.* 824, 826 (2010) (observing that the most common symptoms of shift-work disorder are insomnia and excessive sleepiness).

54. *See Media Fact Sheet: Provigil (Modafinil) Tablets*, CEPHALON, 1–2, available at http://www.cephalon.com/fileadmin/media/downloads/PROVIGIL_Fact_Sheet.pdf [hereinafter *Media Fact Sheet: Provigil*]; *Medication Guide: Provigil*, U.S. FOOD & DRUG ADMIN., MEDICATION GUIDE: PROVIGIL 35–36 (2010), available at <http://www.fda.gov/downloads/Drugs/DrugSafety/UCM231722.pdf> [hereinafter *MEDICATION GUIDE: PROVIGIL*] (noting that Provigil does not cure sleep disorders but works to prevent sleepiness caused by sleep disorders). Provigil is available in 100-milligram or 200-milligram doses with the general recommended dosage set at 200 milligrams consumed once per day. *Provigil*, *RXLIST: THE INTERNET DRUG INDEX*, www.rxlist.com/provigil-drug.htm (last visited Feb. 25, 2012) (advising that patients with narcolepsy take a single dose in the morning and patients with shift-work sleep disorder take a single dose one hour before their work shifts begin).

55. John E. Osborn, *Can I Tell You the Truth? A Comparative Perspective on Regulating Off-Label Scientific and Medical Information*, 10 *YALE J. HEALTH POL’Y L. & ETHICS* 299, 334 (2010). In 2004, the FDA specifically rejected manufacturers’ efforts to have Provigil approved for excessive sleepiness from any cause. Anahad O’Connor, *Wakefulness Finds a Powerful Ally*, *N.Y. TIMES* (June 29, 2004), <http://www.nytimes.com/2004/06/29/health/wakefulness-finds-a-powerful-ally.html?pagewanted=all&src=pm>. However, physicians still prescribe it for off-label uses, such as aiding recovery from jet lag or staving off general fatigue. *Cognitive Enhancement, All on the Mind, supra* note 3, at 103.

56. *See, e.g.*, Monica L. Andersen et al., *Dopamine Transporter-Related Effects of Modafinil in Rhesus Monkeys*, 210 *PSYCHOPHARMACOLOGY* 439, 440 (2010); Nora D. Volkow et al., *Effects of Modafinil on Dopamine and Dopamine Transporters in the Male Human Brain: Clinical Implications*, 301 *J. AM. MED. ASS’N* 1148, 1152 (2009); *see also supra* notes 40–41 and accompanying text (discussing Adderall and Ritalin’s effects on dopamine). Provigil may also elevate norepinephrine in select brain regions by preventing its reuptake. Bertha K. Madras et al., *Modafinil Occupies Dopamine and Norepinephrine Transporters in Vivo and Modulates the*

a federally controlled substance because it can prompt abuse or lead to dependence.⁵⁷

3. Beta Blockers

The final common cognitive enhancers are beta blockers, or beta-adrenergic blocking agents, that are FDA-approved to manage a variety of conditions, such as cardiac arrhythmia, diabetes, and hypertension.⁵⁸ Chemically, they work by preventing two neurotransmitters—norepinephrine (noradrenaline) and epinephrine (adrenaline)—from binding to beta receptors, which, in turn, blocks the effects of adrenaline.⁵⁹

Transporters and Trace Amine Activity in Vitro, 319 J. PHARMACOLOGY & EXPERIMENTAL THERAPEUTICS 561, 567 (2006); see also Dov Fox, *Safety, Efficacy, and Authenticity: The Gap Between Ethics and Law in FDA Decisionmaking*, 2005 MICH. ST. L. REV. 1135, 1142. However, Provigil's precise mechanism of action is not fully understood, although it is known to affect the part of the brain that regulates wakefulness. Osborn, *supra* note 55, at 334.

57. MEDICATION GUIDE: PROVIGIL, *supra* note 54, at 36; *Media Fact Sheet: Provigil*, *supra* note 54. The DEA has categorized Provigil as a Schedule IV drug. DRUGS OF ABUSE, *supra* note 49, at 9. Relative to substances listed on Schedules I–III, Provigil has a low potential for abuse and may lead to limited physical or psychological dependence. See *id.*; see also *supra* note 49 and accompanying text (explaining that Adderall and Ritalin are Schedule II drugs with higher potentials for addiction). Other Schedule IV drugs include Xanax, Paxor, and Valium. DRUGS OF ABUSE, *supra* note 49, at 23. Although Provigil is listed as a low-abuse substance, its potential for abuse is still surrounded by debate. See, e.g., Andersen et al., *supra* note 56, at 440; Volkow et al., *supra* note 56, at 1148. Similar to Ritalin, Provigil binds to the same dopamine transporter sites as cocaine. Volkow et al., *supra* note 56, at 1152; see also *supra* note 50 and accompanying text. Still, reports of Provigil abuse are rare and significantly less frequent than those for Adderall and Ritalin. Volkow et al., *supra* note 56, at 1153 (suggesting, however, that the “risk for addiction in vulnerable persons merits heightened awareness”).

58. *Beta Blockers: Drug Information*, RXLIST: THE INTERNET DRUG INDEX, www.rxlist.com/script/main/art.asp?articlekey=90349 (last visited Feb. 25, 2012) (listing FDA-approved and off-label uses). Since the FDA-approved beta blockers in the 1960s, they have been the most commonly prescribed medication for heart failure and hypertension. Vabren L. Watts, *Beta-Blockers Used by Musicians, Athletes, Students to Enhance Performance*, PHILA. INQUIRER (Aug. 16, 2010), http://articles.philly.com/2010-08-16/news/24973169_1_beta-blockers-graduatestudent-performance-anxiety. Traditionally, beta blockers were used in the treatment of heart problems because they “reduce blood pressure and improve the heart’s ability to relax and pump blood more effectively over time.” Shayna M. Sigman, *Are We All Dopes? A Behavioral Law & Economics Approach to Legal Regulation of Doping in Sports*, 19 MARQ. SPORTS L. REV. 125, 156 (2008).

59. *Beta Blockers: Drug Information*, *supra* note 58; see also Carl Elliott, *In Defense of the Beta Blocker: Is This a Performance Drug That Could Actually Increase the Fairness of Olympic Contests?*, ATLANTIC (Aug. 20, 2008), <http://www.theatlantic.com/magazine/archive/2008/08/in-defense-of-the-beta-blocker/6961> (explaining that beta blockers block particular nervous system receptors). These nervous system or beta receptors are classified into two types—beta-1 receptors that control the heart and beta-2 receptors that control smooth muscle function in the body. See E. Davis et al., *The Rush to Adrenaline: Drugs in Sport Acting on the β -Adrenergic System*, 154 BRIT. J. PHARMACOLOGY 584, 584–85 (2008). “These receptors also happen to be the ones that get activated in times of fear or anxiety” Elliott, *supra*. However, beta blockers do not alleviate

Essentially, this medication prevents the body from triggering its “fight or flight” response.⁶⁰

More than fifteen different brands of beta blockers are available in the United States;⁶¹ some affect the heart, while others influence both the heart and blood vessels.⁶² Two of the most common beta blockers are propranolol (brand name Inderal)⁶³ and metoprolol (brand names Lopressor and Toprol-XL).⁶⁴ Lopressor is the immediate release version of metoprolol,⁶⁵ while Toprol-XL is the extended-release tablet.⁶⁶ Unlike the other cognitive enhancers, beta blockers are generally not addictive.⁶⁷

Cognitive enhancers vary in their methods of administration and addiction potentials mainly because they differ in how they scientifically affect the human body.⁶⁸ Nonetheless, the FDA has approved all of them for

anxiety; instead, they block the outward signs of anxiety. *Id.* Unlike other cognitive enhancers, beta blockers do not affect dopamine levels. *See supra* notes 40, 56 and accompanying text.

60. Sigman, *supra* note 58, at 156 (describing beta blockers as inducing a calming effect). Such an effect has generated off-label beta blocker use in the public performance setting. Michael H. Shapiro, *The Technology of Perfection: Performance Enhancement and the Control of Attributes*, 65 S. CAL. L. REV. 11, 42 (1991) (acknowledging beta blocker use by musicians, athletes, and other performers).

61. *Beta Blockers: Drug Information*, *supra* note 58.

62. Davis et al., *supra* note 59, at 584 (explaining that the effects of beta blockers depend on the type of beta receptor they block); *see also supra* note 59 and accompanying text.

63. *See Beta Blockers: Drug Information*, *supra* note 58. Inderal was the first beta blocker with widespread use and works on both the heart and blood vessels. Adhi Sharma et al., *Beta-Blocker Toxicity*, MEDSCAPE REFERENCE, <http://emedicine.medscape.com/article/813342-print> (last updated Oct. 27, 2011). It is a nonselective beta blocker because it blocks both types of beta receptors. *Id.*; *see also supra* note 59 and accompanying text. Inderal is available in tablets ranging from ten to eighty milligram doses with a recommended dosage generally beginning at forty milligrams twice daily. *Inderal*, RXLIST: THE INTERNET DRUG INDEX, www.rxlist.com/inderal (last visited Feb. 25, 2012); *see also* Mark A. Dotson, *Restatement Third and Prescription Drug Liability: A Tough Pill to Swallow or Business as Usual?*, 4 T.M. COOLEY J. PRAC. & CLINICAL L. 29, 36–37 (2000) (noting that Inderal is also available in “injectable form”). Daily doses above 160 milligrams may cause fatigue, lethargy, and vivid dreams. U.S. FOOD & DRUG ADMIN., MEDICATION GUIDE: INDERIDE 9 (2008), available at http://www.accessdata.fda.gov/drugsatfda_docs/label/2008/018031s0351bl.pdf.

64. *See Beta Blockers: Drug Information*, *supra* note 58. *See generally Metoprolol*, PUBMED HEALTH, <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0000795> (last visited Feb. 25, 2012). Unlike Inderal, Toprol-XL is a selective beta blocker because it blocks only the beta-1 receptor. *Beta Blockers: Drug Information*, *supra* note 58; *see also supra* notes 59, 63 and accompanying text.

65. *See* U.S. FOOD & DRUG ADMIN., MEDICATION GUIDE: LOPRESSOR HCT 1 (2008), available at http://www.accessdata.fda.gov/drugsatfda_docs/label/2008/018303s0331bl.pdf. Lopressor’s initial dosage is usually 100 milligrams daily, but its most effective dose is between 100 to 450 milligrams. *Id.* at 9.

66. *See* U.S. FOOD & DRUG ADMIN., MEDICATION GUIDE: TOPROL-XL 1 (2009), available at http://www.accessdata.fda.gov/drugsatfda_docs/label/2009/019962s0381bl.pdf. Toprol-XL is available in tablets ranging from 25 to 200 milligram doses. *Id.* at 1, 15.

67. Watts, *supra* note 58. Unlike Adderall, Ritalin, and Provigil, the DEA has not categorized beta blockers as controlled substances. *See* DRUGS OF ABUSE, *supra* note 49, at 15–25; *see also supra* notes 49, 57 and accompanying text.

68. *See, e.g., supra* notes 41, 54, 59, 67 and accompanying text.

particular purposes while still explicitly declining to include cognitive-enhancement use.⁶⁹

B. Brain Gain: The Off-Label Benefits of Cognitive Enhancers

Medicinal off-label use is the utilization of a drug for purposes that are not FDA-approved.⁷⁰ In the last decade, physicians have increasingly prescribed medications for off-label cognitive-enhancement reasons in a growing trend termed “cosmetic neurology”—where the focus is enhancement rather than treatment.⁷¹ As pharmaceutical laboratories race to develop the next blockbuster smart drug, commentators agree that the new frontier is mental doping.⁷² Although extensively prescribed for such an off-label function,⁷³ Adderall, Ritalin, Provigil, and beta blockers are just the

69. See *supra* notes 48, 54, 58 and accompanying text (listing the FDA-approved uses for each cognitive enhancer).

70. Letter from Jennifer C. Jaff, Exec. Director, Advocacy for Patients with Chronic Illness, Inc., to Internal Revenue Serv. (Sept. 15, 2010), *available at* 2010 WL 3829485 (“To give a simple example, if the approved use of aspirin were to address pain, the use of aspirin to prevent heart attacks would be considered off-label.”). Similarly, off-label marketing occurs when drug manufacturers promote their products to users or in dosages not approved by the FDA. Fox, *supra* note 56, at 1165–70 (listing arguments for and against FDA regulation of off-label use and prescription). One doctor at Harvard University asserts that growing consumer demand for off-label use “reflects our bombardment with advertisements imploring us to ‘ask your doctor if this pill is right for you.’” Richard Kadison, *Getting an Edge—Use of Stimulants and Antidepressants in College*, 353 NEW ENG. J. MED. 1089, 1089 (2005).

71. V. Cakic, *Smart Drugs for Cognitive Enhancement: Ethical and Pragmatic Considerations in the Era of Cosmetic Neurology*, 35 J. MED. ETHICS 611, 611 (2009) (warning that the student demographic could be the largest non-therapeutic market for future smart drugs). One influential approach to the ethics of enhancement has been to define the term “enhancement” as any intervention designed to improve human functioning beyond what is necessary to restore or sustain good health—in other words, it is always more than mere treatment. Julian Savulescu, *Justice, Fairness, and Enhancement*, 1093 ANNALS N.Y. ACAD. SCI. 321, 322 (2006).

72. See *Cognitive Enhancement, All on the Mind*, *supra* note 3, at 103 (arguing that mind expansion may soon become big business); Karen Kaplan & Denise Gellene, *They’re Bulking Up Mentally*, L.A. TIMES (Dec. 20, 2007), <http://articles.latimes.com/2007/dec/20/science/sci-braindoping20> (“Whatever company comes out with the first memory pill is going to put Viagra to shame.”). One researcher at Cambridge University estimates that scientists are currently working on more than 600 new cognition enhancers. *Cognitive Enhancement, All on the Mind*, *supra* note 3, at 103.

73. Kaplan & Gellene, *supra* note 72 (noting that some students, academics, musicians, corporate executives, and professional poker players currently take these drugs to clarify minds, control emotions, and improve concentration); see also *Cognitive Enhancement, All on the Mind*, *supra* note 3, at 103 (describing off-label use as a means to increase energy and boost exam performance).

precursors to this anticipated smart drug, which could make mind enhancement “as ordinary as a cup of coffee.”⁷⁴

Adderall and Ritalin⁷⁵ work chemically by increasing two neurotransmitters—dopamine and norepinephrine—within the brain.⁷⁶ In a healthy person, this brain stimulation enhances energy and concentration.⁷⁷ Recent tests have affirmed these positive cognitive effects.⁷⁸ Such a perk understandably has popularized stimulant medications on United States college campuses.⁷⁹ For example, one study, which surveyed 10,904 students at 119 four-year universities, found that 6.9% of these students had taken prescription stimulants for non-medical uses.⁸⁰ Other surveys have yielded higher numbers ranging from 16% to 60%.⁸¹ While some of these

74. Melissa Healy, *Sharper Minds*, L.A. TIMES (Dec. 20, 2004), <http://articles.latimes.com/2004/dec/20/health/he-smartdrugs20>. “In the coming years science is likely to create more novel drugs that boost memory, concentration and planning. These may well be less harmful than coffee—and will almost certainly be more useful.” *Smart Drugs: Drugs to Make You Cleverer Are in the Test-Tube*, ECONOMIST (May 24, 2008), <http://www.economist.com/node/11412603>.

75. See *supra* note 36 and accompanying text.

76. See *supra* notes 40–41 and accompanying text.

77. See *supra* note 42 and accompanying text. For example, one California writer confessed to a journalist that he managed to speed write several lucrative soft porn novels while on Ritalin. Minette Marrin, *It’s a No-Brainer: Bring on the Pills That Will Make Us Smarter*, SUNDAY TIMES, Jan. 3, 2010, at 14.

78. See, e.g., C. Thomas Gualtieri & Lynda G. Johnson, *Medications Do Not Necessarily Normalize Cognition in ADHD Patients*, 11 J. ATTENTION DISORDERS 459, 460, 464 (2008) (noting that stimulant use improved school performance); Maia Szalavitz, *Popping Smart Pills: The Case for Cognitive Enhancement*, TIME (Jan. 6, 2009), <http://www.time.com/time/health/article/0,8599,1869435,00.html> (“Research shows that in normal people, stimulants consistently and significantly improve learning of material that must be recalled days later—exactly what you want from a drug when you are prepping for exams.”).

79. Alan D. DeSantis & Audrey Curtis Hane, “*Adderall Is Definitely Not a Drug: Justifications for the Illegal Use of ADHD Stimulants*,” 45 SUBSTANCE USE & MISUSE 31, 31 (2010) (listing seven scientific surveys conducted at different college campuses). “[S]ome of the most competitive college campuses are rife with illicit use of ADD medication.” Chris Good, *Give Scientists Performance-Enhancing Drugs*, ATLANTIC (June 30, 2010), <http://www.theatlantic.com/special-report/ideas/archive/2010/06/give-scientists-performance-enhancing-drugs/58941>.

80. Sean Esteban McCabe et al., *Non-Medical Use of Prescription Stimulants Among U.S. College Students: Prevalence and Correlates from a National Survey*, 99 ADDICTION 96, 102–03 (2005) (finding that cognitive-enhancement drug use is highest among students from colleges with more competitive admission standards).

81. See, e.g., Alan D. DeSantis et al., *Illicit Use of Prescription ADHD Medications on a College Campus: A Multimethodological Approach*, 57 J. AM. C. HEALTH 315, 316 (2008) (reporting that 34% of the surveyed students claimed to have used AD/HD drugs illegally); Christian J. Teter et al., *Illicit Use of Specific Prescription Stimulants Among College Students: Prevalence, Motives, and Routes of Administration*, 26 PHARMACOTHERAPY 1501, 1507 (2006) (explaining that the most common motives for illegal stimulant use among the surveyed students were improved concentration and aid in studying). One study at the University of Wisconsin found that a staggering one in five students had taken either Ritalin or Adderall illegally. Szuflika, *supra* note 36. Another survey estimated that 7% to 25% of all college students had used Adderall “not to get high, but to get higher grades.” Fenton & Wunderlich, *supra* note 44, at 18 (emphasis added); see also Rob Goodman, *Cognitive Enhancement, Cheating, and Accomplishment*, 20 KENNEDY INST. ETHICS J. 145, 148 (2010) (noting that the U.S. Department of Education identifies Ritalin as the most

students buy the drugs illegally on the black market, others simply use their legal prescriptions in non-FDA-approved ways.⁸² Academically, some students who take these stimulants significantly improve their focus and concentration to the point where they morph into study machines.⁸³ Now this coveted power has placed bottles of Adderall and Ritalin in the medicine cabinets of higher education—where medical⁸⁴ and law⁸⁵ school students face steep grading curves and declining job prospects.

commonly abused study drug on college campuses). More recently, *60 Minutes* reported that 50% to 60% of all college students had used AD/HD medications. *60 Minutes: Popping Pills a Popular Way to Boost Brain Power* (CBS television broadcast Apr. 25, 2010) [hereinafter *60 Minutes*], available at http://www.cbsnews.com/2100-18560_162-6422159.html.

82. See Fenton & Wunderlich, *supra* note 44, at 17; see also *60 Minutes*, *supra* note 81 (noting that black market stimulant pills cost between three and five dollars on college campuses). Interestingly, prescriptions for stimulant medications have doubled in the last eight years from four million to eight million; during that same time span, calls to poison-control centers reporting overdoses of legal stimulants by young adults shot up seventy-six percent. Walter Kirn, *A Pharmacological Education*, N.Y. TIMES (Sept. 2, 2009), <http://www.nytimes.com/2009/09/06/magazine/06FOB-wwln-t.html>.

83. Pavisian, *supra* note 42, at 181, 184 (emphasizing that stimulants clear minds and improve concentration for the tasks at hand); see, e.g., Margaret Talbot, *Brain Gain: The Underground World of "Neuroenhancing" Drugs*, NEW YORKER (Apr. 27, 2009), http://www.newyorker.com/reporting/2009/04/27/090427fa_fact_talbot (featuring a Harvard student who experimented with Adderall dosage to make his impossible schedule of work, school, and recreation "possible"). One consumer described Adderall as a career transformer: "I'm talking about being able to take on twice the responsibility, work twice as fast, write more effectively, manage better, be more attentive, devise better and more creative strategies." Carey, *supra* note 1.

84. Jadon R. Webb et al., *Contemplating Cognitive Enhancement in Medical Students and Residents*, 53 PERSP. BIOLOGY & MED. 200, 200 (2010) (exploring stimulant use among medical students for increased study, higher grades, and better care of patients). In recent years, the growing number of medical students who take Adderall and Ritalin has created a "significant controversy" that the health community has just begun to acknowledge. Alison Hayward et al., *Stimulant Use Among Professional Students*, STUDENT DOCTOR NETWORK (June 28, 2008), <http://studentdoctor.net/2008/06/stimulant-use-among-professional-students>; see also Katharine Hibbert, *Ways to Make You Think Better*, GUARDIAN (Nov. 8, 2007), <http://www.guardian.co.uk/society/2007/nov/08/health.lifeandhealth> (describing Ritalin use by medical students as "unexceptional"). One medical student said it was impossible to juggle both academics and a social life without stimulant use—"The only people who get through the (med school) program I'm in either use stimulants or have no social life whatsoever. There is no other way." *An Ethical Look at Cognitive Stimulants, Part 1*, TECHNOLOGICAL CITIZEN, <http://thetechnologicalcitizen.com/?p=2444> (last visited Feb. 27, 2012). However, another student from the same medical school chat forum countered, "People use these medications because they're lazy, and because they have no study habits. They're a crutch for people who need a last minute way to get work done, fast." *Id.*

85. See Fenton & Wunderlich, *supra* note 44, at 17 (commenting on the extensive use of stimulant medications by law school students). One commentator explained this prevalence aptly:

They're well aware of the dire economic news—big law firms instituting hiring freezes; whole industries . . . imploding—and it's natural that they would welcome any advantage in their quests to get the grades that will get them the jobs that will get them the insurance that will get them the medications to do the jobs.

Another medication increasingly booking its appearances during final exams is Provigil,⁸⁶ a pill that boosts dopamine levels and blocks dopamine transporters within the brain—keeping individuals awake and alert.⁸⁷ Provigil, short for “promotes vigilance,”⁸⁸ is a “nap in the form of a pill”⁸⁹ that leaves its users refreshed and alert despite hours or even days of wakefulness.⁹⁰ Individuals take this drug for off-label uses like jet-lag recovery and exam-performance enhancement.⁹¹ In fact, more than eighty

Kirn, *supra* note 82. In 2008, the Volokh Conspiracy group blog, composed mostly of law professors, posted a poll that asked law school students: “[H]ow common is use of Adderall and/or Ritalin among law students who do not have a prescription to . . . boost law school performance?” *Law Student Use of Adderall and/or Ritalin*, VOLOKH CONSPIRACY (Mar. 26, 2008, 2:10 PM), <http://volokh.com/posts/1206555052.shtml>. Of 1063 responses, only 157 stated that such stimulant use was rare or never happened; 350 voted that fifty percent or more of all law school students had used Adderall or Ritalin to improve grades. *Id.* In 2010, *The Onion* chipped in with its own satirical commentary in an article that reported Harvard University’s conferment of an honorary doctorate degree on a bottle of Adderall for its cognitive “inspiration to [them] all.” *Adderall Receives Honorary Degree from Harvard*, ONION (May 31, 2010), <http://www.theonion.com/articles/adderall-receives-honorary-degree-from-harvard,17527>.

86. See *supra* note 54 and accompanying text.

87. See *supra* notes 55–56 and accompanying text; see also Miriam Hill, *Concerns Raised on Cephalon’s Stay-Awake Drug Provigil*, PHILA. INQUIRER, Mar. 17, 2009, at C01 (noting the increasing evidence that shows Provigil use by students and professors as a brain-boosting drug). One psychologist, who works at Cambridge University and writes about the ethics of cognitive enhancement, stated that her first Provigil session allowed her to intensely “work at her computer for hours straight.” Kaplan & Gellene, *supra* note 72. One study demonstrated that test subjects who took Provigil were able to concentrate on a specific task “for as long as fifty-four consecutive hours.” Greely, *supra* note 49, at 127.

88. Andrew Pollack, *A Biotech Outcast Awakens*, N.Y. TIMES (Oct. 20, 2002), <http://www.nytimes.com/2002/10/20/business/a-biotech-outcast-awakens.html?pagewanted=all&src=pm>.

89. O’Connor, *supra* note 55. Provigil has “rapidly become a tempting pick-me-up to a nation that battles sleep with more than 100 million cups of coffee a day.” *Id.*

90. Sanneke A.M. van Vliet et al., *Efficacy of Caffeine and Modafinil in Counteracting Sleep Deprivation in the Marmoset Monkey*, 197 PSYCHOPHARMACOLOGY 59, 60 (2007) (listing studies that demonstrate Provigil’s beneficial effects during sleep deprivation). See generally Joseph V. Baranski et al., *Effects of Modafinil on Cognitive Performance During 40 Hr of Sleep Deprivation in a Warm Environment*, 14 MIL. PSYCHOL. 23, 23 (2002); Joseph V. Baranski et al., *Modafinil During 64 Hr of Sleep Deprivation: Dose-Related Effects on Fatigue, Alertness, and Cognitive Performance*, 10 MIL. PSYCHOL. 173, 173 (1998). Physicians prescribe Provigil to pilots, truck drivers, college students, and any others who “simply were sleepy or tired during the day without any associated medical condition.” Osborn, *supra* note 55, at 335 (“FDA’s Dr. Robert Temple suggested that he was not necessarily troubled by off-label use of Provigil in the case of truck drivers or others who might be driving while sleepy, noting that ‘[i]f they’re driving next to me, I think I’d prefer they be on it.’”).

91. See *supra* note 55 and accompanying text. Provigil enhances cognitive abilities in healthy individuals; for example, it enables people to remember an extra digit when the average person can hold only seven random digits in his or her memory. *Cognitive Enhancement, All on the Mind*, *supra* note 3, at 103. Besides increasing digit span, it also improves spatial planning, visual pattern-recognition memory, and response inhibition. Danielle C. Turner et al., *Modafinil Improves Cognition and Attentional Set Shifting in Patients with Chronic Schizophrenia*, 29 NEUROPSYCHOPHARMACOLOGY 1363, 1364 (2004).

percent of all prescriptions for this medication are for off-label purposes.⁹² Commentators have described this energy drug “as a more effective, non-addictive substitute to caffeine and amphetamines.”⁹³ Doctors declare it the new “lifestyle drug for a sleep-deprived 24/7 society.”⁹⁴ Johann Hari, an award-winning journalist who writes for the *New York Times*, *Los Angeles Times*, and *New Republic*, described his experiments with Provigil—as he took 200 milligrams every day for five days:

I picked up a book about quantum physics and super-string theory I have been meaning to read for ages It had been hanging over me, daring me to read it. Five hours later, I realised [sic] I had hit the last page I hadn’t noticed anything, except the words I was reading, and they came in cool, clear passages; I didn’t stop or stumble once.

Perplexed, I got up, made a sandwich—and I was overcome with the urge to write an article that had been kicking around my subconscious for months. It rushed out of me in a few hours, and it was better than usual

. . . .

92. See O’Connor, *supra* note 55; see also Osborn, *supra* note 55, at 305 (explaining that current law prohibits drug manufacturers from promoting off-label uses for their products). Interestingly, Cephalon, the U.S. manufacturer of Provigil, actually facilitated off-label campaigns until 2008. Evelyn Pringle, *The Rise and Fall of Provigil—Part II*, EVELYN PRINGLE’S CATALOG OF ARTICLES (Sept. 21, 2010, 4:49 AM), <http://evelynpringle.blogspot.com/2010/09/rise-and-fall-of-provigil-part-ii.html> (noting that Provigil sales continued to increase and topped the billion dollar mark in 2009).

93. Fox, *supra* note 56, at 1142; see also O’Connor, *supra* note 55 (describing Provigil as a small, white pill that “revs up the central nervous system without the jitteriness of caffeine or the addiction and euphoria of amphetamines”). However, some contend that Provigil is not significantly more effective at promoting wakefulness than a large dose of caffeine. Mehlman, *supra* note 13, at 484.

94. Pollack, *supra* note 88, at 31 (“[O]ne analyst at a brokerage firm . . . [said], ‘I used to drink twelve cups of coffee a day and now I don’t do that anymore.’”). Not all doctors consider Provigil beneficial; for example, Dr. Martha J. Farah, director of the Center for Cognitive Neuroscience at the University of Pennsylvania, explained, “‘This drug enables us to be that much more workaholic and that much more obsessed with accomplishments and productivity, and I think our society is already extreme along those lines [N]atural checks on that tendency, like needing to go to bed, are being rolled back by [Provigil].’” O’Connor, *supra* note 55. Others contend that the off-label cognitive use of Provigil represents a high-risk behavior that calls for further monitoring and intervention efforts. See Andersen et al., *supra* note 56, at 446.

The next morning I woke up and felt immediately alert. Normally it takes a coffee and an hour to kick-start my brain; today I'm ready to go from the second I rise. And so it continues like this, for five days: I inhale books and exhale articles effortlessly . . . I keep waiting for an exhausted crash, and it doesn't seem to come.⁹⁵

Because Provigil costs almost twenty-seven dollars per pill,⁹⁶ it is primarily popular with the higher education and income crowd.⁹⁷ For example, one recent survey of 1400 academics from sixty countries reported that one in five had taken medications for non-medical cognitive-enhancing purposes;⁹⁸ of that one in five, 40% used Provigil.⁹⁹ Students see it as the difference between an A and a B,¹⁰⁰ where enhanced concentration,

95. Johann Hari, *My Experiment with Smart Drugs*, JOHANNHARI.COM (May 5, 2008), www.johannhari.com/2008/05/06/my-experiment-with-smart-drugs (describing how he bought Provigil online from a foreign pharmacy and without a prescription). For a similar account detailing a writer's personal experiences with Provigil, see Chen, *supra* note 3, at 170.

96. In March 2012, one hundred 200-milligram tablets of Provigil cost \$2661.20—or \$26.61 per pill—at drugstore.com. *Provigil*, DRUGSTORE.COM, <http://www.drugstore.com/provigil/200mg-tablets/qxn63459020101> (last visited Mar. 1, 2012). Dr. Eric Heiligenstein, a psychiatrist at the University of Wisconsin, noted that while Provigil is a “very clean drug,” the “main barrier to more widespread use is that it's expensive, which will change as more insurance companies start to cover it.” O'Connor, *supra* note 55.

97. See Kirby, *supra* note 7, at 94 (calling Provigil an “entrepreneur's drug of choice”); see, e.g., O'Connor, *supra* note 55 (describing Provigil use as a “fixture” among college students, computer programmers, and “others determined to burn the midnight oil”); *60 Minutes*, *supra* note 81 (depicting an interview with a Harvard professor who uses Provigil and calls such cognitive enhancement “extremely common” in his profession).

98. Brendan Maher, *Poll Results: Look Who's Doping*, 452 NATURE 674, 674 (2008). “Apparently, while the chattering classes tsk-tsked the doping habits of pro athletes, those within their own circles—writers, designers, scientists, scholars—have been juicing up themselves, or secretly wishing they could.” Chen, *supra* note 3, at 170.

99. Maher, *supra* note 98, at 674 (noting that half of the respondents reported adverse side effects). One-third of the respondents purchased the drug over the Internet, while the remaining two-thirds obtained Provigil from pharmacies or with prescriptions. *Id.* at 675. “‘We aren't the teen clubbers popping uppers to get through a hard day running a cash register after binge drinking,’ wrote a Ph.D. research scientist . . . ‘We are responsible humans.’” Alexis Madrigal, *Wired.com Readers' Brain-Enhancing Drug Regimens*, WIRED (Apr. 24, 2008), http://www.wired.com/medtech/drugs/news/2008/04/smart_drugs. Other individuals who used Provigil in their cognitive-enhancement drug regimens included neuroscience graduate students, lawyers, and an elementary school teacher. *Id.*; see also Hill, *supra* note 87, at C01 (detailing the nonmedical use of Provigil among students and professionals).

100. Studies report Provigil's presence on both sides of the Atlantic—in the hands of U.S. and English university students. See, e.g., Katy Lee, *Wired Awake*, VARSITY (Nov. 16, 2007), <http://www.varsity.co.uk/news/807>; Margaret Talbot, *Can a Daily Pill Really Boost Your Brain Power?*, OBSERVER (Sept. 20, 2009), <http://www.guardian.co.uk/science/2009/sep/20/neuroenhancers-us-brain-power-drugs> (describing students' personal experiences with the medication); see also Madrigal, *supra* note 99 (coining this new era of scholastic drug experimentation as “personalized research”).

alertness, and short-term memory are useful qualities for complex term papers and all-night study sessions.¹⁰¹

The final commonly utilized cognitive enhancer is the beta blocker,¹⁰² which primarily enables off-label use in the public-performance setting.¹⁰³ Because beta blockers block the effects of adrenaline, they leave individuals calm in typically anxious situations.¹⁰⁴ Most likely, the first performers to exploit this off-label result were musicians, whose hands tend to become clammy and tremble during concert performances.¹⁰⁵ Now, beta blockers are found in a variety of other settings—golf tournaments,¹⁰⁶ pistol shooting contests,¹⁰⁷ and college campuses.¹⁰⁸ In a 1991 study investigating beta

101. *Being Provigilant About Enhancing the Brain*, BIOETHICS.NET BLOG (June 27, 2006, 12:59 AM), <http://www.bioethics.net/2006/06/being-provigilant-about-enhancing-the-brain> (describing Provigil as a new smart pill and even a possible ticket to Harvard Law). *But cf.* Gary Stix, *Turbocharging the Brain*, SCI. AM., Oct. 2009, at 46, 53 (“Users with lower IQs appear to derive a large performance boost from [Provigil], whereas those with more innate ability show little or no benefit.”). Specifically, medical students and residents admit to using Ritalin and Provigil to face 24-hour or longer work shifts, but the medical community largely polices itself, leaving many students with the belief that cognitive enhancement will continue to spread if not checked. Greely, *supra* note 6, at 1143; Mark Meier, *The End of Impairment? Generation Rx Goes to Medical School*, SCI. PROGRESS (Sept. 30, 2008), <http://scienceprogress.org/2008/09/the-end-of-impairment>.

102. *See supra* note 58 and accompanying text.

103. *See supra* note 60 and accompanying text.

104. *See supra* notes 59–60 and accompanying text; *see also* Elliott, *supra* note 59 (noting that the drug can keep the voice from quavering, hands from trembling, heart from pounding, and forehead from sweating).

105. Elliott, *supra* note 59 (describing a 1970s British study that tested the effects of beta blockers on musicians and found a significant improvement with usually nervous players); *see also* Watts, *supra* note 58 (reporting beta blocker use among musicians and music students). Musicians primarily rely on beta blockers to control fine motor tremors. Claudio M. Tamburrini & Torbjorn Tannsjo, *Transcending Human Limitations*, 1 SPORT, ETHICS & PHIL. 113, 113 (2007). One musician estimates that three-quarters of her peers use the drugs at least occasionally. Kaplan & Gellene, *supra* note 72. While professional musicians have taken this medication for years to combat stage fright, students in music schools are increasing their prescriptions too. David Stabler, *Better Music Through Chemistry? Music Students Turn to Medications to Calm Stage Fright*, PORTLAND OREGONIAN (Mar. 3, 2010), http://www.oregonlive.com/performance/index.ssf/2010/03/better_music_through_chemistry.html.

106. Sigman, *supra* note 58, at 156–57. Several top golfers have admitted to taking beta blockers or accused others of such use. *See* Christopher Clarey, *Clean as a Whistle That’s Never Blown*, INT’L HERALD TRIB., July 17, 2004, at 18; Dave Feschuk, *PGA Drug Tests Looming*, TORONTO STAR, Sept. 7, 2006, at B01.

107. Davis et al., *supra* note 59, at 586 (noting beta blocker use among athletes to reduce motor tremors, particularly in motor racing and pistol shooting). In 2008, an Olympic pistol shooter lost his medals after testing positive for beta blockers, and at the 2010 Paralympics, a Swedish wheelchair curler garnered suspension after taking a beta blocker. Watts, *supra* note 58. In general, beta blockers are used by individuals whose activities require “precision.” Shapiro, *supra* note 60, at 42. “Some may prefer to view such enhancement as more athletic than intellectual, but there is no sharp line here.” *Id.*

blocker effectiveness on test performance, thirty-two high school students, who had already taken the SAT and exhibited general exam anxiety, received a beta blocker one hour before retaking the test. The results? On average, they scored 130 points higher than their previous exams.¹⁰⁹ Professionally, both lawyers and doctors use beta blockers to combat the fear of public speaking.¹¹⁰

All four of these cognitive enhancers have already claimed a place next to textbook supplements and commercial outlines as modern educational study aids,¹¹¹ but with this rise in academic brain boosting, proponents and critics have called for a strict ethical scrutiny in certain situations, such as lower education classrooms.¹¹² Medical and law schools, which are ethically governed settings, also merit the same stringent analysis.¹¹³ As medical and law school students continue to jump on the bandwagon of cosmetic neurology,¹¹⁴ the question becomes whether their medicinal brain boosting is actually cheating.¹¹⁵

108. Watts, *supra* note 58 (reporting that beta blockers significantly improve exam performance for students who suffer from test anxiety). One scientific study noted that “beta-blockers may be particularly useful for students who do not do themselves justice because of examination nerves.” Desmond Kelly, *Beta-Blockers in Anxiety*, 1 STRESS MED. 143, 148 (1985). While beta blockers still allow energizing adrenaline to flow through people’s bodies, they prevent test takers from feeling that adrenaline, so they are not distracted by their own nervousness. Kaplan & Gellene, *supra* note 72.

109. Harris C. Faigel, *The Effect of Beta Blockade on Stress-Induced Cognitive Dysfunction in Adolescents*, 30 CLINICAL PEDIATRICS 441, 441 (1991) (noting that a normal score increase would have been thirty points). Other studies have duplicated similar results with other testing situations. See, e.g., D.Q. Beversdorf et al., *Central Beta-Adrenergic Modulation of Cognitive Flexibility*, 13 NEUROREPORT 2505, 2505 (2002) (using anagram problems); D.Q. Beversdorf et al., *Noradrenergic Modulation of Cognitive Flexibility in Problem Solving*, 10 NEUROREPORT 2763, 2764–66 (1999) (using three problem solving tasks—number series, shape manipulation, and anagrams); J.A. Silver et al., *Effect of Anxiolytics on Cognitive Flexibility in Problem Solving*, 17 COGNITIVE & BEHAV. NEUROLOGY 93, 93 (2004) (using three test sessions). Of course, beta blockers work best for nervous test takers, while non-anxious students show minimal improvement. See Elliott, *supra* note 59 (“[T]hey seem to level the playing field for anxious and non-anxious performers, helping nervous performers much more than they help performers who are naturally relaxed.”).

110. See Zev Chafets, *Drugs that Give You an Edge Just Part of the Game*, J. GAZETTE (Fort Wayne) (Feb. 15, 2009), <http://www.journalgazette.net/article/20090215/EDIT05/302159938/-1/EDIT01> (“Trial lawyers and Broadway actors pop beta blockers to ward off stage fright.”). Kaplan & Gellene, *supra* note 72 (“[S]ome doctors had . . . used the drugs themselves to calm their own nerves before making presentations at medical meetings.”). In the 2008 *Nature* survey, 15% of its academic respondents who reported use of cognitive-enhancement medications picked beta blockers as their drug of choice before giving presentations. Maher, *supra* note 98, at 674; see also Kelly, *supra* note 108, at 147–48 (“[T]here is no doubt that beta-blocking drugs can alleviate the unpleasant subjective symptoms associated with public speaking, especially in susceptible people. The major advantage is that the speaker is not sedated in any way, and so is not robbed of mental agility.”).

111. See *supra* notes 79, 100, 108 and accompanying text.

112. See *supra* notes 10–12 and accompanying text.

113. See *supra* notes 15–25 and accompanying text.

114. See *supra* notes 71, 101, 108 and accompanying text.

115. See *supra* note 26 and accompanying text.

III. NO BRAINER: IS COGNITIVE ENHANCEMENT CHEATING?

Taking medications—such as Adderall, Ritalin, or Provigil—without a physician’s prescription is illegal and, as such, is “a *per se* ethics violation.”¹¹⁶ While federal and state statutes govern the sale, distribution, and use of prescription drugs,¹¹⁷ the Controlled Substances Act compiles national regulations that individual states apply as their legal floor.¹¹⁸ This Act prohibits a person from “knowingly or intentionally” distributing, dispensing, or possessing a controlled substance not lawfully obtained from a doctor.¹¹⁹ As federally classified drugs, Adderall, Ritalin, and Provigil are such substances.¹²⁰ Federal and state laws stipulate that individuals who (1) take these cognitive-enhancement medications without prescriptions, (2) buy these medications from others, or (3) sell and share these medications with others are subject to criminal penalties—including arrest, fines, and imprisonment.¹²¹ Both the AMA and ABA recognize illegal acts like these

116. Fenton & Wunderlich, *supra* note 44, at 17; *see also infra* note 122 and accompanying text. Medical prescriptions are licenses that permit a drug’s sale or use in certain circumstances. RICHARDS, *supra* note 2, at 190. States license doctors as “competent medical professional[s]” so that they can then license the sale or use of medications. *Id.*

117. *See* Leamor Kahanov et al., *Adherence to Drug-Dispensation and Drug-Administration Laws and Guidelines in Collegiate Athletic Training Rooms: A 5-Year Review*, 45 J. ATHLETIC TRAINING 299, 299 (2010) (explaining that federal and state laws direct prescription and over-the-counter drug dispensation and administration); *see also* John Goetz & Donald Lund, *What the Law Allows*, PHARMACEUTICAL EXECUTIVE, Aug. 2000, at 76, 78, 82 (addressing the state and federal statutes that govern online pharmaceutical sales).

118. *See* 21 U.S.C. § 801 (2006).

119. *Id.* § 841. Controlled substances are the drugs listed in Schedules I through V of the Controlled Substances Act. *Id.* §§ 811–812. Illegal drug use is the use of a controlled substance not in accordance with a valid prescription. *See* 10 C.F.R. § 707.4 (2012).

120. *See supra* notes 51, 57 and accompanying text (explaining that Adderall and Ritalin are Schedule II drugs and Provigil is a Schedule IV drug). The Controlled Substances Act does not apply to beta blockers. *See supra* note 67 and accompanying text. As Schedule II drugs, Adderall and Ritalin prescriptions are limited to thirty days worth of doses with no automatic refills. DeSantis et al., *supra* note 81, at 320 (noting that these medications are also subject to DEA production quotas). As a Schedule IV drug, Provigil is not restricted in its production; instead, the DEA places restraints on its manufacture and distribution. RICHARDS, *supra* note 2, at 164.

121. *See* 21 U.S.C. § 841 (2006); *see also supra* note 117 and accompanying text. While penalties vary depending on the amount of medication and its schedule classification, imprisonment ranges from one year to life and fines from \$100,000 to \$50,000,000, with penalties doubling for second offenses. *See* 21 U.S.C. § 841. Federal law also prohibits buying controlled substances online without a valid prescription and recognizes the importation of drugs into the United States as a felony. Goetz & Lund, *supra* note 117, at 78; *see also* Consumer Alert, *Prescription Drugs: Buying On-Line Could Mean Doing Time*, DEA OFFICE OF DIVERSION CONTROL, www.deadiversion.usdoj.gov/consumer_alert.htm (last visited Mar. 1, 2012) (warning that most rogue pharmaceutical websites are usually based in foreign countries). A 2008 study found that 85% of all websites that sold medications required no physician’s prescription, making the illicit nature of

as per se ethics violations.¹²² But ethical lines begin to blur when brain-boosting users obtain *legal* prescriptions for off-label purposes, and the real question becomes whether “legal” use is unethical when students pop cognitive enhancers for medical and law school examinations.¹²³

When debating the ethical implications of cognitive enhancement by society at large, proponents and critics commonly focus on three concerns: safety concerns, social implications, and fairness issues.¹²⁴ These categories provide an apt framework for the analysis of brain boosting within a narrower segment of society—the classrooms of medical and law school universities.¹²⁵

A. *Look Who’s Doping: Safety Concerns with Scholastic Steroids*

The Federal Food, Drug, and Cosmetic Act requires that drug manufacturers establish that medications are safe for their intended purposes.¹²⁶ However, the law permits physicians to prescribe drugs for off-

online drug sales apparent. Bryan A. Liang & Tim Mackey, *Searching for Safety: Addressing Search Engine, Website, and Provider Accountability for Illicit Online Drug Sales*, 35 AM. J.L. & MED. 125, 126 (2009). For example, one recent survey of 1811 students at a large public university discovered that 34% of the students who reported taking stimulants for cognitive enhancement claimed to use such prescription medications illegally. DeSantis & Hane, *supra* note 79, at 32.

122. See generally CODE OF MEDICAL ETHICS OP. 8.15 (1986) (addressing substance abuse among doctors); MODEL CODE OF PROF’L CONDUCT R. 8.4(b) (2010) (discussing professional misconduct among lawyers). The AMA also discourages doctors or student doctors from self-prescribing or prescribing for their peers. See CODE OF MEDICAL ETHICS OP. 8.19 (1993); CODE OF MEDICAL ETHICS OP. 8.191 (2008).

123. See Fenton & Wunderlich, *supra* note 44, at 17. This ethical analysis should focus on the subjective intent of the drug takers, or the medical and law school students “who ‘game’ the system to get legally—yet ethically questionable”—prescription medications. *Id.* As one journalist summarized, “In the real world, there are no rules to prevent overachievers from using legally prescribed drugs to operate at peak mental performance.” Kaplan & Gellene, *supra* note 72 (asking what patient would not want his or her surgeon to be at such a level for life-or-death procedures).

124. See, e.g., Fox, *supra* note 56, at 1146–49; Greely, *supra* note 6, at 1148. For instance, a commentator explained, “While [cognitive-enhancement drug] use is not inherently unethical, steps must be taken to ensure that they are safe, that they are widely available to promote equality of opportunity, and that individuals are free to decide whether or not to use them.” Mehlman, *supra* note 13, at 483.

125. See *supra* text accompanying notes 113–15.

126. 21 U.S.C. § 355(b)(1) (2006). Congress passed the Food, Drug, and Cosmetic Act in 1938 to ensure that the FDA had the authority to conduct pre-market safety reviews for all “new drugs.” Victor E. Schwartz et al., *Marketing Pharmaceutical Products in the Twenty-First Century: An Analysis of the Continued Viability of Traditional Principles of Law in the Age of Direct-to-Consumer Advertising*, 32 HARV. J.L. & PUB. POL’Y 333, 339 (2009) (providing a detailed history behind the Act); see also Michelle Meadows, *A Century of Ensuring Safe Foods and Cosmetics*, FDA CONSUMER, Jan.–Feb. 2006, at 6, 8–9 (explaining the Act’s impact on drug and food regulation). Although the Act represents federal law, more than half of the states have adopted a Uniform State Food, Drug, and Cosmetic Bill, closely patterned after the federal act. *Developments in the Law—The Federal Food, Drug, and Cosmetic Act*, 67 HARV. L. REV. 632, 636 (1954); see also JOHN E.H. SHERRY, THE LAWS OF INNKEEPERS—FOR HOTELS, MOTELS, RESTAURANTS, AND

label reasons, although manufacturers have not submitted any “safety or efficacy data to the FDA substantiating the so-called off-label use.”¹²⁷ This means cognitive enhancement—an unapproved, unsubstantiated, non-therapeutic purpose¹²⁸—may pose unknown safety risks, including adverse side effects, addictive propensities, other long-term dangers, and personalized research hazards.¹²⁹ For example, the World Anti-Doping Agency (WADA) already prohibits all four types of cognitive enhancers in a variety of sports, primarily relying on their actual or potential risks to an athlete’s health, rather than their ability to create unfair advantages.¹³⁰

CLUBS 633 (3d ed. 1993) (explaining that the federal law does not completely preempt state law as long as the states do not contravene the federal act).

127. Mehlman, *supra* note 13, at 486 (“Organized medicine has staunchly defended this prerogative as an exercise of professional autonomy within the practice of medicine, a realm that the FDA has long acknowledged lies outside the scope of its authority.”). Although the law does restrict manufacturers’ abilities to promote off-label medicinal use, the practice still persists. Marc A. Rodwin, *Drug Advertising, Continuing Medical Education, and Physician Prescribing: A Historical Review and Reform Proposal*, 38 J.L. MED. & ETHICS 807, 809 (2010); *see, e.g.*, Stix, *supra* note 101, at 55 (explaining that Cephalon already paid nearly \$444 million to two states and the federal government for its illegal promotion of Provigil for unapproved uses); *supra* note 92 and accompanying text (noting Cephalon’s off-label marketing of Provigil); *see also* Michael Jon Andersen, *Bound Guidance: FDA Rulemaking for Off-Label Pharmaceutical Drug Marketing*, 60 CASE W. RES. L. REV. 531, 532 (2010) (“[D]espite the marketing restrictions, manufacturers utilize a number of methods to promote off-label uses of pharmaceuticals, including paying for professional education sessions, hiring speakers, engaging in direct mail campaigns, and reprinting favorable journal articles.”).

128. *See supra* text accompanying note 69 (noting that FDA-approved uses do not include cognitive enhancement).

129. *See* Greely, *supra* note 49, at 129–30 (stating that safety concerns are the strongest arguments against medicinal cognitive enhancement). “‘It would be wonderful if one could take a drug and be smarter, faster, or have more energy,’ said Nora Volkow, director of the National Institute on Drug Abuse ‘But that is like fairy tales. We currently have nothing that has those benefits without side effects.’” Carla K. Johnson, *The Downside of ‘Smart Drug’: Study Finds It May Be Addictive*, STAR-LEDGER, Mar. 18, 2009, at 9, available at 2009 WLNR 5142091.

130. Cakic, *supra* note 71, at 613 (“Caffeine, for example, reliably increases performance in a range of sports including swimming, cycling and running at doses allowed by WADA. Yet despite being a form of ‘cheating’ in the same vein as anabolic steroids, caffeine’s use in sport is permitted because it is relatively harmless.”). *See generally* *The World Anti-Doping Code: The 2011 Prohibited List—International Standard*, WORLD ANTI-DOPING AGENCY (Sept. 18, 2010), available at http://www.wada-ama.org/Documents/World_Anti-Doping_Program/WADP-Prohibited-list/To_be_effective/WADA_Prohibited_List_2011_EN.pdf (noting that this list took effect January 1, 2011). WADA prohibits Adderall, Ritalin, and Provigil for all in-competition situations but it bans beta blockers only for sixteen in-competition sports and two out-of-competition and in-competition categories—archery and shooting. *Id.* at 7–9.

1. Adverse Side Effects

Possible side effects of cognitive enhancers vary depending on the medication. Adderall and Ritalin commonly cause dizziness, irritability, headache, appetite suppression, and insomnia.¹³¹ Their more serious side reactions include stroke, seizure, heart attack, blurred vision, psychiatric disturbance, and death.¹³²

While Provigil chemically works in a similar manner as Adderall and Ritalin,¹³³ its common side effects are less severe: back pain, stuffy nose, and upset stomach.¹³⁴ Provigil's more serious potential side effects include psychiatric experiences, heart difficulties, and rashes that require

131. MEDICATION GUIDE: ADDERALL XR, *supra* note 48, at 3; MEDICATION GUIDE: RITALIN, *supra* note 48, at 2; *see also* Johnny Graham & David Coghill, *Adverse Effects of Pharmacotherapies for Attention-Deficit Hyperactivity Disorder: Epidemiology, Prevention and Management*, 22 CNS DRUGS 213, 216 (2008) (analyzing numerous studies that largely agree on the common adverse effects of stimulant medications). *But see* Madhiraju, *supra* note 36, at 1666 (noting that Ritalin's common side effects of headache, insomnia, and loss of appetite usually dissipate quickly). Ritalin's other possible adverse reactions include a decreased ability to learn, social withdrawal, abdominal pain, extensive bruising, and abnormally low white and red blood cell counts. Szufflita, *supra* note 36; *see also* Chiumino, *supra* note 12, at 383 (warning that children also may develop Tourette's Syndrome).

132. Schieffelin, *supra* note 13, at 973. *See also* Gardiner Harris, *Warning Urged on Stimulants Like Ritalin*, N.Y. TIMES (Feb. 10, 2006), <http://www.nytimes.com/2006/02/10/health/policy/10drug.html?pagewanted=all> (explaining that reports of sudden death have never exceeded one in a million for any stimulant drug). In 2004, more than 3000 people visited hospital emergency rooms because of adverse reactions from AD/HD medications. Miranda Hitti, *ADHD Drugs Tied to ER Visits*, WEBMD HEALTH NEWS (May 25, 2006), <http://www.webmd.com/add-adhd/news/20060525/adhd-drugs-tied-to-er-visits> (noting that most of the cases requiring hospitalization were linked to inappropriate use of the stimulant drugs). In 2006, a federal advisory panel recommended that drug manufacturers place prominent warnings describing their possible dangerous cardiac effects on AD/HD medication labels. Harris, *supra* (“[The committee] voted 8 to 7 to suggest that stimulant labels carry the most serious of the agency’s drug-risk warnings—a ‘black box.’”). Both the Adderall and Ritalin medication guides already caution that people who are very agitated, anxious, or tense should not take these stimulants, thereby warning against consumption by most medical and law school students. *See* MEDICATION GUIDE: ADDERALL XR, *supra* note 48, at 1; MEDICATION GUIDE: RITALIN, *supra* note 48, at 2.

133. *See supra* note 56 and accompanying text.

134. MEDICATION GUIDE: PROVIGIL, *supra* note 54, at 39; *see also* Yaron Dagan & Julia T. Doljansky, *Cognitive Performance During Sustained Wakefulness: A Low Dose of Caffeine Is Equally Effective as Modafinil in Alleviating the Nocturnal Decline*, 23 CHRONOBIOLOGY INT’L 973, 974 (2006) (observing that Provigil’s mild side effects are only expressed at high doses—usually requiring more than 600 milligrams).

hospitalization.¹³⁵ In actuality, Provigil's adverse side effects "are rarely worse than a mild headache or slight nausea."¹³⁶

Lastly, beta blockers commonly engender dizziness, fatigue, and cold hands.¹³⁷ Their less recognized reactions include loss of sex drive, breathing difficulties, insomnia, abdominal cramping, hallucination, and short-term memory loss.¹³⁸ Although Provigil and beta blocker consumption rarely pose serious safety concerns—unlike Adderall and Ritalin¹³⁹—all four cognitive enhancers can create severe complications, including heart problems, psychiatric experiences, and death.¹⁴⁰

2. Abuse Potentials

These cognitive enhancers also differ in their potential for abuse or addiction.¹⁴¹ Adderall, Ritalin, and Provigil are federally-specified schedule drugs, or federally controlled substances, because they can encourage abuse or dependence.¹⁴² As Schedule II medications, Adderall and Ritalin exhibit a high potential for prompting severe physical and psychological

135. MEDICATION GUIDE: PROVIGIL, *supra* note 54, at 39; *Cephalon Response to the March 18, 2009, JAMA Article, "The Effects of Modafinil on Dopamine and Dopamine Transporters in the Male Human Brain,"* CEPHALON (Mar. 2009), <http://www.cephalon.com/media/on-the-record/cephalon-response-to-march-18-2009-jama-article-the-effects-of-modafinil-on-dopamine-and-dopamine-transporters-in-the-male-human-brain.html> (additionally listing chest pain, breathing difficulty, hallucination, aggression, and suicidal thoughts).

136. O'Connor, *supra* note 55 (noting that in clinical trials, only about one percent of patients complained of any side effects). Most Provigil users do not even experience the jitteriness associated with amphetamines. Osborn, *supra* note 55, at 334. At an advisory panel meeting in 2003, FDA officials even suggested "they were not overly concerned" with Provigil use by healthy adults because it was "generally safe." Andrew Pollack & Alicia Ault, *Advisory Panel Endorses More Uses for Stimulant*, N.Y. TIMES (Sept. 26, 2003), <http://www.nytimes.com/2003/09/26/business/advisory-panel-endorses-more-uses-for-stimulant.html>.

137. MEDICATION GUIDE: LOPRESSOR HCT, *supra* note 65, at 7–8 (noting that adverse effects are "mild and transient"); MEDICATION GUIDE: TOPROL-XL, *supra* note 66, at 13; *see also* Sigman, *supra* note 58, at 157. Beta blockers can make users tired or dizzy by slowing or weakening their heartbeat. Catherine Nelson, *The Taboo Tablet: Drugs and Performance*, STRAD, Aug. 2010, at 24, 26. These medications can also cause cold hands and feet by constricting small blood vessels and, consequently, reducing the blood's circulation to these limbs. *Id.* Generally, any unwanted effects are uncommon. Kelly, *supra* note 108, at 149.

138. Sigman, *supra* note 58, at 157; *see also* Inderal, *supra* note 63.

139. *See supra* notes 131, 134, 137 and accompanying text.

140. *See supra* notes 132, 135, 138 and accompanying text.

141. *See supra* notes 49, 57, 67 and accompanying text.

142. *See supra* note 120 and accompanying text. Schedules are federally-imposed classifications of drugs that are popular for addictive or recreational use. Greely, *supra* note 49, at 115 (noting that federal law requires special handling and paperwork requirements for scheduled medications).

dependence.¹⁴³ Provigil, a Schedule IV medication, is said to have a lesser potential for abuse and may lead to dependence in only some users.¹⁴⁴ However, recent scientific studies have found that Provigil chemically binds to the same dopamine transporter sites as cocaine and Ritalin—leaving its abuse potential in question.¹⁴⁵ In contrast, beta blockers are not federally controlled substances because they present zero addiction potential.¹⁴⁶ They also tend to be fairly safe¹⁴⁷ and relatively inexpensive.¹⁴⁸

3. Long-Term Dangers

Regardless of their differing potentials for dependence,¹⁴⁹ cognitive-enhancement medications can create undesirable risks if non-addicted

143. See *supra* note 49. Dependence leads to extended stimulant use or abuse, which can create numerous adverse reactions. See *infra* notes 156–57 and accompanying text. Besides a high abuse potential, stimulant medications also induce unpleasant withdrawal effects. Vliet et al., *supra* note 90, at 60. Physical dependence generates withdrawal symptoms when drug use is stopped. RICHARDS, *supra* note 2, at 174.

144. See *supra* note 57 and accompanying text. For instance, after Hari experimented with Provigil for five days and decided to take a three-day break, he reported he “painlessly sagged back to [his] former somewhat-depleted state, as though the Provigil had never happened.” Hari, *supra* note 95; see also *supra* note 95 and accompanying text (recounting Hari’s short experience with Provigil). Nonetheless, he also wrote that he “stared sadly at the pack of Provigil, and every time [he] hit a mental stumbling block, [he] had to discipline [himself] not to crack out a Provigil.” Hari, *supra* note 95.

145. See *supra* notes 56–57; see also Raminder Kumar, *Approved and Investigational Uses of Modafinil: An Evidence-Based Review*, 68 DRUGS 1803, 1828–29 (2008) (describing a recent study where Provigil had a similar profile as Ritalin). But see Volkow et al., *supra* note 56, at 1152–53 (noting that reports of Provigil abuse are rare and less frequent than those for Adderall and Ritalin). However, one psychiatrist said he has treated three cases of Provigil addiction—“I had two doctors back-to-back who were addicted . . . [to Provigil], so I became alarmed” Rita Rubin, *A Warning on Off-Label Use of Sleep-Disorder Drug*, USA TODAY (Mar. 17, 2009), http://www.usatoday.com/news/health/2009-03-17-awake-modafinil_N.htm (explaining that drugs that increase dopamine levels have potential for abuse). In July 2010, the European Medicines Agency recommended that Europeans only use Provigil to treat sleepiness associated with narcolepsy; the Agency presented this advisement to the European Commission after concluding that Provigil’s medicinal risks outweighed any other beneficial purpose. See Press Release, European Meds. Agency, European Meds. Agency Recommends Restricting the Use of Modafinil (July 22, 2010), available at http://www.ema.europa.eu/docs/en_GB/document_library/Press_release/2010/07/WC500094976.pdf (noting safety concerns that related to psychiatric disorders, skin reactions, potential for abuse, and significant off-label use).

146. See *supra* note 67 and accompanying text. Nevertheless, extended beta blocker use may still cause adverse side effects. See *infra* notes 161–62 and accompanying text.

147. SYNCOPE: MECHANISMS AND MANAGEMENT 60 (Blair P. Grubb & Brian Olshansky eds., 2d ed. 2005). *Contra infra* notes 174–77 and accompanying text (describing the effects of beta blocker poisonings).

148. Beta blockers usually are the cheapest cognitive-enhancement medications; for example, drugstore.com sells 100 twenty-milligram tablets of propranolol hcl for \$13.99—about 14¢ per pill. *Propranolol Hcl*, DRUGSTORE.COM, <http://www.drugstore.com/propranolol-hcl/inderal/20mg-tablets/qxn23155011110> (last visited Mar. 1, 2012); see also *supra* note 96 (noting, in contrast, that drugstore.com sells Provigil for \$26.61 per pill).

149. See *supra* text accompanying note 141.

students voluntarily take them over a protracted time.¹⁵⁰ While students usually complete medical and law school educations within three or four years,¹⁵¹ they may not stop taking brain boosters upon graduating if their high-pressured professions seem to demand the enhanced capabilities the drugs can provide.¹⁵² Both brain-boosting critics and proponents acknowledge a lack of concrete information about the long-term use of cognitive enhancers by healthy adults—leaving medicinal mental doping in a state of dangerous uncertainty.¹⁵³ Questions remain as to whether extended use actually diminishes vital aspects of intellectual activity—such as verbal fluency, creativity, and abstract thinking—through cognitive constriction.¹⁵⁴ “[I]t remains to be seen whether [cognitive enhancers]

150. See Mehlman, *supra* note 13, at 485 (arguing that deleterious side effects may be exacerbated by long-term use).

151. See U.S. GOV’T ACCOUNTABILITY OFFICE, GAO-10-412, FOREIGN MEDICAL SCHOOLS: EDUCATION SHOULD IMPROVE MONITORING OF SCHOOLS THAT PARTICIPATE IN THE FEDERAL STUDENT LOAN PROGRAM 20 (2010), available at <http://www.gao.gov/assets/310/306021.pdf> (noting that most U.S. medical school programs last four years and some foreign programs last three); William D. Henderson, *The LSAT, Law School Exams, and Meritocracy: The Surprising and Undertheorized Role of Test-Taking Speed*, 82 TEX. L. REV. 975, 998, 1023 (2004) (observing that law school programs usually last three years).

152. See Mehlman, *supra* note 13, at 485. “Even if the use of cognitive enhancements is not explicitly mandated, people may feel that they must do so in order to succeed or just to stay where they are in competitive endeavors.” *Id.* at 488. Another commentator warned against the future of employment discrimination, where students must either continue to enhance their brains for employers who expect the same output they demonstrated in school or endure discrimination because of their lessened cognitive abilities. See J.M. Appel, *When the Boss Turns Pusher: A Proposal for Employee Protections in the Age of Cosmetic Neurology*, 34 J. MED. ETHICS 616, 617 (2008); see also Megan Ogilvie, *Stronger, Faster, Smarter?*, TORONTO STAR (Feb. 2, 2008), <http://www.thestar.com/News/article/299706> (explaining that employees may use cognitive enhancers to work better, faster, and longer, and to keep up with other colleagues who also consume brain boosters).

153. Daniel J. DeNoon, *Brain-Boosting Drugs FAQ: What You Must Know*, WEBMD HEALTH NEWS (Dec. 11, 2008), <http://www.webmd.com/brain/news/20081211/brain-boosting-faq-what-you-must-know> (observing that scientists recommend “[a]ccelerated research into the risks and benefits of cognitive enhancement”); see, e.g., Watts, *supra* note 58 (asserting that research has yet to determine the consequences of long-term beta blocker use by the healthy). A shortage of focused research hampers not only the understanding of long-term effects of these drugs but also the development of more effective cognitive enhancers. Nick Jackson, *Against the Grain: ‘The Benefits of Brain-Boosting Drugs Are Huge,’* INDEP. EDUC. (May 29, 2008), <http://www.independent.co.uk/news/education/higher/against-the-grain-the-benefits-of-brainboosting-drugs-are-huge-835576.html>. One neuroscientist at Brown University Medical School explained, “There are lots of quick and dirty studies of cognitive enhancement that make the news, but the number of rigorous, well-designed studies that will stand the test of time is much smaller We’re sort of in the Wild West.” Sharon Begley, *Can You Build a Better Brain?*, NEWSWEEK, Jan. 2011, at 40.

154. Jacquelyn H. Flaskerud, *American Culture and Neuro-Cognitive Enhancing Drugs*, 31 ISSUES MENTAL HEALTH NURSING 62, 63 (2010); see also Goodman, *supra* note 81, at 148 (discussing the concerns with hampered lateral thinking). Cognitive constriction is the “narrowing

represent a pharmacological ‘free lunch’ or if the enhancement of some cognitive functions can only be realized at the expense of others.”¹⁵⁵

For Adderall and Ritalin, the nationwide McCabe survey found long-term, non-medical prescription stimulant consumers were “more likely to report use of alcohol, cigarettes, marijuana, ecstasy, cocaine, and other risky behaviors.”¹⁵⁶ Moreover, extensive abuse of stimulant medications can encourage nervous system anomalies, extreme depression, seizures, schizophrenia, and toxic psychosis.¹⁵⁷ Although doctors consider Provigil less harmful than stimulants,¹⁵⁸ some scientists declare that its long-term manipulation of the sleep system can have dire consequences.¹⁵⁹ Chronic sleep deprivation weakens the immune system, damages health, increases the likelihood of disease, and is linked to a shorter life span.¹⁶⁰ Finally, for beta blocker consumption, studies demonstrate that extended use causes such adverse effects as depression, nightmares, wheezing, sexual

of attentional focus, such that stimuli which are ‘peripheral’ in space, time, or meaning to the subject are relatively ignored.” Mary V. Solanto, *Dosage Effects of Ritalin on Cognition*, in RITALIN: THEORY AND PATIENT MANAGEMENT 233, 240 (Laurence L. Greenhill & Betty B. Osman eds., 1991). For example, a lawyer who took Provigil daily for several months said all his daydreaming, extraneous thoughts, and distractions disappeared—leaving only complete concentration for the task at hand. Madrigal, *supra* note 99. But one college student claimed stimulant medications made her feel more creative, focused, and energetic. *Id.* (explaining how Adderall helped her write a thirty-five-page thesis in less than twelve hours). Many critics of cognitive enhancement suggest that unknown future harms outweigh any short-term intellectual benefits. Appel, *supra* note 152, at 617.

155. Cakic, *supra* note 71, at 613. The executive director of the Neurotechnology Industry Organization warned that poor research on healthy adult consumption means consumers may not notice serious side effects of cognitive enhancers until at least twenty years down the road. Kirby, *supra* note 7, at 94.

156. McCabe et al., *supra* note 80, at 96; *see also supra* note 80 and accompanying text (describing the survey’s general results).

157. *See* Madhiraju, *supra* note 36, at 1667; Pavisian, *supra* note 42, at 179. Toxic psychosis is a “severe mental illness in which the patient loses contact with reality.” BANTAM MEDICAL DICTIONARY 358 (rev. ed. 1990).

158. *See supra* note 94 and accompanying text.

159. O’Connor, *supra* note 55; *see also* Szuflika, *supra* note 36 (“[A]buse of such drugs can lead to serious sleep deprivation in a demographic group that is already very sleep deprived.”). Dr. David Slamowitz, a sleep disorder specialist, cautioned, “‘People think they can now burn the candle at both ends and not have to pay for it if they take this drug’ But even if a person doesn’t feel the need for sleep . . . doing without it can be harmful.” Pollack, *supra* note 88, at 31.

160. O’Connor, *supra* note 55. *But see* Vliet et al., *supra* note 90, at 59 (recommending wake-promoting drugs to combat the detrimental consequences of sleepiness). Skimping on sleep affects a person’s judgment; for example, many blame the lack of sleep for such disasters as the Exxon Valdez oil spill, Chernobyl nuclear meltdown, and the space shuttle Challenger incident. O’Connor, *supra* note 55. In terms of mental impairment, eighteen hours of no sleep is equivalent to a 0.05 blood alcohol level; twenty-one hours of no sleep is equivalent to a 0.08 blood alcohol level—which is illegal when driving in most states. *Id.* (quoting the director of the University of Michigan’s sleep disorders center).

dysfunction, and light-headedness.¹⁶¹ Rarer reactions include weight gain, hypertension, and increased risk of new-onset diabetes.¹⁶²

4. Personalized Research Risks

The final safety concern for medicinal cognitive enhancement is the risk inherent in personalized research, or self-experimentation,¹⁶³ where individuals try different dosages and methods of administration “in a wild, crowdsourced, ad hoc brain-enhancement experiment.”¹⁶⁴ Because cognitive enhancement is an off-label purpose, the FDA does not require drug manufacturers to set dosages and methods for this type of use—leaving consumers to discover their own personal drug regimens.¹⁶⁵ Even in the face of hazardous uncertainty, these consumers still readily embark on such a precarious path:

It’s hard to know exactly how many healthy adults are doping their brains. Anecdotal evidence on the Internet suggests an underground enhancement culture is taking shape not unlike what occurred in the early days of steroid use in bodybuilding. In online forums devoted to cognition enhancement, participants rhyme off their pharmaceutical regimens the same way other people swap

161. F.H. Messerli et al., *Cardioprotection with Beta-Blockers: Myths, Facts and Pascal’s Wager*, 266 J. INTERNAL MED. 232, 239 (2009); see, e.g., Watts, *supra* note 58 (describing an incident where a doctor passed out during his presentation after taking a beta blocker for stage fright). A 1998 research study confirmed that some beta blockers can decrease sexual libido and even cause impotence with long-term use. R. Fogari et al., *Libido Decreases with Long-Term Beta-Blocker Use*, 11 AM. J. HYPERTENSION 1244, 1244 (1998); see also Paul C. Ajamian, *Beta-Blockers: Treat with Care*, REV. OPTOMETRY, Feb. 2001, at 89, 89 (recommending that physicians advise male patients that beta blocker consumption may affect their sexual performances).

162. Messerli et al., *supra* note 161, at 239.

163. See THE OXFORD ILLUSTRATED COMPANION TO MEDICINE 744–45 (Stephen Lock et al. eds., 3d ed. 2001) (“Observing and measuring the effects on oneself of ingested or injected drugs have long been mainstays of experimental pharmacology.”).

164. Madrigal, *supra* note 99 (listing more than fifteen different drug regimens from students, scientists, and executives). For example, a scientist at the MIT-affiliated Whitehead Institute for Biomedical Research explained how he experimented with Provigil dosages over several weeks: “200 mg in the morning, 100 mg, 50 mg, 10 mg, and then split doses of more in the morning and a reduced dose at lunch.” *Id.* A wireless ISP owner said his drug regimen was half a Provigil tablet and three ginkgo capsules in the mornings—to activate his triple espresso. *Id.* Lastly, a Florida college student claimed that taking thirty-milligram Adderall XR improved his focus, attention to detail, and test scores. *Id.*

165. See *supra* notes 69, 127–28 and accompanying text. This lack of FDA oversight may explain why a recent survey among doctors found that “they’re more comfortable prescribing sex drugs than smart drugs.” Begley, *supra* note 153, at 41.

cocktail recipes. Except in this case, the ingredients are some of the most powerful compounds on the market, approved to treat not just narcolepsy and attention deficit disorder, but also Parkinson's disease, Alzheimer's and depression.¹⁶⁶

The two most notable dangers of self-experimentation are drug overdose¹⁶⁷ and unforeseeable medicinal interactions.¹⁶⁸ Overdosing can be accidental or premeditated.¹⁶⁹ For stimulant users, most overdosing is probably premeditated because unintentional overdosing on the recommended amount is a rare occurrence.¹⁷⁰ When acute Adderall overdose does occur, it can result in hypertension, seizure, hyperthermia, hallucination, stroke, or death.¹⁷¹ Similarly, Ritalin overdose can cause irregular heartbeat, seizure, and cardiac failure.¹⁷² Provigil overdose has less severe consequences—such as nausea, diarrhea, confusion, and hallucination.¹⁷³ Lastly, beta blockers vary in their acute overdose potential

166. Kirby, *supra* note 7, at 94.

167. DeNoon, *supra* note 153. Overdosing is “a result of ‘super dosage’ in the use of one or more substances that trigger physiological alterations which can seriously compromise the user’s health and require immediate medical attention to avoid death.” Eroy Aparecida da Silva et al., *Death by Drug Overdose: Impact on Families*, 39 J. PSYCHOACTIVE DRUGS 301, 302 (2007).

168. Barbara Sahakian & Sharon Morein-Zamir, *Professor’s Little Helper*, 450 NATURE 1157, 1158 (2007) (explicitly not advocating self-medication because of potential drug interactions).

169. Silva et al., *supra* note 167, at 303 (noting that unintentional “super dosage” occurs (1) when compulsive drug use leads consumers to lose awareness of their past ingestion or (2) when drugs contain unexpectedly high lethal potentials).

170. See Robert M. Diener, *Toxicology of Ritalin*, in RITALIN: THEORY AND PATIENT MANAGEMENT 35, 42 (Laurence L. Greenhill & Betty B. Osman eds., 1991); Pavisian, *supra* note 42, at 179. For example, while a single recommended Adderall dosage is ten to thirty milligrams, a person may need to consume 400 to 500 milligrams before a dose turns fatal. Pavisian, *supra* note 42, at 178–79. Overdosing on Adderall more easily occurs when users do not swallow extended-release Adderall XR tablets whole, but instead crush or chew them, because too much of the drug enters a body’s biological system at one time. See MEDICATION GUIDE: ADDERALL XR, *supra* note 48, at 2. If consumers cannot swallow Adderall XR capsules, the medication guide recommends they open the capsules, sprinkle the medicine on a spoonful of applesauce, and swallow all the applesauce without chewing. *Id.* Although overdose potential is low for recommended doses, prolonged stimulant use can create dependence and tolerance that may necessitate higher doses to achieve desired effects. See Pritesh J. Gandhi et al., *Myocardial Infarction in an Adolescent Taking Adderall*, 62 AM. J. HEALTH-SYS. PHARMACY 1494, 1494 (2005).

171. Gandhi et al., *supra* note 170, at 1494. However, statistical reports suggest most Adderall-related deaths result from chronic or extended consumption, not acute toxicity. Steven Karch, *The Problem of Methamphetamine Toxicity*, 170 W. J. MED. 232, 232 (1999).

172. Diener, *supra* note 170, at 42. Mild Ritalin overdoses potentially foster insomnia, nervousness, hypersensitivity, anorexia, palpitations, drowsiness, headache, blood pressure changes, and abdominal pain. *Id.*

173. *Provigil*, *supra* note 54; see also MEDICATION GUIDE: PROVIGIL, *supra* note 54, at 39. *Contra* Kumar, *supra* note 145, at 1804 (asserting that Provigil has “serious dermatological toxicity”). Provigil overdose is infrequent and rarely life threatening. Henry A. Spiller et al., *Toxicity from Modafinil Ingestion*, 47 CLINICAL TOXICOLOGY 153, 155 (2009). While 137 Provigil overdoses were reported at fifteen poison centers from eleven states during an eight-year period, intentional abuse occurred in only seven of those cases. *Id.*

with Inderal predominantly provoking the most beta blocker poisonings.¹⁷⁴ However, overdosing on Inderal, Lopressor, or Toprol-XL can all lead to seizure, bronchospasm,¹⁷⁵ hypotension,¹⁷⁶ and cardiac failure.¹⁷⁷

Besides the possibility of an overdose, self-experimenting with cognitive enhancers can result in unanticipated interactions with other drugs or substances.¹⁷⁸ For instance, the medication guides for Adderall, Ritalin, and Provigil warn that interactions with other prescriptions may engender serious side effects.¹⁷⁹ FDA-approved medication guides also advise Provigil and beta blocker patients to avoid alcohol.¹⁸⁰ Lastly, the beta blocker medication guides specifically list other drugs that inhibit or exacerbate medicinal effects with concurrent use.¹⁸¹

While risks are inherent with all medications, the fact that healthy individuals consume cognitive enhancers for mental enhancement rather

174. Sharma et al., *supra* note 63; see also Jeffrey N. Love et al., *Acute Beta Blocker Overdose: Factors Associated with the Development of Cardiovascular Morbidity*, 38 CLINICAL TOXICOLOGY 275, 277 (2000) (finding that Propranolol was implicated in 121 of 280 beta blocker overdoses). Possible overdose is more common with beta blockers than with other cognitive enhancers; for example, in 1997, consumers reported 8553 beta blocker exposures to the American Association of Poison Control Centers (AAPCC). Love et al., *supra*, at 278–79; see also *supra* notes 170, 173 and accompanying text (describing smaller overdose rates for the other cognitive enhancers).

175. Bronchospasm is the spasmodic narrowing of the windpipe. STEDMAN'S MEDICAL DICTIONARY, *supra* note 51, at 197.

176. Hypotension is low blood pressure. *Id.* at 682.

177. See MEDICATION GUIDE: IDERIDE, *supra* note 63, at 10; see also David M. Reith & Andrew H. Dawson, *Relative Toxicity of Beta Blockers in Overdose*, 34 J. TOXICOLOGY 273, 273 (1996). In 2003, consumers reported 15,350 beta blocker exposures—including 2163 severe overdose cases—to the AAPCC; of these, thirty-three resulted in death. Joel S. Holger et al., *A Comparison of Vasopressin and Glucagon in Beta-Blocker Induced Toxicity*, 44 CLINICAL TOXICOLOGY 45, 45 (2006).

178. DeNoon, *supra* note 153; see also Syed F. Ali & S.C. Bondy, *Red Wine But Not Ethanol at Low Doses Can Protect Against the Toxicity of Methamphetamine*, BRAIN RES., July 30, 2010, at 247, 248 (explaining that drug abusers often consume several substances in conjunction).

179. See MEDICATION GUIDE: ADDERALL XR, *supra* note 48, at 1; MEDICATION GUIDE: PROVIGIL, *supra* note 54, at 37; MEDICATION GUIDE: RITALIN, *supra* note 48, at 1. These guides caution consumers to tell their doctors about all medicinal use—including prescriptions, vitamins, herbal supplements, and nonprescription medications. See MEDICATION GUIDE: ADDERALL XR, *supra* note 48, at 1–2; MEDICATION GUIDE: PROVIGIL, *supra* note 54, at 37; MEDICATION GUIDE: RITALIN, *supra* note 48, at 1–2.

180. See MEDICATION GUIDE: IDERIDE, *supra* note 63, at 7; MEDICATION GUIDE: PROVIGIL, *supra* note 54, at 39 (“It is not known how drinking alcohol will affect you when taking PROVIGIL.”).

181. See MEDICATION GUIDE: IDERIDE, *supra* note 63, at 6–7 (listing such medications as catecholamine-depleting drugs, calcium-channel blocking drugs, nonsteroidal anti-inflammatory drugs, and aluminum hydroxide gel); MEDICATION GUIDE: LOPRESSOR HCT, *supra* note 65, at 5 (also including clonidine and general anesthetics); MEDICATION GUIDE: TOPROL-XL, *supra* note 66, at 11 (further listing digitalis glycosides and CYP2D6 inhibitors).

than medical treatment may indicate that any type of risk is unacceptable.¹⁸² However, the true exercise of personal autonomy requires individuals who are aware of the possible safety concerns to make their own free-will decisions.¹⁸³ For example, in the recent *Nature* survey, questioning 1400 academics from sixty countries, half of the respondents who took cognitive enhancers for non-medical purposes reported unpleasant side effects, but only some chose to discontinue use.¹⁸⁴ Sixty-nine percent of all surveyed stated they would risk mild side effects for the cognitive-enhancement trade-off, and 80% thought healthy adults should have the choice to participate in brain-boosting use.¹⁸⁵ Generally, some ethicists argue that civil liberties should outweigh theoretical safety hazards, especially those created when

182. Cakic, *supra* note 71, at 613; *see also* Sahakian & Morein-Zamir, *supra* note 168, at 1157 (“For all medications, the chief concern cautioning against their use is adverse side effects that affect the individual’s health and well being [sic].”). Acceptable safety risks depend on the potential benefits, which understandably are slim for already healthy individuals. *See* Greely et al., *supra* note 9, at 703; *see also* Michael K. Ahljanian, *Eschew Enhancement: Memory-Boosting Drugs Should Not Be Made Available to the General Public*, *TECH. REV.* (May 1, 2009), <http://www.technologyreview.com/biomedicine/22476> (contending that the risks of harm substantially outweigh any cognitive benefits).

183. Cakic, *supra* note 71, at 613; *see also* *Enhancing, Not Cheating*, 450 *NATURE* 320, 320 (2007) (describing the opponents of cognitive enhancement as “whistling in the wind” against the opposing ethical argument of the “pursuit of personal liberty”). It would appear these two extremes exist in an untenable compromise—where consumers have the right to decide if risks are acceptable, but their “civil liberties must also be balanced by the need to safeguard the public good.” Cakic, *supra* note 71, at 613. For illustration, one survey of 1811 students at an American public university found that none of the interviewed respondents had “sought out information from health professionals, medical or pharmaceutical reference guides, or even Internet sites” before taking their first cognitive enhancer. DeSantis et al., *supra* note 81, at 317 (reporting that most first-time cognitive-enhancement use occurred at times of high academic stress and anxiety). Further, the researchers discovered that a majority of the student users possessed limited knowledge about the cognitive enhancers they voluntarily consumed, with no understanding of their appropriate doses, psychological or physiological side effects, or the legal ramifications of their illicit use. *Id.* at 320–21 (finding that 96% of the student consumers had obtained their cognitive enhancers without prescriptions). Such survey results may dictate a shift away from personal autonomy and towards mandatory safeguards for the well-being of society. *See* Cakic, *supra* note 71, at 613.

184. Maher, *supra* note 98, at 674 (listing the reported side effects as headaches, anxiety, jitteriness, and sleeplessness); *see also supra* note 98 and accompanying text (describing the survey’s general results).

185. Maher, *supra* note 98, at 674. Academics that would employ cognitive enhancers, notwithstanding their risks, follow an already established practice in athletics—where sports competitors continue to take anabolic steroids, despite their serious adverse effects. Mehlman, *supra* note 13, at 487. For example, one biannual study repeatedly reveals that more than half of the 200 world-class athletes interviewed “would take a drug that guaranteed them a gold medal but would also kill them within five years.” Gretchen Reynolds, *Phys Ed: Will Olympic Athletes Dope If They Know It Might Kill Them?*, *N.Y. TIMES WELL BLOG* (Jan. 26, 2010, 12:01 AM), <http://well.blogs.nytimes.com/2010/01/20/phys-ed-will-olympic-athletes-dope-if-they-know-it-might-kill-them> (discussing the Goldman Dilemma survey). Surprisingly, a similar question asked of nonathletes in a 2009 study reported that only two of the 250 respondents would take a medication that would ensure both success and an early death. J.M. Connor & J. Mazanov, *Would You Dope? A General Population Test of the Goldman Dilemma*, 43 *BRIT. J. SPORTS MED.* 871, 871 (2009) (only surveying Australians).

healthy *adults* consume *legally* prescribed medications.¹⁸⁶ But when these adults are medical or law school students in an arena governed by ethical codes, perhaps the scales tip toward mandatory safeguards.¹⁸⁷ To fully determine whether administrators and professional associations should be tasked to monitor this medicinal practice, an ethical analysis must also consider social implications and fairness concerns.¹⁸⁸

B. All on Everyone's Mind: Social Concerns with Prevalent Use

Cognitive enhancement in the medical and legal academic setting creates a unique social ramification that is less prevalent or nonexistent in other specialties—namely, social coercion.¹⁸⁹ In many medical and law schools, the educational stakes are high.¹⁹⁰ Students work to outperform their peers so they can earn high GPAs on tightly graded curves, to secure the clinical or journal positions that will better position them to obtain the limited career positions available in this increasingly competitive job market.¹⁹¹ And if they do secure that coveted position at a “big name” hospital or firm, the pressure to outperform may remain just as, or more, intense.¹⁹² Individuals in these academic and professional settings often

186. RICHARDS, *supra* note 2, at 170, 184. Richards contends that personal autonomy means healthy adults may consciously choose medicinal use to obtain a more fulfilling life:

It is, of course, a banality of the literature of perceptive observers on drug experience that the quality of such experience varies according to the expectations, aims, and identity that the person brings to the experience. This should confirm that drug experience is neither satanic damnation nor divine redemption of the self, but merely one means by which the already existing interests of the person may be explored or realized.

Id. at 170. If the interests of free will allow for unchecked medicinal cognitive enhancement, physicians and consumers themselves can still act as the gatekeepers that prevent unsafe drug use. *See* Mehlman, *supra* note 13, at 486. This presupposes that physicians and the general public are making informed choices because they know the risk–benefit profiles of the cognitive enhancers they either are prescribing or consuming. *Id.* *But see supra* note 183 and accompanying text (discussing the possible ramifications from uninformed cognitive-enhancement use).

187. *See supra* notes 26–27 and accompanying text. For a setup of the ethical restrictions on both medical and law school students and their respective professions, *see supra* notes 15–25 and accompanying text.

188. *See supra* notes 124–25 and accompanying text.

189. *See* Cynthia Forlini & Eric Racine, *Autonomy and Coercion in Academic “Cognitive Enhancement” Using Methylphenidate: Perspectives of Key Stakeholders*, 2 *NEUROETHICS* 163, 164 (2009) (explaining that the key concern is the degree of freedom that students have to abstain from or engage in cognitive enhancement).

190. *Id.* at 167 (“In terms of grad studies, we’re getting into a highly competitive level where you can be replaced at the snap of a finger purely based on grades.”).

191. *See, e.g., id.*; Webb et al., *supra* note 84, at 200 (describing medical school pressures).

192. *See supra* note 152 and accompanying text; *see also* Peter J. Whitehouse & Eric Juengst, *Enhancing Cognition in the Intellectually Intact*, *HASTINGS CENTER REP.*, May–June 1997, at 14, 21.

experience social coercion—they think they must take brain boosters to succeed or even stay on equal footing with their cognitively-enhanced peers.¹⁹³ This implicit coercion interferes with the exercise of free choice, meaning that those who are opposed to using cognitive enhancers themselves may either acquiesce to peer pressure or give up hopes of academic and professional success.¹⁹⁴ Those who ignore social coercion may begin to resent their medicinal-using peers—creating more competitive and stressful learning and working environments.¹⁹⁵ Besides implicit coercion, the prevalence of cognitive enhancement also may generate direct coercion—leading parents¹⁹⁶ and employers¹⁹⁷ to strongly encourage continued use for the sake of acquiring a consumer’s peak performance.¹⁹⁸

193. See Greely, *supra* note 6, at 1150 (equating implicit coercion with competition); Mehlman, *supra* note 13, at 488 (discussing the pressures and inducements of performance-enhancing drug use). “So long as resources remain scarce and continue to be apportioned to such a large extent competitively, this type of inducement will persist.” Mehlman, *supra* note 13, at 500. For example, if most students use stimulants to vastly improve their grades, then the remaining nonusers may feel pressure to follow suit if they wish to remain competitive. Cakic, *supra* note 71, at 612 (comparing performance pressure in sports to cognitive pressure in schools).

194. Fox, *supra* note 56, at 1148. “Environments, like academia, can constitute ‘winner take all’ situations meaning that slight gains in cognitive performance can translate into substantial benefits.” Forlini & Racine, *supra* note 189, at 164.

195. See Kaplan & Gellene, *supra* note 72 (quoting a professor who noticed resentment growing among her students who refrained from cognitive enhancers). Abstaining students may resent their peers because of the idea that their peers’ artificial study habits undermine the value of their natural hard work. See *id.*

196. See Sarah Harris, *Fears for ‘Smart Pill’ Generation*, DAILY MAIL (London), Aug. 19, 2008, at 60. Parental coercion has a long history with various levels of outrageousness. Greely, *supra* note 6, at 1151. Presently, evidence points to ambitious parents tackling the cognitive arena by buying smart pills from the Internet for their studious children. See Marrin, *supra* note 77, at 65 (discussing correlating safety concerns); see also Forlini & Racine, *supra* note 189, at 167 (interviewing parents who felt the pressure to perform and succeed supported cognitive-enhancement practices). “These pressures were often described as a demand for the individual to be the best in contrast to simply being average.” Forlini & Racine, *supra* note 189, at 167.

197. See *supra* note 152 and accompanying text. In considering employer coercion, it is important to note that “[e]ventually, without preventive legislative action, employers [may] begin to demand that their employees accept neurological enhancement as a condition for employment or promotion—and the working stiffs of the world will not have the financial power to resist.” Appel, *supra* note 152, at 618. Two commentators have speculated on the possibilities of such a future:

It is not difficult to imagine that a worker’s willingness to use a drug that increased productivity would soon become a factor in hiring and promotion. A company deciding which law firm to engage might want to know which of them requires their attorneys to use cognitive enhancers: the presumably higher efficiency would translate into fewer hours billed and lower cost. Attorneys willing to use cognitive enhancers might earn better fees and find more firms ready to hire them.

Whitehouse & Juengst, *supra* note 192, at 20. Employers already insist on some types of enhancement; for instance, they may force their employees to take mandatory training programs or risk losing their jobs. Greely, *supra* note 6, at 1150. However, this pressure does not consider other ethical concerns involved with drug use—such as safety and fairness. See *supra* note 124 and accompanying text.

198. Greely et al., *supra* note 9, at 703 (asking whether schools and employers “[s]hould be allowed to require pharmaceutical enhancement”); see also Sahakian & Morein-Zamir, *supra* note

These different social scenarios increasingly can emerge as medicinal brain-boosting use becomes more widespread.¹⁹⁹ Coercion—indirect or direct—proscribes personal autonomy and lacks legitimate justification in the educational setting.²⁰⁰ Instead of promoting a cognitive arms race among students,²⁰¹ educational policies may need to prohibit social pressures if the ethical scales tilt towards these mandatory safeguards for the students' greater good.²⁰² To determine this ethical balance requires the analysis of one final consideration—fairness.²⁰³

168, at 1159 (stressing the concern of direct and indirect coercion). For an in-depth study on school administration coercion, see Marc Bousquet, *Take Your Ritalin and Shut Up*, 108 S. ATLANTA Q. 623, 625 (2009).

199. Fox, *supra* note 56, at 1148; *see also* Cakic, *supra* note 71, at 612 (explaining that a sufficiently high portion of students must use cognitive enhancers before nonusers feel peer pressured with the perception that “everybody else is taking them”). Studies already reveal that brain-boosting drugs are prevalent on school campuses. *See supra* note 111 and accompanying text. But, as one doping researcher explained, if drugs actually made people smarter, their use would turn epidemic. Kaplan & Gellene, *supra* note 72. “Just think what it would do to anybody’s career in about any area. There are not too many occupations where it’s really good to be dumb.” *Id.*

200. *See* Greely et al., *supra* note 9, at 703 (“Employers, schools or governments should not generally require the use of cognitive enhancements.”). *Contra* Cakic, *supra* note 71, at 613 (contending that restraining others’ actions to protect nonusers from feelings of coercion is equally an attack on personal freedom). However, giving free reign to every cognitive-enhancer user actually may allow individuals to identify their use as voluntary self-improvement, rather than coerced consumption. Forlini & Racine, *supra* note 189, at 164; *see also* RICHARDS, *supra* note 2, at 172 (noting that treating everyone as equals means respecting the individual’s ability to choose). Arguably, cognitive coercion may be appropriate when considering the safety of individuals that others depend on in dangerous situations; for example, soldiers sometimes take stimulants to increase alertness, but perhaps surgeons also should use safe brain boosters if the drugs would enable them to save more lives. *See* Greely et al., *supra* note 9, at 703; *see also* Carol Lewis, *Chemical Allies to Boost Performance*, TIMES (London), Oct. 14, 2004, at 10 (considering smart drugs for doctors and pilots to facilitate sharper minds and faster reactions).

201. *See* Nick Bostrom & Rebecca Roache, *Ethical Issues in Human Enhancement*, in NEW WAVES IN APPLIED ETHICS 120, 137 (Jesper Ryberg et al. eds., 2007).

202. *See supra* note 183 and accompanying text. However, one commentator warns, “[T]here is something morally perverse in condemning drug use as intrinsic moral slavery when the very prohibition of it seems to be an arbitrary abridgement of personal freedom.” RICHARDS, *supra* note 2, at 177.

203. *See supra* notes 124–25 and accompanying text. As one editorial stressed, “If you take away the risk of personal harm, it becomes largely an argument of fairness.” Daniel Malherbe, *Blogs Are Abuzz About Brain Boosters*, CAPE TIMES (S. Afr.), Mar. 11, 2008, at E1 (asking whether cognitive-enhancement medicinal use is cheating). Other ethicists suggest fairness is the predominant consideration to determine the existence of cheating because the definition of “cheating” is mainly a matter of fairness. Schermer, *supra* note 26, at 85; *see also supra* note 26.

C. *Mind Hacks: Fairness Concerns with Cognitive Advantages*

Fairness encompasses a spectrum of ethical concerns from both individual and societal perspectives.²⁰⁴ On the individual level, fairness considerations largely focus on personal achievements and competition,²⁰⁵ while on the societal level, they primarily involve equal access and the possibilities of increased discrimination.²⁰⁶

1. Personal Achievement

Critics of cognitive enhancement traditionally object to drug use as an unnatural means to improve one's mental abilities.²⁰⁷ This overlooks the fact that while stimulants, narcolepsy medications, and beta blockers may not be natural substances,²⁰⁸ other cognitive enhancers do occur in nature—including caffeine, ginkgo, and nicotine.²⁰⁹ However, even naturally occurring compounds may be used in an *unnatural* manner to artificially boost cognition.²¹⁰ In the classroom setting, this method of obtaining scholastic achievement is a false self-improvement that differs from innate talent or diligent study,²¹¹ partially because (1) it is more transitory in nature

204. Greely, *supra* note 6, at 1151–52.

205. See *infra* notes 207–48 and accompanying text.

206. See *infra* notes 249–80 and accompanying text.

207. See Mehlman, *supra* note 13, at 491 (noting that cognitive enhancers are singled out for rebuke because they are not customary, traditional, or natural). In actuality, unnatural cognitive enhancers may be traditional because of their long-lived existence:

Since Adam and Eve's apple, however, the most controversial means of cognitive enhancement have always been the enhancers we take rather than the ones we invent or earn: the supernatural gifts, magic potions, or medical drugs that promise to expand our abilities without requiring us to exert ourselves unduly in the process.

Whitehouse & Juengst, *supra* note 192, at 14; see, e.g., *infra* note 209 (noting the traditional use of caffeine). In fact, proponents of cognitive enhancement call the "preferability of the natural" a status quo bias that has long affected ethical analyses. Nick Bostrom & Toby Ord, *The Reversal Test: Eliminating Status Quo Bias in Applied Ethics*, 116 *ETHICS* 656, 679 (2006).

208. See, e.g., *supra* note 92 (explaining that Provigil is a manufactured drug).

209. Mehlman, *supra* note 13, at 492 (specifically mentioning that caffeine has been used as a natural brain booster for centuries); see also *supra* note 5 and accompanying text.

210. Greely, *supra* note 6, at 129. Some critics contend that this unnatural method of obtaining academic accomplishments makes them both unearned and unworthy of reward. Mehlman, *supra* note 13, at 492 (noting, however, that medicinal consumers are still likely to expend some effort to produce praiseworthy results).

211. Katrina A. Bramstedt, *Caffeine Use by Children: The Quest for Enhancement*, 42 *SUBSTANCE USE & MISUSE* 1237, 1247 (2007). In finding the distinction between natural and unnatural self-improvement, Bramstedt relies on the reasons behind the medicinal use:

The test for whether or not cognitive enhancement is cheating is the concurrent presence or absence of a clinically diagnosed cognitive deficit. In the presence of such a deficit, drug-mediated cognitive enhancement is not cheating but rather correction of a medical problem. In the absence of such a deficit, drug-mediated cognitive enhancement is a form of cheating because it circumvents the honest way of attaining excellence—that is, diligent study.

than the cognitive permanence gained by other natural means,²¹² and (2) it diminishes the accomplishments of those who only use those other means.²¹³ It also belies the consumer's achievements by "confounding the identity . . . acquired through natural gift cultivated by genuinely lived experiences."²¹⁴ Studies demonstrate that mental characteristics like intelligence are more fundamental to self-identity than physical attributes.²¹⁵ Because people generally desire to express and preserve their own self-identities,²¹⁶ an unnatural enhancement of such a personal trait for the sake of achieving better grades may engender personal antipathy rather than any sense of actual accomplishment.²¹⁷ In a correlating manner, enhancements

Id. at 1247–48. Bramstedt further points out that even if some students have more natural abilities than others, unethical behavior is not the ethically appropriate means to fill gaps in natural talent. *Id.* at 1248. This reasoning especially holds true for the unique ethically bound environments of medical and law schools. *See supra* note 15 and accompanying text.

212. Whitehouse & Juengst, *supra* note 192, at 21. To actually increase the mind's potential requires the repeated use of the brain's neural circuits; therefore, when a person focuses on or learns a particular skill or subject, the mind's capacity to process and retain data also improves as more "neuronal real estate" is used. Begley, *supra* note 153, at 44.

213. Schieffelin, *supra* note 13, at 976–77.

214. Jason Riis et al., *Preferences for Enhancement Pharmaceuticals: The Reluctance to Enhance Fundamental Traits*, 35 J. CONSUMER RES. 485, 497 (2008); *see also* Fox, *supra* note 56, at 1150 ("This objection has to do with the shift *away* from achievements humans *undertake* through self-initiated striving, and *toward* those they experience by biochemical interventions, which *act on us* as passive subjects."). Life experiences, which take time and effort, have the potential to develop many individual attributes—including emotions, strength, beauty, and intellectual endeavors. Torbjorn Tansj, *Ought We to Enhance Our Cognitive Capacities?*, 23 BIOETHICS 421, 428 (2009). For example, while medicinal cognitive enhancement may enable a user to more easily learn a second language, it also deprives such a consumer from the accomplishment of immersing oneself into a foreign culture. *Id.* at 428–29 ("Generally speaking, making life easier is not tantamount to making life better."). Therefore, cognitive enhancers actually may violate the integrity of a person's efforts or endeavors. *See* Greely, *supra* note 6, at 1152.

215. Riis et al., *supra* note 214, at 497, 503; *see also* Whitehouse & Juengst, *supra* note 192, at 17 (noting that the human race's "self defining feature and point of pride is that the form of sensation we prize most is that which constitutes the life of the mind: cognitive experience").

216. Riis et al., *supra* note 214, at 497. Nevertheless, some proponents of cognitive enhancement contend that it is humanity's "biologically grounded nature" to be open to artificial tools and medications that literally become part of the consumer and create a new identity as the "soft self." Andy Clark, *Re-Inventing Ourselves: The Plasticity of Embodiment, Sensing, and Mind*, 32 J. MED. & PHIL. 263, 278 (2007).

217. *See* Riis et al., *supra* note 214, at 497; *see also* Fox, *supra* note 56, at 1150 (explaining that cognitive enhancers undermine the authenticity of self). This scenario may be more common with cognitive enhancers that offer only a slight mental boost at the cost of reducing other human capacities—such as creative thought, emotional depth, and perceptiveness. *See* Whitehouse & Juengst, *supra* note 192, at 22; *see also supra* notes 154–55 and accompanying text. However, "[i]t is possible that people who perceive themselves as worse than they 'should be' on some trait dimension are more likely to enhance that trait in an effort to become 'who they really are.'" Riis et al., *supra* note 214, at 506. Other cognitive proponents additionally note that even if cognitive

that require effort, such as meditation and brain games,²¹⁸ are deemed more socially and morally acceptable because they enable rather than artificially enhance the self.²¹⁹ Ultimately, the concern becomes whether obtaining cognitive achievements through brain-boosting use “make[s] individuals less themselves—less human and less them—in a way that deprives them of a life lived genuinely and fully.”²²⁰

While considerations of personal achievement predominantly focus on the subjective self,²²¹ a fairness assessment also requires understanding how potentially cheating the self can affect the accomplishments of others.²²² A consumer’s use of cognitive enhancers can be viewed in this larger framework by questioning the effects of brain boosting in competitive environments.²²³

enhancers negatively affect character, it would only be certain aspects of character. Maartje Schermer, *Enhancements, Easy Shortcuts, and the Richness of Human Activities*, 22 *BIOETHICS* 355, 357 (2008) (“Virtues like justice, wisdom, humanity or transcendence appear to be less vulnerable to the use of enhancers.”).

218. Begley, *supra* note 153, at 45.

219. See Riis et al., *supra* note 214, at 506; see also Whitehouse & Juengst, *supra* note 192, at 21 (“The traditional methods of expanding our capabilities, the pharmaceutical Calvinists argue, are ‘natural’ and therefore praiseworthy, while drug-induced abilities are ‘artificial’ and thereby suspect.”). *Contra Enhancing, Not Cheating*, *supra* note 183, at 320. In opposition, the editorial board of *Nature* contends that if medicinal enhancement can enable scientists or artists to achieve new heights of performance, they are not suspect mechanisms. *Id.* Instead, “[f]ar from cheating on themselves or others, they would be delivering a higher return on their investment of effort, and indeed on society’s investment in them.” *Id.*

220. Fox, *supra* note 56, at 1151; see also *supra* notes 216–19 and accompanying text. Not all ethicists view the utilization of brain boosters as a form of self-deprivation; instead, they argue the opposite—that the banning of cognitive enhancers is an attack on personal autonomy that deprives consumers of their human fulfillment:

Many other courses may reasonably and responsibly accommodate the diverse individuality of human competences, aspirations, and ends. What for one is a reasonable, self-imposed ideal of self-control and social service may be for another a self-defeating impoverishment of human experience and imagination, a rigid and inflexible willfulness without intelligent freedom or reasonable spontaneity, a masochistic denial of self and subjectivity in the service of uncritical and dubiously manipulative moral aims.

RICHARDS, *supra* note 2, at 172 (arguing that moral conceptions are not valid justifications for sanctioning or restricting drug use). *But see supra* notes 183, 202 and accompanying text.

221. See *supra* notes 211, 214 and accompanying text.

222. See, e.g., *supra* note 213 and accompanying text.

223. See *supra* note 205 and accompanying text. Competition, which can be defined as the pursuit of victory or excellence, necessarily involves weighing or judging the accomplishments of all competitors to determine the winners. See Sarah J. Wild, *On Equal Footing: Does Accommodating Athletes with Disabilities Destroy the Competitive Playing Field or Level It?*, 37 *PEPP. L. REV.* 1347, 1353 (2010); see also *supra* note 222 and accompanying text (noting the need to consider others’ achievements in a fairness analysis).

2. Competitive Endeavor

Any analysis that considers the fairness implications of medicinal enhancement in competitive situations should begin with a look at the clearest example of competitive activity—sports.²²⁴ In the athletic arena, drug use is not only viewed as taboo, it also is seen as fundamentally incompatible with sports²²⁵ because society values winners for their natural²²⁶ rather than artificial efforts.²²⁷ Illegal drug use also violates the actual rules of sport.²²⁸ Most notably, WADA already prohibits all four types of cognitive enhancers in different athletic competitions.²²⁹ When deciding whether to ban a substance from international athletics, WADA

224. See Savulescu, *supra* note 71, at 326. Athletics offers a fitting starting point for most fairness evaluations because the “paradigmatic example of cheating as gaining an unfair advantage over others by breaking the rules comes from competitive sports.” Schermer, *supra* note 26, at 85.

225. Mehlman, *supra* note 13, at 490; see, e.g., *supra* notes 106–07 and accompanying text. For instance, Kelli White, an American sprinter who won two gold medals at the 2003 World Track Championships, lost her medals and received a two-year suspension after testing positive for Provigil. Greely, *supra* note 49, at 126–27. Although her family exhibited a history of narcolepsy and she had a valid prescription, White admitted to taking the drug for competitive rather than health reasons. Wild, *supra* note 223, at 1379 n.142. Even before her confession, the International Association for Athletics Federations was contemplating punishment merely because her case involved drug use during competition. See Greely, *supra* note 49, at 127.

226. Natural efforts encompass determination, talent, and luck. Mehlman, *supra* note 13, at 490. Some proponents of performance enhancement point out that victory in competition is significantly dependent on the “genetic lottery.” W. Miller Brown, *The Case for Perfection*, 36 J. PHIL. SPORT 127, 128 (2009). They contend, “No matter the extent of our effort and courage in the pursuit of athletic excellence, most of us do not have the genetic endowments to succeed at world-class competition.” *Id.* While this genetic discrepancy probably is unfair, more importantly from an ethical view, natural efforts are morally neutral—neither just nor unjust. *Id.*

227. Mehlman, *supra* note 13, at 490; see also *supra* notes 210–11 and accompanying text. Society upholds natural efforts as the means to make victories both deserved and authentic; conversely, the general public views drug use as the tool that creates undeserved and inauthentic accomplishments. See Mehlman, *supra* note 13, at 490, 493. Therefore, true competition is the “quest for excellence through challenge,” and the question becomes whether medicinal performance-enhancement use essentially destroys such a challenge. Wild, *supra* note 223, at 1354–55, 1362 (mentioning that some view drug use as an easy way to win). For a more in-depth analysis of the “easy win” or shortcut contention, see Schermer, *supra* note 217, at 360–63.

228. Mehlman, *supra* note 13, at 490; see also Savulescu, *supra* note 71, at 327 (noting that “[c]onsiderations of fairness play a prominent part in the regulation of drugs in sport”). For an examination on the standardized rules governing athletic competitions, see Wild, *supra* note 223, at 1356–58 (describing how these regulations attempt to create fair results that reflect the competitors’ pursuits of excellence).

229. See *supra* note 130 and accompanying text; see also Wild, *supra* note 223, at 1359–60 (explaining that the regulation of performance enhancers primarily focuses on substances rather than other artificial tools). To enforce these prohibitions, the International Olympic Committee drug tests or “dope checks” athletes at all major games and contests. Schermer, *supra* note 26, at 85; see, e.g., *supra* note 225.

considers whether the drug would (1) potentially enhance sport performance, or (2) violate the spirit of sport.²³⁰ Therefore, WADA prohibits cognitive enhancers because it recognizes that they can give athletes an unfair advantage or violate the fundamental spirit of competition, or both.²³¹ If athletes break these explicit rules to gain an enhancing edge, they unequivocally cheat the game.²³² Essentially, performance-enhancing drugs jeopardize the integrity of sports and transform their athletic users into “cheaters” when they “eliminate athletic talent as a prerequisite for competition.”²³³

Similar to athletics, medical and law schools are also competitive environments²³⁴ where students continuously compete for the handful of top positions in their class ranks so they can earn academic gold medals—such as Dean’s recognitions, clinical and journal positions, graduation honors, and employment opportunities.²³⁵ In this competitive setting, students “are often driven by the rewards and permitted by the low penalties to seek unfair advantage[s]”²³⁶—specifically through brain-boosting medications.²³⁷ However, unlike the sports world, medical and legal academia does not have

230. Savulescu, *supra* note 71, at 327. WADA actually defines the “spirit of sport” as ethics, fair play, honesty, respect for rules and laws, and respect for the self and other participants. *Id.*

231. *Id.* But see *supra* note 130 and accompanying text. For instance, Greely explained that significant fairness concerns arise when some athletic competitors use enhancing drugs, while others do not. Greely, *supra* note 6, at 1151.

232. See Schermer, *supra* note 26, at 85. For the definition of cheating, see *supra* note 26.

233. Wild, *supra* note 223, at 1359.

234. McGuire & Phye, *supra* note 15, at 63. It is important to establish medical and law school educations as uniquely competitive activities to differentiate these settings from other graduate or lower education programs. See *supra* note 13 and accompanying text. Of course, although this outlook is realistic and accurate, it undercuts the ideological view of higher education:

Education and studying have internal goods next to their more instrumental goals. Such internal goods may be the attained appreciation of the internal goods of the practices one is educated in, knowledge and truth, the activity of studying with its character-building side effects, or the general (moral) self-development it effectuates. . . . [T]hese are the ends of education, but these are increasingly substituted by a rat-race in which only exams and test-results count.

Schermer, *supra* note 26, at 88 (contending that cognitive enhancers cannot add to the ultimate ends of education). For instance, while brain boosters may temporarily improve memory or attention, they still undermine active learning, disciplined study, and creative insight. *Id.*; see also *supra* notes 154–55 and accompanying text.

235. See *supra* notes 190–91 and accompanying text. Because this type of competition involves limited prizes, it engenders an “inherently selfish venture” that essentially transforms medical and law schools into zero-sum settings. See Wild, *supra* note 223, at 1353; see also *supra* note 12 (noting that Greely argued for the acceptance of medicinal cognitive enhancement in non-zero sum school environments).

236. See Savulescu, *supra* note 71, at 328; see also *supra* note 194.

237. See, e.g., *supra* notes 71, 80, 111 and accompanying text. Brain boosters are inherently unfair and facilitate deceptive behavior in an examination setting because an exam performance is supposed to represent the “accumulation of a semester’s worth of work” and the student’s own efforts, not the student’s “chemically induced performance.” Fenton & Wunderlich, *supra* note 44, at 18.

an oversight body like WADA that explicitly forbids legally prescribed medications in a classroom setting.²³⁸ Instead, these schools establish honor codes that implicitly govern different forms of scholastic conduct.²³⁹ When applicants become students and take up the mantels of the medical or legal profession, they are tacitly accepting these rules and their professional associations' corresponding ethical guidelines as valid restrictions on their actions.²⁴⁰ When they break these rules to create unfair advantages against their studious peers, they become academic cheaters against themselves²⁴¹ and others.²⁴² This holds especially true in a competition analysis because medical and law school examinations²⁴³ are the epitome of zero-sum activities.²⁴⁴

238. See *supra* note 219 and accompanying text; see also Schermer, *supra* note 26, at 87 (noting that the rules of the educational game are not as clear or explicit as sports regulations).

239. See *supra* notes 22–23 and accompanying text. Nevertheless, honor codes or exam regulations are not overt rules against medicinal cognitive enhancement because they do not expressly forbid such drug use before exams or during study. Schermer, *supra* note 26, at 87.

240. See Schermer, *supra* note 26, at 85; see also *supra* notes 17–24 and accompanying text.

241. See *supra* notes 211–14 and accompanying text. If exams are meant to test a student's personal performance and signify his or her individual achievement, the use of a cognitive enhancer to acquire a certain grade would be akin to allowing the use of a calculator on a math test or roller skates in a marathon. Schermer, *supra* note 26, at 87 (asking whether the brain booster would undercut the rationale behind an exam); see also *supra* note 14 and accompanying text.

242. See Schermer, *supra* note 26, at 85; see also *supra* note 231 and accompanying text. For example, if a student takes Adderall to obtain better grades than his or her academic peers and such a "study tool" is against school rules, the student is cheating. Savulescu, *supra* note 71, at 327. Here, cheating essentially means earning prized grades through artificial tools, rather than on actual merit. See Schermer, *supra* note 26, at 86. GPA rankings are only fair if schools distribute them to students because they are earned or deserved through natural abilities or studious training. See *id.* In the most basic sense, justice and fairness dictate that the top ten to fifteen percent of each class actually merit their rankings. See *id.* at 87.

243. Respective universities usually require professors to grade medical and law school exams on predefined tight curves, where sometimes less than fifteen percent of the class even has a chance at earning an A-level grade. See, e.g., George Kulick & Ronald Wright, *The Impact of Grading on a Curve: A Simulation Analysis*, INT'L J. SCHOLARSHIP TEACHING & LEARNING, July 2008, at 1, 3–4, available at http://academics.georgiasouthern.edu/ijstl/v2n2/articles/PDFs/Article_Kulick_Wright.pdf (discussing grade curves in pre-med and medical programs); *Law School Grading Curves*, Memorandum by Andy Mroch, from Ass'n of Am. Law Schs., (Mar. 30, 2005), available at <http://www.aals.org/deansmemos/Attachment05-14.pdf> (analyzing grade curves from a swath of legal universities). This type of grading creates the zero-sum setting. See *supra* note 235 and accompanying text. When medicinal cognitive enhancement enters this grading calculation, professors must try to compare "apples and oranges"—students with the added medicinal edge, and those taking examinations under normal conditions. Fenton & Wunderlich, *supra* note 44, at 20.

244. See Fox, *supra* note 56, at 1147 ("[E]nhancements generate unfairness when individuals use them to gain relative advantage over others in zero-sum competitions such as athletic events and academic testing."); Goodman, *supra* note 81, at 149; see also *supra* notes 234, 242 and accompanying text. Zero-sum activities or environments always require the existence of a winner and a loser. Goodman, *supra* note 81, at 149. This zero-sum delineation may explain why

Although medicinal cognitive enhancement clearly creates unfair scholastic advantages in medical and law schools,²⁴⁵ it may not be a form of academic cheating if no specific regulatory framework actually forbids such enhancement.²⁴⁶ After all, cheating fundamentally requires the violation of a rule to obtain that unfair edge.²⁴⁷ If the unfair advantages themselves disappear because all students acquire equal access to the enhancement, then the fairness equation changes even more dramatically—perhaps even necessitating a new calculation.²⁴⁸

3. Equal Access

Cognitive enhancers are positional goods²⁴⁹ because they give users advantages over others when competing for academic grades and honors.²⁵⁰ Unfairness thus arises when only a select few have the ability to purchase or consume these goods.²⁵¹ This necessarily raises social-equity concerns²⁵²

numerous commentators analogize athletic performance-enhancement drug use with academic cognitive-enhancement drug use. *See, e.g.*, Bostrom & Roache, *supra* note 201, at 137 (“Just as using drugs to enhance one’s strength is seen as cheating in professional sport, using drugs to improve one’s memory in order to perform better in an examination could be seen as cheating.”); Schermer, *supra* note 26, at 87 (noting that the parallel with sports offers insights into educational cheating arguments).

245. *See supra* notes 241–42 and accompanying text.

246. *See supra* note 239 and accompanying text. “So, as long as schools or universities, or other supervising authorities do not issue rules against the use of modafinil, Ritalin or any other cognitive enhancer, students can use whatever they want without it being cheating.” Schermer, *supra* note 26, at 87 (noting, however, that “[t]here may be some inarticulate rule broken by the use of cognitive enhancers, which would make their use a form of cheating”).

247. *See supra* note 26 and accompanying text; *see also* Greely, *supra* note 6, at 1152 (explaining that cheating unequivocally happens when a person does not follow a rule that actually is enforced). Merely obtaining an unfair advantage without breaking the rules is not necessarily cheating. R. MERKEL ET AL., INTERVENING IN THE BRAIN: CHANGING PSYCHE AND SOCIETY 353 (Carl Friedrich Gethmann ed., 2007). For example, genetic disposition and innate natural intelligence foster discrepant advantages that society admires and encourages. *See id.* (“What then exactly explains the difference if we substitute ‘artificial medical enhancement’ for ‘genetic giftedness?’”); *see also supra* note 226 and accompanying text.

248. *See* Schermer, *supra* note 26, at 86.

249. Positional goods are tangibles or intangibles that “confer substantial advantages on their possessors relative to others within the context of social competition for scarce and valued positions and other desired goods.” MERKEL ET AL., *supra* note 247, at 359.

250. Bostrom & Roache, *supra* note 201, at 137; *see also supra* text accompanying note 245.

251. Mehlman, *supra* note 13, at 488; *see also* Fox, *supra* note 56, at 1147 (“[L]imited access to enhancement biotechnologies exacerbates inequalities of wealth and status between the haves and the have-nots.”).

252. Purchasable positional goods generate social-equity concerns because their limited availability can create a spiraling effect that interferes with the idea of equitable distribution:

If (1) means of mental enhancements are available only to the wealthy and (2) making use of such means confers substantial competitive advantages for the acquisition of additional advantages, including wealth, and (3) a grossly unequal distribution of wealth is a matter of concern for distributive justice, then the exacerbating effect of artificial mental enhancements on problematic patterns of social distribution is obvious.

that stem from the public's desire to establish equality "between individuals and across society."²⁵³ However, such concerns may be alleviated if everyone has equal access to these positional goods.²⁵⁴ Presently, the use of cognitive enhancers is limited by income,²⁵⁵ chance, and geography.²⁵⁶ In light of such limitations, proponents of medicinal enhancement suggest that health insurance companies, the government, or even private philanthropies could provide cognitive enhancers to those without sufficient means.²⁵⁷ The President's Committee on Bioethics also added (perhaps sarcastically) that free cognitive enhancers could be supplied "at the door as students file into the testing room, so that all who wished to take [them] could do so, and we

MERKEL ET AL., *supra* note 247, at 359.

253. Greely, *supra* note 6, at 1151–52 (noting, for example, that society already provides equitable access to education for all children across class and racial lines). However, society does tolerate certain sources of inequality, including the advantages obtained by wealth, natural talent, good luck, and powerful social connections. Mehlman, *supra* note 13, at 490. Nevertheless, society may decline to accept the inequalities fostered by medicinal cognitive enhancement because "cognitive enhancement could be so powerful a determinant of social success that it would undermine the foundations of our liberal, democratic society." *Id.*; see also *supra* note 251 and accompanying text.

254. Savulescu, *supra* note 71, at 332–33. This "would make everyone more equal, creating a society in which there was greater equality of opportunity." Mehlman, *supra* note 13, at 498.

255. See, e.g., *supra* note 148 and accompanying text (explaining the significant difference in the prices for beta blockers and Provigil). Because cognitive enhancers are relatively expensive, they can potentially create a "modern caste system" that will favor the wealthy. MERKEL ET AL., *supra* note 247, at 43.

256. See Greely, *supra* note 49, at 129. Furthermore, the DEA places manufacturing restrictions on Adderall, Ritalin, and Provigil because they are controlled substances. See Mehlman, *supra* note 13, at 488; see also *supra* note 120 and accompanying text. This limits their overall supply and national availability. Mehlman, *supra* note 13, at 488. However, even if they existed in an unlimited supply, the FDA still requires valid physician prescriptions for all four types of cognitive enhancers. See *id.*; see also *supra* note 118 and accompanying text. A prescription requirement mandates access to a personal physician—creating yet another cost-prohibitive hurdle. See Mehlman, *supra* note 13, at 488, 490 (noting, for instance, that more than 40 million Americans lack health-insurance coverage). *But see supra* note 121 (describing online purchasing without needing a prescription).

257. See MERKEL ET AL., *supra* note 247, at 358 (discussing the possibility of health-care coverage); Mehlman, *supra* note 13, at 489, 498–500 (promoting subsidy programs). However, if these entities provide medications that consumers will use for mere enhancement purposes, they potentially could be wasting the available supply of medical resources. See MERKEL ET AL., *supra* note 247, at 362–63 (explaining the "resource-squandering" effect). This essentially means:

[T]hat medical means, including expert manpower, used up for one particular purpose are necessarily unavailable for any other potential application. If they are used for enhancement purposes, the resources thus deployed are not available for use in the much more important area of treatment, where they function as potentially life-saving or health-restoring means.

Id. at 363. Besides the waste of medicinal resources, some may argue that these public and private entities are misusing their own funds that could be utilized to help the truly unhealthy. See *id.*

would know it was being properly administered.”²⁵⁸ Securing equitable access may “potentially increase equality in society by enabling those with lower cognitive ability to function at a level that is closer to those with naturally high cognitive ability.”²⁵⁹ However, if cognitive enhancers do become available to everyone, questions of social coercion²⁶⁰ would again emerge—would individuals who deliberately refuse to take these drugs be disadvantaged given that others’ cognitive levels were artificially raised as standard procedure?²⁶¹ Moreover, equal access may not be the end-all solution when considering the entire ethical status of enhancement.²⁶² In fact, it actually may facilitate the final societal concern by increasing discrimination.²⁶³

4. Increased Discrimination

While equal access to cognitive enhancers initially appears to “make everyone more equal [by] creating a society in which there [is] greater equality of opportunity,” this oversimplifies the approach.²⁶⁴ Instead, consider the ramifications of equal access on a standard population characterized by intellectual differences:

258. Lerner, *supra* note 42, at 1071 (noting that this suggestion has its own drawbacks).

259. Bostrom & Roache, *supra* note 201, at 138. Equal access levels the mental playing field. See MICHAEL S. GAZZANIGA, *THE ETHICAL BRAIN: THE SCIENCE OF OUR MORAL DILEMMAS* 70 (2005). *But see infra* notes 265–69 and accompanying text. Two proponents recently suggested that such mental equality also will level economic disparities: “[I]t has been estimated that a 3 per cent population-wide increase in IQ could reduce poverty rates by up to 25 per cent and increase GDP by up to 1.5 per cent.” Barbara J. Sahakian & Ahmed D. Mohamed, *Going Mental*, PROSPECT, June 2010, at 68, 68. Basically, they propose that equal access to cognitive enhancers will eventually mitigate societal poverty. *Id.*

260. See *supra* notes 193–98 and accompanying text.

261. See MERKEL ET AL., *supra* note 247, at 43; see also *supra* notes 194–95 and accompanying text. If cognitive-enhancement drug use became a “social practice undertaken by large numbers of people,” the “aggregate will of others” will exert pressure on the drug free. MERKEL ET AL., *supra* note 247, at 364.

262. Michael J. Sandel, *The Case Against Perfection: What’s Wrong with Designer Children, Bionic Athletes, and Genetic Engineering*, ATLANTIC MONTHLY, Apr. 2004, at 50, 52 (“[T]he fundamental question is not how to ensure equal access to enhancement but whether we should aspire to it in the first place.”).

263. Whitehouse & Juengst, *supra* note 192, at 19; see also *supra* note 206 and accompanying text. For example, equal access potentially fosters discrimination against the naturally fortunate by equalizing the mental playing field. Whitehouse & Juengst, *supra* note 192, at 19. *Contra* Savulescu, *supra* note 71, at 335. In this sense, discrimination means a person is guilty or unethical when his actions penalize another simply because that other person is a member of a certain group. See Lerner, *supra* note 42, at 1049.

264. Mehlman, *supra* note 13, at 498. In actuality, equal access can potentially “reshape the [mental] playing field in unanticipated ways—just as the use of calculators works to the relative disadvantage of students who are quickest at doing long division with pencil and paper.” Goodman, *supra* note 81, at 150.

[S]uppose cognitive enhancements gave people a certain boost in their cognitive ability—say made them 20 percent smarter. Suppose further that cognitive enhancements were given to all those in the lower half of the “normal” range. These individuals, along with those with below-normal cognitive ability who received the interventions therapeutically, would move up 20 percentage points. But people in the upper half of the population range who obtained enhancements on their own would move up as well. The entire population would move upward in terms of cognitive ability, but the disparities created by natural talent and luck would remain.²⁶⁵

Nonetheless, cognitive enhancers do not affect everyone equally;²⁶⁶ they do not raise everyone’s cognitive ability to the same mental ceiling.²⁶⁷ While some drug users may achieve a fifty percent mental improvement, others may only see a five percent increase.²⁶⁸ Similarly, consumers who attain small intellectual gains can still accomplish significant scholastic outcomes through other abilities.²⁶⁹ Therefore, cognitive enhancers may only add to the list of undeserved factors²⁷⁰ that generate individual success and increase societal differences.²⁷¹

Furthermore, cognitive-enhancement drug use by the healthy “usurps the accommodation provided to those with real disability, thus denying them

265. Mehlman, *supra* note 13, at 498–99. This hypothetical demonstrates how equal access fails to remove natural discrepancies in intellectual abilities, especially if naturally smart people also take brain boosters—meaning people who function at lower levels will never have the opportunity to catch up. *See id.*; *see also supra* note 253. But both the equal access and personal autonomy concerns suggest that medicinal cognitive enhancement cannot and should not be limited to those below a certain intellectual level. *See supra* notes 183, 251 and accompanying text. However, this scenario also assumes that cognitive enhancers boost everyone’s mental capacity in the same incremental amount. *See Mehlman, supra* note 13, at 498. *Contra infra* notes 266–67 and accompanying text.

266. Begley, *supra* note 153, at 43. For example, because Adderall and Ritalin work by raising dopamine levels in the brain, they provide less benefit to individuals with naturally high dopamine activity. *Id.* In fact, some people can achieve the same dopamine-boosting benefits by simply believing in their own success—which also increases dopamine. *Id.*

267. Mehlman, *supra* note 13, at 499.

268. *See id.*

269. *See Sahakian & Mohamed, supra* note 259, at 68 (“[A] 10 per cent improvement in memory score could [still] lead to a higher A-level grade or degree classification.”).

270. *See supra* notes 227, 253 and accompanying text. In a university setting, good school performances are partly determined by unearned factors, such as inborn ability and luck, but they also require effort and determination. Schermer, *supra* note 26, at 87 (explaining that praise is given for the effort and endurance that is put into the performance, and not just for the final outcome).

271. Mehlman, *supra* note 13, at 499.

their equal playing field.”²⁷² All four types of cognitive enhancers are medications that doctors prescribe for FDA-approved treatments.²⁷³ Students who take cognitive enhancers for learning disabilities like AD/HD²⁷⁴ are disadvantaged when the healthy consume the same medications for purely enhancement purposes.²⁷⁵ However, some of these students may have actively pursued a learning disability diagnosis merely to obtain their own prescription enhancers.²⁷⁶

To understand the ethical difficulties arising from these different scenarios, imagine that intelligence is ranked on a scale from 1 to 10.²⁷⁷ A performs at Level 8, B performs at Level 5, and C performs at Level 2. At Level 2, C obtains a prescription for Adderall based on a validly diagnosed learning disability, but this drug enables C to perform at Level 7. Is this fair to B, especially in a zero-sum scholastic setting?²⁷⁸ Perhaps B should now take cognitive enhancers because he is mentally below both A and C. Assume B does “game the system” and with the help of Ritalin now performs at Level 9. A discovers the cognitive use and secures her own brain boosters, which may or may not increase her cognitive abilities. Either way, C—who had the valid disability—is still denied equal footing on the intelligence scale. Such a hypothetical illustrates the inherent unfairness of improper cognitive-enhancer use²⁷⁹ and has led numerous critics to contend

272. Fenton & Wunderlich, *supra* note 44, at 18. “Proper use [of cognitive enhancers] is like a person with poor vision wearing glasses so they can see the ball as clearly as those who naturally have 20/20 vision. Improper use is more akin to a nonhandicapped person parking in handicapped spaces.” *Id.* Proper use occurs when an intellectually disabled individual takes cognitive enhancers for the chance to lead a good life. Savulescu, *supra* note 71, at 334. Low intelligence is a disease when the IQ is less than 70, and doctors already use pharmacological means to treat this disease. *Id.*

273. See *supra* notes 128, 256 and accompanying text.

274. A learning disability is an “unexplained learning discrepancy—academic underachievement that cannot be explained by an observable physical or mental handicap.” Lerner, *supra* note 42, at 1059–60, 1065; see, e.g., *supra* note 272.

275. See Greely, *supra* note 6, at 1153 (noting that in a society of enhanced individuals, discrimination may increase against those—such as the disabled or sick—who cannot achieve this same mental enhancement); see, e.g., *supra* note 42 and accompanying text; see also MERKEL ET AL., *supra* note 247, at 388 (explaining the difference between enhancement and valid treatment). Essentially, if everyone is “focused on becoming Supermen and Superwomen, the people who are left behind will be left even further behind.” Greely, *supra* note 6, at 1153.

276. See Lerner, *supra* note 42, at 1075 (additionally discussing how “an LD diagnosis can mean shortened homework assignments, additional and personalized assistance, exemptions from otherwise required classes, and accommodations on exams”); see also Freedley Hunsicker, *Learning Disabilities, Law Schools and the Lowering of the Bar*, 42 S. TEX. L. REV. 1, 4–5, 13–17 (2000) (analyzing the fairness of learning-disability accommodations in law schools). Of course, if other students suspect that their peers are “gaming the system,” they may (1) socially stigmatize the cognitive-enhancer users, (2) report them to administration, or (3) follow their examples. See Lerner, *supra* note 42, at 1075; see also *supra* notes 23, 194 and accompanying text.

277. The author created the following hypothetical to illustrate the fairness implications involved *infra* at notes 278–80 and accompanying text.

278. See *supra* notes 243–44 and accompanying text.

279. Fenton & Wunderlich, *supra* note 44, at 18.

that natural efforts free of drug use are the more acceptable means of securing academic achievements because they are morally neutral.²⁸⁰

While safety concerns, social implications, and fairness issues are the three main concerns that proponents and critics repeatedly address when debating the morality of cognitive-enhancement use by society at large,²⁸¹ these categories take on new meaning and generate even more ethical dilemmas when analyzed within the narrower setting of medical and law schools.²⁸² For example, the zero-sum characteristic of most medical and law school examinations dictates that most artificially-obtained unfair advantages are forms of scholastic cheating.²⁸³ Fundamental to this ethical analysis is the reality that medical and law school students must study and work within ethics-based guidelines and rules.²⁸⁴ Therefore, after fully weighing all three ethical concerns,²⁸⁵ it becomes clear that the scales tip away from personal autonomy and towards mandatory safeguards in these higher education settings.²⁸⁶ This means that university administrators and professional associations should both recognize and monitor medical and law school students' medicinal cognitive-enhancement use if they wish to prevent cognitive cheating and uphold the values embraced by their respective professions.²⁸⁷

IV. SMART POLICY: SUGGESTIONS TO PREVENT COGNITIVE CHEATING

Greely and Sahakian—well-known proponents of medicinal enhancement²⁸⁸—have both cautioned that in a scholastic environment, educators and professional organizations should implement regulations when cognitive-enhancement drug use imparts unfair advantages.²⁸⁹ Such

280. See *supra* note 226 and accompanying text. Specifically, one commentator suggests that cognitive enhancers disrupt the ideal of fairly earned praise in academia: “[T]o what extent can you take credit for accomplishments if they are not achieved through the socially valued practices, like study and effort that have traditionally produced them?” Schermer, *supra* note 26, at 87.

281. See *supra* note 124 and accompanying text.

282. See, e.g., *supra* notes 189–92, 216–17, 235–37 and accompanying text.

283. See *supra* notes 241–44 and accompanying text.

284. See *supra* notes 239–42 and accompanying text.

285. See *supra* notes 126–280 and accompanying text.

286. See *supra* notes 186–87 and accompanying text.

287. See *supra* notes 15–16, 188 and accompanying text.

288. See *supra* notes 8–9 and accompanying text.

289. See Greely et al., *supra* note 9, at 704–05; Sahakian & Morein-Zamir, *supra* note 168, at 1159. For well-written analyses explaining why the government and Congress cannot create and enforce these laws or regulations that prohibit cognition-improving products, see RICHARDS, *supra* note 2, at 185–88, and Mehlman, *supra* note 13, at 495–97.

regulations are particularly needed in medical and law schools where students' medicinal brain boosting gives them an academic edge against their studious, but drug-free, peers.²⁹⁰

A. The Drug War: Recruitment of University Administrators

Because cheating involves obtaining an unfair advantage,²⁹¹ ethicists suggest that universities could implement two different procedures to eliminate medicinal cognitive advantages:

Academic institutions could follow the model of sports leagues and explicitly ban enhancers for students enrolled in competitive courses or taking competitive exams; they could even institute random drug testing. At the other extreme, they could follow the lead of ethicists like Allen Buchanan, who compare the use of CEDs [cognitive enhancement drugs] to the use of calculators on math exams. On that reasoning, professors might make cognitive enhancement an explicit course expectation and even distribute CEDs before exams, or professors might permit CEDs without distributing them.²⁹²

Both these approaches focus on obtaining fairness through consistent, clear, and enforceable rules.²⁹³ However, the ethical concerns stemming from cognitive-enhancement drug use encompass more than fairness inquiries.²⁹⁴ When safety and societal implications enter the cheating equation,²⁹⁵ the equal access approach is no longer a valid consideration.²⁹⁶ Instead, suggestions for university monitoring must focus on methods that ban or discourage medicinal brain boosting as an ethical violation.²⁹⁷

Traditionally, educational institutions have dealt with impermissible drug use in three ways—drug testing, transcript asterisking, and early preventative action.²⁹⁸ While these methods also may work to prevent medicinal cognitive enhancement, universities must first establish rules that

290. See *supra* notes 241–44 and accompanying text.

291. See *supra* note 26 and accompanying text.

292. Goodman, *supra* note 81, at 150 (citations omitted); see also *supra* notes 238, 258 and accompanying text.

293. Goodman, *supra* note 81, at 150.

294. See *supra* note 124 and accompanying text.

295. See *supra* notes 124–25 and accompanying text.

296. See *supra* notes 260–63, 292 and accompanying text.

297. See *supra* notes 287, 292 and accompanying text; see also Fenton & Wunderlich, *supra* note 44, at 18 (noting that medicinal cognitive enhancement is an unethical and deceptive practice that undermines the integrity of education).

298. See Fenton & Wunderlich, *supra* note 44, at 20–21.

clearly prohibit this type of drug consumption.²⁹⁹ The government already recognizes that cognitive-enhancer use is illegal without a physician's prescription.³⁰⁰ In upholding these laws, both medical and law school student handbooks include rules that forbid illicit drug use.³⁰¹ Some universities also penalize and discourage the abuse of legally obtained drugs.³⁰² However, medical and law schools *still* need to establish policies³⁰³ that explicitly ban illegally³⁰⁴ and legally obtained prescription medications when used *purely* for cognitive-enhancement purposes before medicinal brain boosting officially becomes a recognized form of scholastic cheating.³⁰⁵ Clear, consistent rules allow university administrators to

299. See Goodman, *supra* note 81, at 150.

300. See *supra* notes 119–21 and accompanying text.

301. See, e.g., EMORY UNIV. SCH. OF MED., MEDICAL STUDENT HANDBOOK 65–66 (2010), available at http://www.med.emory.edu/education/omesa/SOM_Handbook_2010_2011.pdf; HARVARD LAW SCH., HANDBOOK OF ACADEMIC POLICIES 99–100 (2011), available at <http://www.law.harvard.edu/academics/handbook/2011-12handbookofacademicpolicies.pdf>; MERCER UNIV. SCH. OF MED., MEDICAL STUDENT HANDBOOK 74 (2011), available at http://medapps.mercer.edu/index.php?header=off&file_path=/mednet/handbooks/&file_name=studenthandbook.pdf; SUFFOLK UNIV., GRADUATE STUDENT HANDBOOK 95–101 (2010), available at http://www.suffolk.edu/files/Student_Services_PDF/Grad_Student_Handbook_2010_092910.pdf; WASH. & LEE UNIV., STUDENT HANDBOOK 33 (2011), available at <http://law.wlu.edu/deptimages/student%20services/StudentHandbook.pdf>.

302. See, e.g., BIRMINGHAM SCH. OF LAW, STUDENT HANDBOOK 35–36 (2009), available at http://www.bspl.com/BSL_Handbook09.pdf (warning that “[a]ny student who presents themselves for class in an impaired state (including over medicating with prescription drugs) is subject to being dismissed from class by their professor and subject to possible dismissal from BSL” and that any “student suspected of substance abuse or dependency (prescription or non-prescription drugs) may be required to undergo testing and/or treatment as a condition of . . . continued attendance”); DUKE SCH. OF NURSING, STUDENT HANDBOOK 38 (2010), available at http://nursing.duke.edu/sites/default/files/current_students/phd_student_handbook_2011-20121.pdf (cautioning that “misuse of legal drugs” that can result in “health difficulties impairing performance” may warrant withdrawal from the nursing program if it poses a danger to patients or other students); GEORGE WASHINGTON SCH. OF MED., STUDENT HANDBOOK FOR HEALTH SCIENCES PROGRAMS 16 (2011), available at http://www.gwumc.edu/healthsci/academics/Health_Sciences_Student_Handbook.pdf (explaining that inappropriate student behavior includes “using illegal drugs or abusing controlled substances”).

303. I emphasize “still” because higher educational institutions typically are reluctant to address medicinal cognitive enhancement. See Appel, *supra* note 152, at 616. For example, “[f]or all particular purposes—except within the limited realm of state-run schools—neurocognitive enhancement remains no more regulated today than any other basic medical or pharmacological interventions.” *Id.*

304. Although university drug policies already ban illicit drug use, prohibitions must explicitly focus on medicinal cognitive enhancement as a separate form of academic cheating. See *supra* note 301 and accompanying text.

305. See *supra* notes 246–47 and accompanying text. One commentator aptly explained the need for unambiguous rules:

When new enhancement technologies are introduced . . . the question of cheating cannot be answered with a simple appeal to existing rules. The question is whether the old rules

enforce the prohibition on such cheating through the common methods employed against any other forbidden drug use.³⁰⁶

1. Drug Testing

Drug testing is the most common traditional tool employed to deter prohibited drug abuse in many sectors of society.³⁰⁷ For example, the United States Department of Defense began drug testing military personnel as early as the 1960s.³⁰⁸ Drug testing has since expanded to the athletic,³⁰⁹ employment,³¹⁰ and educational arenas.³¹¹ When applying drug-testing

still suffice to deal with the new technological possibilities. If the new technology offers some unfair advantage, it may have to be banned by new rules.

Schermer, *supra* note 26, at 85–86; *see also infra* note 306 and accompanying text. In the law school setting, if administrators unequivocally recognize medicinal cognitive enhancement as a form of cheating, then law schools and individual professors can report this questionable behavior to state bar authorities when they consider certifying applicants who incurred this academic violation. McCulley, *supra* note 19, at 856.

306. *See supra* notes 298–99 and accompanying text.

307. *See* Stephen O. Griffin et al., *Developing a Drug Testing Policy at a Public University: Participant Perspectives*, 30 PUB. PERSONNEL MGMT. 467, 468 (2001); *see also infra* notes 308–11 and accompanying text.

308. Griffin et al., *supra* note 307, at 468.

309. Pavisian, *supra* note 42, at 194–96. Both WADA and the National Collegiate Athletic Association (NCAA) administer random drug tests on qualifying athletes. *Id.*; *see also supra* note 229 and accompanying text. The NCAA is a private entity that helps U.S. universities regulate their student athletic programs. Pavisian, *supra* note 42, at 194. Under the NCAA scheme, when a student athlete tests positive for a banned substance, the NCAA suspends that athlete until he or she tests negative on a subsequent drug test. *Id.* The United States Anti-Doping Agency administers drug tests for WADA on any foreign athlete present within the United States and on any athlete who participates in a competition sanctioned by the United States Olympic Committee. *Id.* at 195–96. Both athletic organizations give athletes therapeutic use exemptions when they consume prohibited drugs for authorized medical purposes. *Id.* (explaining that the athlete has the burden of requesting such an exemption from his or her respective anti-doping agency).

310. Griffin et al., *supra* note 307, at 467–68. Private companies began to increasingly drug test employees and applicants in the early 1980s, but the Anti-Drug Abuse Act of 1986 really spurred drug-testing growth in both the private and public sectors. *Id.* at 468; *see also* Anti-Drug Abuse Act of 1986, Pub. L. No. 99-570, 100 Stat. 3207. In the public arena, the Omnibus Transportation Employee Testing Act of 1991 (implemented in 1994 and amended in 2010) mandated drug and alcohol testing for all “employees in safety-sensitive positions in the railroad, airline, mass transit, motor carrier, and pipeline industries.” Griffin et al., *supra* note 307, at 468; *see also* Omnibus Transportation Employee Testing Act of 1991, Pub. L. No. 102-143, 105 Stat. 917. Currently, the federal government applies random drug testing to all its employees in safety-sensitive positions. Griffin et al., *supra* note 307, at 468. In the private arena, drug-testing policies also remain on the rise; for example, from 1987 to 1996, drug-testing schemes implemented by major corporations actually increased fourfold. *Id.*

311. James Velasquez, *Drug Testing in Schools: A Brief Review and Analysis of Recent Events*, 41 AM. J. HEALTH EDUC. 180, 180 (2010). In 2003, 13% of United States middle and secondary schools applied random drug-testing programs on their students; in 2006, this figure rose to 25.5%. *Id.* (noting that drug testing policies vary widely among school districts across the country); *see also* Paul J. Fudala et al., *An Examination of Current and Proposed Drug-Testing Policies at US Colleges*

schemes in an academic environment, concerns center on the balance between students' privacy rights under the Fourth Amendment³¹² and university administrators' interests in preventing drug abuse and medicinal cheating.³¹³ Fourth Amendment protections are triggered when a state or a state agent conducts the drug-testing search.³¹⁴ Generally, courts consider scholastic state actors to include publicly-funded colleges or universities.³¹⁵ Therefore, drug testing at private universities may not require the same Fourth Amendment scrutiny.³¹⁶

For public universities³¹⁷ to apply a constitutionally permissible drug-testing scheme, the drug testing must be (1) voluntary, (2) based on reasonable suspicion, or (3) administered in a reasonable manner that furthers an important governmental interest.³¹⁸ Obtaining voluntary consent

and Universities, 42 J. AM. C. HEALTH 267, 267 (1994) (analyzing results from a national survey encompassing 332 colleges that drug test their students).

312. The Fourth Amendment to the U.S. Constitution protects an individual's right to be secure in his person or effects against unreasonable searches and seizures. U.S. CONST. amend. IV.

313. Velasquez, *supra* note 311, at 180. Fourth Amendment analysis requires this balancing test to determine if searches either are unreasonable or permissible under the special needs doctrine—a doctrine “applied ‘only in those exceptional circumstances in which special needs, beyond the normal need for law enforcement, make the [Fourth Amendment’s] warrant and probable-cause requirement impracticable.’” Schieffelin, *supra* note 13, at 962–63.

314. Pavisian, *supra* note 42, at 185. Random searches by state actors traditionally required probable cause, a search warrant, or both to satisfy Fourth Amendment reasonableness standards. *See Velasquez, supra* note 311, at 181.

315. Pavisian, *supra* note 42, at 192; *see also* NCAA v. Tarkanian, 488 U.S. 179, 192 (1988) (explaining that private parties perform state actions when “the State provide[s] a mantle of authority that enhance[s] the power of the harm-causing individual actor[s]”).

316. *See generally Private Law Schools*, AM. BAR ASS'N, http://www.americanbar.org/groups/legal_education/resources/aba_approved_law_schools/private_law_schools.html (last visited Mar. 3, 2012) (listing 117 private law schools); *Private Medical Schools—Tuition and Fees First Year Medical Students 2011–2012*, ASS'N OF AM. MED. COLLS., http://services.aamc.org/tsfreports/report.cfm?select_control=PRI&year_of_study=2012 (last visited Mar. 3, 2012) (listing fifty-four private medical schools).

317. *See generally Public Law Schools*, AM. BAR ASS'N, http://www.americanbar.org/groups/legal_education/resources/aba_approved_law_schools/public_law_schools.html (last visited Mar. 3, 2012) (listing eighty-one public law schools); *Public Medical Schools—Tuition and Fees First Year Medical Students 2011–2012*, ASS'N OF AM. MED. COLLS., http://services.aamc.org/tsfreports/report.cfm?select_control=PUB&year_of_study=2012 (last visited Mar. 3, 2012) (listing eighty public medical schools).

318. *See Pavisian, supra* note 42, at 201; Velasquez, *supra* note 311, at 184. Public middle and secondary schools can perform drug testing through the doctrine of *in loco parentis*, which allows “school officials [to] stand in place of parents/guardians in maintaining discipline, supervision, and safety.” Velasquez, *supra* note 311, at 181. Graduate universities cannot use the *in loco parentis* doctrine because their students typically are adults, which means they must apply the traditional Fourth Amendment balancing test to justify random drug-testing searches. Pavisian, *supra* note 42, at 189; *see also supra* note 313 and accompanying text.

may be the simplest way to implement a legal drug-testing policy.³¹⁹ Medical and law school admissions can include drug-testing consent forms within their acceptance applications³²⁰ or even make these forms prerequisites for participation in extracurricular activities—such as clinical programs, journals, and moot court competitions.³²¹

Suspicion-based drug testing enables school administrators to test students who act in a manner that gives rise to the reasonable suspicion of drug abuse.³²² For example, in *Pierce v. Smith*,³²³ the Fifth Circuit upheld the drug testing of a medical resident after she slapped a patient because the Texas Tech University teaching hospital had written policies that provided for drug testing when a medical student's behavior was consistent with drug use.³²⁴ In the same way, medical and law school administrators can

319. Pavisian, *supra* note 42, at 201. For example, numerous universities require student athletes to sign drug-testing consent forms before they can participate in intercollegiate athletics. See, e.g., CHARLESTON S. UNIV., STUDENT-ATHLETE HANDBOOK 20–24 (2011), available at <http://csusports.athleticsite.net/SAHandbook.pdf>; FLA. GULF COAST UNIV., STUDENT-ATHLETE HANDBOOK 64–74 (2011), available at <http://www.fgcuathletics.com/media/2011-12/Student%20Athlete%20Handbook%201112.pdf>; UNIV. OF TEX. STUDENT-ATHLETE MANUAL 49–53 (2011), available at http://grfx.cstv.com/photos/schools/tex/genrel/auto_pdf/2011-12/misc_non_event/11-acad-serv-student-manual.pdf.

320. See Pavisian, *supra* note 42, at 201 (noting that consent precludes students from asserting Fourth Amendment claims). For example, Florida International University requires drug testing for all applicants as a prerequisite to entering the first year of its medical school. *Background Check and Drug Testing*, FLA. INT'L UNIV., <http://medicine.fiu.edu/admissions.php?ss=back> (last visited Mar. 3, 2012). However, such a broad policy creates strong Fourth Amendment challenges that may incentivize courts to strike this admissions procedure. See WILLIAM A. KAPLIN & BARBARA A. LEE, THE LAW OF HIGHER EDUCATION: A COMPREHENSIVE GUIDE TO LEGAL IMPLICATIONS OF ADMINISTRATIVE DECISION MAKING 267–68 (4th ed. 2006); see, e.g., Ga. Ass'n of Educators v. Harris, 749 F. Supp. 1110, 1114 (N.D. Ga. 1990) (holding that the absence of a governmental interest made a drug-testing scheme for all job applicants unconstitutional under the Fourth Amendment balancing test). Instead, universities can seek voluntary consent from all incoming applicants—but not as a prerequisite for enrollment. If an applicant opts out of the drug-testing scheme, administrators can note this decision on a student's transcript or file in a similar manner as transcript asterisking. See *infra* notes 346–48 and accompanying text.

321. For example, Oregon Health and Science University requires all of its medical students who participate in clinics and involve themselves with patient care to first go through a drug-screening process. *Medical Student Information Regarding Drug Testing*, OR. HEALTH & SCI. UNIV., available at <http://www.ohsu.edu/xd/education/schools/school-of-medicine/students/upload/Drug-Testing-Information-4.pdf>. Most universities also employ the “prerequisite scheme” with student-athletes. See *supra* note 319. For middle and secondary schools, courts have held that adolescent students who participate in athletics or school-sponsored extracurricular activities have reduced privacy rights and can be subjected to prerequisite consent forms. Velasquez, *supra* note 311, at 181–82; see also Bd. of Educ. of Indep. Sch. Dist. No. 92 v. Earls, 536 U.S. 822 (2002) (upholding random drug testing for all students who participate in extracurricular activities); Vernonia Sch. Dist. 47J v. Acton, 515 U.S. 646 (1995) (upholding random drug testing for all student-athletes).

322. Velasquez, *supra* note 311, at 181 (“Reasonable suspicion may result from an eyewitness account, a tip or information from a reliable source, suspicious behavior, drug or alcohol odor, or behavior consistent with intoxication.”).

323. 117 F.3d 866 (5th Cir. 1997).

324. *Id.* at 882–83; see also KAPLIN & LEE, *supra* note 320, at 268 (noting that the nature of medical students' work means medical universities have special reasons to prevent drug abuse). For

implement clear rules that require drug testing of their respective students who exhibit the common signs of cognitive-enhancement drug abuse.³²⁵

If public universities do not obtain students' consent or rely on reasonable suspicion, they must establish that their drug testing policies further sufficient governmental interests³²⁶ and are reasonably administered.³²⁷ When drug-testing schemes apply to adults,³²⁸ courts repeatedly have held that such warrantless searches are valid under the Fourth Amendment if the governmental interests outweigh the individual's constitutional rights.³²⁹ In medical and law schools, randomized drug testing targeted at medicinal cognitive-enhancement use furthers two governmental interests: academic integrity³³⁰ and student safety.³³¹ Courts have found both concerns are valid state interests in Fourth Amendment analyses.³³² Therefore, public universities can implement drug-testing schemes that will pass constitutional muster if their applicable policies are also reasonably administered.³³³

Reasonable administration considers the type of drug testing, the procedures for the drug testing, and the policy of confidentiality.³³⁴

more information on drug-testing policies in the health-care sector, see Dana Devon, *Drug Testing of Health Care Workers: Toward a Coherent Hospital Policy*, 23 AM. J.L. & MED. 399, 400–08 (1997).

325. See *supra* notes 131, 134, 137 and accompanying text (listing the common side effects for different cognitive enhancers).

326. See *supra* note 318 and accompanying text.

327. For instance, in *Colorado v. Derdeyn*, the Colorado Supreme Court held that mandatory drug testing for student-athletes, absent consent, was unconstitutional when the university failed to (1) specify the method of administration and (2) provide advance notice. 863 P.2d 929, 949–50 (Colo. 1993).

328. Again, most medical and law school students are adults. See *supra* note 318.

329. See, e.g., *Nat'l Treasury Emps. Union v. Von Raab*, 489 U.S. 656, 679 (1989) (drug testing U.S. Customs Service employees who dealt with drugs or possessed firearms); *Skinner v. Ry. Labor Execs' Ass'n*, 489 U.S. 602, 628, 634 (1989) (drug testing railroad employees involved in accidents); *Int'l Union v. Winters*, 385 F.3d 1003, 1013 (6th Cir. 2004) (drug testing employees with law enforcement powers); *Dimeo v. Griffin*, 943 F.2d 679, 685 (7th Cir. 1991) (drug testing employees of the Illinois Racing Board); *Int'l Bhd. of Teamsters, Chauffeurs, W. Conference of Teamsters v. Dep't of Transp.*, 932 F.2d 1292, 1304–05 (9th Cir. 1991) (drug testing drivers of commercial vehicles).

330. See *supra* notes 285–87 and accompanying text.

331. See *supra* notes 131–81 and accompanying text.

332. See Pavisian, *supra* note 42, at 201–04 (providing an in-depth examination into courts' opinions and common-sense arguments that support drug-testing policies based on safety and academic integrity); see also Schieffelin, *supra* note 13, at 974 (noting that the government has a "special need" to ensure a fair and safe educational environment).

333. See *supra* notes 326–27 and accompanying text.

334. Pavisian, *supra* note 42, at 205–06 (explaining that courts measure reasonableness by weighing the proffered governmental interests with the testing intrusions).

Administrators can test different samples—such as urine, hair, sweat, and saliva—with varying degrees of intrusion.³³⁵ To avoid overly broad privacy infringement, some universities may only check for cognitive enhancers, and not for other illegal substances, to further the purpose of the medicinal screening.³³⁶ Procedures for drug testing focus on whether the testing should be randomly applied throughout the school year or predominantly administered before or after exams.³³⁷ They also consider how administrators should handle students with valid prescriptions—by either giving them pre-exemptions³³⁸ or requiring them to prove valid use after testing positive for cognitive-enhancer consumption.³³⁹ Lastly, drug testing necessitates policies of confidentiality to protect students’ privacy rights.³⁴⁰ Inherent in privacy protection is the idea that positive drug-testing results will not result in criminal penalties because schools will deal with testing outcomes internally.³⁴¹

While drug testing is a viable method to combat the overarching problem of medicinal cognitive enhancement,³⁴² school administrators may

335. *Id.* at 205. Pavisian recommends saliva testing as the most accurate, convenient, and least intrusive method. *Id.* Hair and sweat samples, while less intrusive than urinalysis, create too many false positives. *Id.* However, all types of drug testing are susceptible to error. Velasquez, *supra* note 311, at 184. Therefore, universities may wish to implement subsequent follow-up tests to combat the fears of flawed or inaccurate results. *See id.*

336. Schieffelin, *supra* note 13, at 976. Because student safety is one of the governmental interests furthered by randomized drug testing, administrators may feel the need to also test for illegal substances. *See supra* notes 331–32. However, this will implicate privacy concerns to a larger extent, requiring the governmental interest to be even greater. *See supra* note 334.

337. Pavisian, *supra* note 42, at 206. Because medical and law school students consume cognitive enhancers to improve their mental capabilities for final exams or papers, drug testing during final exam periods makes more sense. *See supra* note 6 and accompanying text.

338. *See* Pavisian, *supra* note 42, at 206–07; Schieffelin, *supra* note 13, at 976. Administrators should only give preexemptions to students who can prove their prescriptions are for FDA-approved purposes, and not for off-label use. *See supra* note 69. For example, students who take Adderall for AD/HD can receive medical exemptions in a similar manner as athletes under the NCAA or WADA policies. Pavisian, *supra* note 42, at 206–07; *see also supra* note 309.

339. *See* Velasquez, *supra* note 311, at 184.

340. Pavisian, *supra* note 42, at 206. Pavisian suggests that universities can ensure confidentiality by replacing “student names with identification numbers to ensure that lab technicians are blindly testing the samples” and by limiting “the group of people involved in administering the tests, analyzing it, and reading the results.” *Id.*

341. Schieffelin, *supra* note 13, at 976; *see also* Velasquez, *supra* note 311, at 184 (stressing that schools should not use drug testing to academically or legally punish student drug users). As one commentator noted, courts probably are “more open to allowing a drug-testing scheme that does not include jail time.” Pavisian, *supra* note 42, at 207. Because this drug testing is meant to catch scholastic cheaters, university administrators have the discretion to determine appropriate academic sanctions. Schieffelin, *supra* note 13, at 976.

342. Society has used drug testing to deter drug abuse since at least the 1960s, and, of course, medicinal cognitive enhancement is a form of drug abuse. *See supra* notes 307–08 and accompanying text.

encounter other difficulties in its implementation—including expense,³⁴³ logistics, and potential liability.³⁴⁴ Specifically in the medical and law school settings, drug screening serves to effectively negate the traditional honor code framework that forms the “bedrock” of their educational systems.³⁴⁵ Therefore, when weighing the pros and cons of drug-testing policies, universities should also consider two other deterrence methods—transcript asterisking and early preventative action.³⁴⁶

2. Transcript Asterisking

Transcript asterisking³⁴⁷ enables administrators to mark students’ transcripts with indiscrete asterisks to indicate grades may be a result of cognitive-enhancer use—rather than solely talent or studious effort.³⁴⁸ An asterisking policy will not reduce a grade;³⁴⁹ instead, it will warn potential

343. Expense is one of the biggest factors weighing against drug-testing policies, especially since the cost “will ultimately rest with the university and the student body.” Pavisian, *supra* note 42, at 205. However, while urinalysis is expensive, other testing procedures are less expensive and continue to drop in cost. *See id.*; Velasquez, *supra* note 311, at 184.

344. Fenton & Wunderlich, *supra* note 44, at 21. For a comparison of the advantages and disadvantages of drug-testing schemes, see Griffin et al., *supra* note 307, at 470–71.

345. Fenton & Wunderlich, *supra* note 44, at 21; *see also supra* notes 22–23 and accompanying text.

346. *See supra* note 298 and accompanying text.

347. An asterisk “is a star-shaped symbol used in writing to serve as a reference point.” Jody Weisel, *Asterisk is Not a Dirty Word*, 37 MOTOCROSS ACTION MAG. 154, 154 (Feb. 2009). It indicates “there is more to the story” than a record, statistic, or file reveals on its face. *See id.*

348. *See* Fenton & Wunderlich, *supra* note 44, at 21. This type of asterisk policy is commonly found in sports. *See, e.g.,* Karen Crouse, *Swimming Bans High-Tech Suits, Ending an Era*, N.Y. TIMES (July 24, 2009), <http://www.nytimes.com/2009/07/25/sports/25swim.html> (considering asterisks for athletes who wore swimsuits akin to “doping on a hanger”); Jere Longman, *Track Hears a Call to Wipe Out Records*, N.Y. TIMES (July 18, 2004), <http://www.nytimes.com/2004/07/18/sports/track-and-field-track-hears-a-call-to-wipe-out-records.html?pagewanted=all&src=pm> (mentioning asterisks in international track and field annuals for drug use and faulty equipment); Tom Verducci, *Is Baseball in the Asterisk Era?*, SPORTS ILLUSTRATED (Mar. 15, 2004), <http://sportsillustrated.cnn.com/vault/article/magazine/MAG1031393/index.htm> (discussing asterisks for steroid use). However, an asterisk essentially reflects disgust for cheating or alleged cheating in any competitive setting, not just sports. Melinda Rosenberg, *Nietzsche, Competition and Athletic Ability*, 2 SPORT, ETHICS & PHIL. 274, 283 (2008); *see also supra* notes 234–35 and accompanying text (recognizing that medical and law schools are competitive environments).

349. Rules that reduce grades when disciplining students for nonacademic conduct may be illegal depending on the jurisdiction. Gary Chartier, *Truth-Telling, Incommensurability, and the Ethics of Grading*, 2003 BYU EDUC. & L.J. 37, 38. For instance, in *Smith v. School City of Hobart*, a federal district court held that a school violated a student’s substantive due process rights when it reduced her grade by twenty percent as punishment for alcohol-related misconduct. *Smith v. Sch. City of Hobart*, 811 F. Supp. 391, 399 (N.D. Ind. 1993). However, courts also have taken the opposite stance, such as the Texas Tenth District Court of Appeals that rejected the claim that “an academic

employers³⁵⁰ that a grade may not “accurately reflect students’ abilities in the subject matter taught.”³⁵¹ Essentially, asterisking has two effects: deterrence and exposure.³⁵² “[I]t will deter those who understand that the behavior is unethical; and it will expose those who don’t.”³⁵³

Transcript asterisking is an inexpensive and effective academic sanction³⁵⁴ that universities can employ for different forms of scholastic cheating.³⁵⁵ In terms of medicinal academic dishonesty, administrators can mark student files and transcripts for brain-boosting use if students (1) are caught taking cognitive enhancers³⁵⁶ or (2) test positive for cognitive

penalty for non-academic disciplinary purposes is constitutionally unreasonable and impermissible.” *New Braunfels Indep. Sch. Dist. v. Armke*, 658 S.W.2d 330, 332 (Tex. App. 1983) (noting that the grade reduction came from school suspension relating to alcohol use). The difficulty with medicinal cognitive enhancement is that it is both nonacademic drug abuse and academic dishonesty. *See supra* notes 303–06 and accompanying text.

350. It will also alert other graduate schools, certification boards, and bar examiners. *See Fenton & Wunderlich, supra* note 44, at 21 (explaining that asterisking warns that a “student’s grade may be more reflective of a chemical induction”).

351. Chartier, *supra* note 349, at 41. Grades should represent natural abilities and retained knowledge:

A grade is *accurate* to the extent that it permits someone to estimate the extent of a student’s knowledge and skills in a given area. It is *inaccurate* to the extent that it leads someone to believe that she knows more or less than she does or that she can do more or less than she can.

Id.; *see also supra* notes 211–13 and accompanying text. Grades should not represent artificially acquired and transient capabilities. *See supra* notes 237, 241–42 and accompanying text.

352. Fenton & Wunderlich, *supra* note 44, at 21.

353. *Id.*

354. To compare asterisk policies with the expense of drug testing, *see supra* notes 343–44 and accompanying text.

355. Many universities already use permanent transcript notations to punish academic dishonesty. *See, e.g., Academic Integrity and the Judiciary Process: Frequently Asked Questions—Students*, STONY BROOK UNIV., <http://www.stonybrook.edu/uaa/academicjudiciary/faqstudent.shtml> (last visited Mar. 4, 2012); *The Code for General Behavior and Citizenship Expectations*, TUFTS UNIV., available at http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cts=1330888437919&ved=0CDQQFjAA&url=http%3A%2F%2Fwww.tufts.edu%2Fstudentaffairs%2Fcodeofconduct%2Fgeneral_citizenship_expectations.doc&ei=jb1TT6uXC4LciAKMvrm0Bg&usg=AFQjCNH84pWXcb5xiWjzVCUSsyonUhmfgf&sig2=hL2_Fe8BW8HRYT2SaT0qwg; *Undergraduate Academic Ethics Board*, JOHNS HOPKINS UNIV., http://www.jhu.edu/design/oliver/academic_manual/ethics.html (last visited Mar. 4, 2012).

356. Professors or other students who discover cognitive-enhancement drug use can report it in the same manner as any other form of academic cheating. *See supra* note 350 and accompanying text. For example, professors or students can approach either university administrators or academic honor boards. *See supra* notes 22–23, 355 and accompanying text. Accused students then have the opportunity to refute the charges or prove valid prescription use. *See supra* notes 338–39 and accompanying text. For examples of university honor codes, *see The Medical Student Honor Code for the University of Washington School of Medicine*, UNIV. OF WASH., available at http://depts.washington.edu/honorsom/Honor_Code.pdf; *Academic Honor Code: University of California, Irvine—School of Law*, UNIV. OF CAL., IRVINE, available at http://www.law.uci.edu/current/UCI_Law_Honor_Code.pdf.

enhancers.³⁵⁷ For universities to validly facilitate asterisk procedures, they also must implement early preventive actions that specifically acknowledge that cognitive-enhancement drug use is an academic violation.³⁵⁸

3. Early Preventative Action

Because medical and law schools already require students to adhere to honor codes, they can execute preventative actions within this ethical framework.³⁵⁹ For example, they can include specific guidelines within these codes that address medicinal cheating and its resulting sanctions.³⁶⁰ Additionally, orientations for first-year students can incorporate the signing of honor statements that explain the ethics of cognitive-enhancement drug use.³⁶¹ Finally, mandatory professional responsibility and ethics courses³⁶²

357. See *supra* note 341 and accompanying text. If students opt out of voluntary drug-testing programs, universities can also use asterisks to note their non-participation. See *supra* note 320 and accompanying text.

358. See *infra* note 360 and accompanying text. “[T]here is something to be said of declaring the conduct unethical in and of itself. To many, they may not consider taking [cognitive enhancers] a form of cheating. [S]chools should take a firm stance and announce that the conduct is against the rules.” Fenton & Wunderlich, *supra* note 44, at 21.

359. See *supra* notes 15, 22–23 and accompanying text.

360. See *supra* notes 303–06 and accompanying text; see also *supra* note 356 (listing examples of university honor codes). If honor codes state that cognitive-enhancement drug use is a form of academic dishonesty, then administrators will need to teach professors and honor board student members how to detect signs of this scholastic cheating. See *supra* note 325 and accompanying text. Most honor codes also require student witnesses to report violations or face their own possible sanctions. See Justin Imperato, *Trust Flourishes When Students Enforce Their Own Honor Code*, CHRISTIAN SCI. MONITOR, Nov. 7, 2000, at 15 (explaining the Statement of Non-Tolerance); see also *supra* note 23.

361. Fenton & Wunderlich, *supra* note 44, at 21–22 (“[O]nce people begin thinking about honesty, they stop cheating completely; although, when you remove the benchmark of ethical thought, they stray into dishonesty.”). Dan Ariely, the author of *Predictably Irrational*, explored whether honor codes and professional oaths actually affected behavior: “He notes that occasional swearing of oaths and statements of adherence of rules are not enough. Oaths and rules must be recalled at, or just before, the moment of temptation. Students must be indoctrinated with honesty early on.” *Id.* at 23; see also Tricia Bertram Gallant & Patrick Drinan, *Organizational Theory and Student Cheating: Explanation, Responses, and Strategies*, 77 J. HIGHER EDUC. 839, 850 (2006) (remarking that most researchers agree honor codes are not sufficient in and of themselves). During high peak periods of potential cheating, such as finals weeks, schools can heed Ariely’s advice by reminding students about the honor statements they previously signed. See David D. Wagaman & Ibolya Balog, *Reminders Work Wonders with Ethics*, PA. CPA J., Winter 2011, at 1, 2. Furthermore, exam procedures can require students to sign and submit statements that represent they have not engaged in any form of academic cheating, including medicinal cognitive enhancement. Fenton & Wunderlich, *supra* note 44, at 20 (discussing similar exam requirements for Loyola University Chicago School of Law); see also Gary Pavela, *Encouraging Students to Stop Cheating*, CURRICULUM REV., Jan. 1996, at 4, 4 (explaining exam procedures for the University of Maryland).

can discuss the safety, legal, and ethical implications of brain boosting as part of their curriculum.³⁶³ Even if instructors take just a day to address cognitive-enhancement drug abuse, their discussions will give validity to the scholastic problem and may engage the “moral imagination” of students in a way that will encourage them to embrace the values of their prospective professions.³⁶⁴

B. The Drug War: Recruitment of Professional Organizations

Besides university rules and honor codes, medical and law school students must also study and work under the restrictions and regulations imposed by their respective professional associations—including the AMA and ABA.³⁶⁵ Both of these associations have rules against illicit substance abuse and professional misconduct,³⁶⁶ but neither specifically tackles illegal or legal cognitive-enhancer consumption for the sole purposes of academic cheating.³⁶⁷

In the medical profession, students are especially vulnerable to substance abuse because of their easy access to prescription medications.³⁶⁸ For example, one survey reported that senior medical students and residents³⁶⁹ had a five to fifteen percent lifetime risk of developing a chemical dependence.³⁷⁰ The AMA plays a key role in assisting medical

362. See *supra* notes 22–23 and accompanying text (explaining that medical and law school students must take an ethics course within their respective curriculum); see also McCulley, *supra* note 19, at 862 (suggesting the need for additional ethics education beyond one mandatory course).

363. See Fenton & Wunderlich, *supra* note 44, at 23 (noting that many educators find ethics instruction sorely lacking). Universities rarely discuss the ethics of drug use. See Richard D. Aach et al., *Alcohol and Other Substance Abuse and Impairment Among Physicians in Residency Training*, 116 ANNALS INTERNAL MED. 245, 245–47 (1992). For example, most medical schools do not provide educational programs on student drug abuse, do not have a formal system to address the problem, and do not train faculty to recognize the problem. *Id.*; see also Barbara B. Blechner et al., *The Jay Healey Technique: Teaching Law and Ethics to Medical and Dental Students*, 20 AM. J.L. & MED. 439, 440–42 (1994) (describing and recommending a needed law and ethics program).

364. See Fenton & Wunderlich, *supra* note 44, at 23; *supra* note 16 and accompanying text. As one commentator aptly stated, “By implementing these suggestions, [medical and] law schools will play a more active role in [medical and] legal professionalism.” McCulley, *supra* note 19, at 869.

365. See *supra* notes 17–18 and accompanying text.

366. See CODE OF MEDICAL ETHICS OP. 8.15 (1986) (addressing substance abuse among doctors); MODEL CODE OF PROF'L CONDUCT R. 8.4(b) (2010) (discussing professional misconduct among lawyers).

367. See *supra* note 366 and accompanying text.

368. Aach et al., *supra* note 363, at 245; see also Deborah Brooke et al., *Addiction as an Occupational Hazard: 144 Doctors with Drug and Alcohol Problems*, 86 BRIT. J. ADDICTION 1011, 1011–12 (1991) (noting the same concern for physicians).

369. Medical residents are newly graduated medical students who are training in medical residency programs. David C. Yao & Scott M. Wright, *The Challenge of Problem Residents*, 16 J. GEN. INTERNAL MED. 486, 486 (2001).

370. Edward C. Halperin et al., *Pre-Placement Screening of Resident Physicians by Substance Abuse Testing: Efficacy, Cost, and Physician Opinions*, 15 DRUGS: EDUC., PREVENTION & POL'Y

students, residents, and physicians with their alcohol and drug-related problems.³⁷¹ The association even recommends drug testing for student doctors and residents in certain health positions to further the “highest traditions of the profession” because they have “voluntarily accepted behavioral and ethical standards” that govern their vocation.³⁷² In keeping with this position, the AMA should adopt codes within the *Principles of Medical Ethics*³⁷³ that clearly discourage both illegal and legal cognitive-enhancer consumption when utilized as a form of scholastic cheating.³⁷⁴ Because studies have found links between medical student burnout and the propensity to cheat,³⁷⁵ the AMA can further its ethical regulations by continuing to encourage “medical schools to establish relationships between faculty members and students to promote a positive learning environment.”³⁷⁶ Finally, the AMA can approve and support Continuing Medical Education (CME)³⁷⁷ classes that discuss the ethics of cognitive-

77, 78 (2008) (noting that physicians have the same prevalent risk); *see also* Aach et al., *supra* note 363, at 246 (listing other surveys for medical students and residents-in-training with varying results).

371. *See* Aach et al., *supra* note 363, at 247.

372. Devon, *supra* note 324, at 411. The AMA also directly discourages student doctors from self-prescribing or prescribing medications for their peers. *See supra* notes 122, 368 and accompanying text.

373. *See supra* note 17 and accompanying text.

374. *See infra* notes 387–89 and accompanying text. The AMA already has a rule that addresses substance abuse: “It is unethical for a physician to practice medicine while under the influence of a controlled substance, alcohol, or other chemical agents which impair the ability to practice medicine.” CODE OF MEDICAL ETHICS OP. 8.15 (1986). However, this Opinion does not recognize cognitive-enhancer consumption as cheating. *See supra* note 367. The AMA can either (1) add a comment to this Opinion that specifically states cognitive-enhancement use is a form of cheating, or (2) adopt a new Opinion, such as “it is unethical for a medical student to practice or learn medicine while under the influence of an illegal or legal cognitive enhancer when utilized for cheating purposes.” *See supra* note 367.

375. *See, e.g.*, Liselotte N. Dyrbye et al., *Medical Student Distress: Causes, Consequences, and Proposed Solutions*, 80 MAYO CLINIC PROC. 1613, 1616 (2005) [hereinafter *Medical Student Distress*]; Liselotte N. Dyrbye et al., *Relationship Between Burnout and Professional Conduct and Attitudes Among US Medical Students*, 304 J. AM. MED. ASS’N 1173, 1176–77 (2010).

376. *Medical Student Distress*, *supra* note 375, at 1617–19 (listing other actions that the AMA can suggest—such as implementing student-led support programs, identifying and assisting struggling students, and teaching stress-coping skills).

377. CME are educational courses that physicians must take to earn their required annual credits for continued certification. *See supra* note 25 and accompanying text. *See generally* *Continuing Medical Education*, AM. MED. ASS’N, <http://www.ama-assn.org/ama/pub/education-careers/continuing-medical-education/cme-credit-offerings.page?> (last visited Mar. 4, 2012) (describing the importance of a physician’s continuing educational and professional development). For more information on CME activities and the credit system, see *The Physician’s Recognition Award and Credit System: Information for Accredited Providers and Physicians*, AM. MED. ASS’N, 1–5 (2010), available at <http://www.ama-assn.org/ama1/pub/upload/mm/455/pr-booklet.pdf>.

enhancement drug use and teach physicians how to detect such medicinal abuse in their student doctors.³⁷⁸

In a similar vein as the AMA, the ABA needs to explicitly state in the *Model Rules of Professional Conduct*³⁷⁹ that cognitive-enhancement drug abuse is a form of dishonesty or deceit that constitutes professional misconduct.³⁸⁰ Recognizing that medicinal brain boosting is an academic violation will allow bar examiners to use the existing ABA framework for evaluating the good moral character of legal applicants found guilty of such cheating.³⁸¹ This legal professional association, which requires active lawyers to take Continuing Legal Education (CLE)³⁸² classes in a manner comparable to the AMA,³⁸³ can also promote and endorse courses that

378. See Yao & Wright, *supra* note 369, at 486–90 (explaining how residency program directors and attending physicians can identify and handle problem residents); see also *supra* note 360 (noting that medical and law schools also should teach professors and students how to recognize medicinal cognitive enhancement). In a 2006 large-sample survey of health-care providers, respondents stated that ethics-based CME classes were more likely to assist them with more effective client care. Mark E. Johnson et al., *The Need for Continuing Education in Ethics as Reported by Rural and Urban Mental Health Care Providers*, 37 PROF. PSYCHOL.: RES. & PRAC. 183, 184, 187 (2006). Specifically, they asked for more classes dealing with the ethical management of clients with substance abuse problems and the ethical issues of colleague misconduct. *Id.* at 187. The authors of the study challenged continuing education providers “to offer ethics learning experiences that not only provide critical information on key ethical issues, but also engage the learner by providing information on timely and relevant topics that can be applied on a daily basis.” *Id.* at 188. Education on cognitive-enhancement drug use fits these criteria because it is a growing, relevant problem among medical students and physicians-in-training who provide health services and intern under the doctors taking the CME classes. See *supra* notes 84, 372 and accompanying text.

379. See *supra* note 18 and accompanying text.

380. See McCulley, *supra* note 19, at 845. Generally, the *Model Rules* already warn that lawyers will have to answer professionally for offenses of dishonesty and breach of trust. *Id.* at 845–46; see also RONALD D. ROTUNDA, PROFESSIONAL RESPONSIBILITY 20 (3d ed. 1992) (“Conduct, whether or not a crime, that involves dishonesty, fraud, deceit, or misrepresentation, is disciplinable.”). Specifically, Rule 8.4(b) states, “It is professional misconduct for a lawyer to commit a criminal act that reflects adversely on the lawyer’s honesty, trustworthiness or fitness as a lawyer in other respects.” MODEL CODE OF PROF’L CONDUCT R. 8.4(b) (2010). While this Rule may encompass the illegal consumption of cognitive enhancers, the ABA can definitively address cognitive-enhancement cheating by either (1) adding a comment to this Rule that specifically states that both illegal and legal cognitive-enhancement cheating is professional misconduct, or (2) adopting a new Rule, such as “it is professional misconduct for a law student to practice or learn law while under the influence of an illegal or legal cognitive enhancer when utilized for cheating purposes.” See *supra* note 374 (suggesting similar phrasing for an AMA proposed rule).

381. McCulley, *supra* note 19, at 846. Bar examiners already consider an applicant’s academic violations in determining whether to certify the applicant for legal practice. *Id.* at 846, 849 (noting that bar examiners also take an applicant’s suspected cheating and failure to disclose into account when assessing good moral character).

382. *ABA Model Rule for Continuing Legal Education and Comments*, AM. BAR ASS’N, 1–2 (2004), available at http://www.americanbar.org/content/dam/aba/migrated/2011_build/cle/mcle/aba_model_rule_cle.authcheckdam.pdf (explaining that lawyers must acquire twelve to fifteen credit hours annually through CLE classes).

383. See *supra* note 377 and accompanying text.

address medicinal brain boosting and its ethical implications.³⁸⁴ Lastly, the ABA should encourage law school administrators, professors, and lawyers to uphold its regulations against cognitive-enhancement drug abuse through their own respective programs, rules, and reporting methods.³⁸⁵ Only with the AMA and ABA's official recognition and approval can medical and law schools begin to effectively combat Generation Rx's growing trend of cognitive cheating.³⁸⁶

V. CONCLUSION

Cognitive enhancers improve the mental performance of the average consumer and arguably are appropriate brain-boosting tools for the majority of society.³⁸⁷ While numerous proponents lobby for general utilization of these prescription medications,³⁸⁸ medicinal cognitive enhancement abuse is not ethically appropriate in the higher-educational setting of medical and law schools.³⁸⁹ Instead, such use is equivalent to academic cheating.³⁹⁰ Both university administrators and professional organizations need to address this growing trend of dishonesty before new, more potent memory drugs hit the scholastic market.³⁹¹ Further, the adoption of clear prohibitions against cognitive-enhancement drug abuse will enable these respective parties to monitor and prevent Generation Rx's latest cheating technique.³⁹²

384. See *supra* note 378 and accompanying text. While medical students work with practicing physicians in clinical programs, law students intern with lawyers through clinics and externships. James Backman, *Externships and New Lawyer Mentoring: The Practicing Lawyer's Role in Educating New Lawyers*, 24 *BYU J. PUB. L.* 65, 65–66 (2009). Therefore, lawyers who recognize the signs of cognitive-enhancer abuse will facilitate prevention in the same way as informed physicians. See *supra* note 378 and accompanying text. For example, under the *Model Rules*, lawyers who supply character references for bar applicants are discouraged from recommending applicants who demonstrate behavior not in accord with good moral character. ROTUNDA, *supra* note 380, at 29. If a lawyer discovers that a student is cognitively cheating, he should not recommend that student for legal certification. *Id.* He also may “volunteer [this] unfavorable information to the bar authorities about an applicant” to support “ethical aspiration[s].” *Id.* at 30; see also MODEL CODE OF PROF'L CONDUCT R. 8.1 (2010).

385. See *supra* notes 306, 381, 384 and accompanying text.

386. See *supra* notes 374, 380 and accompanying text.

387. See *supra* notes 4–7, 124 and accompanying text.

388. See *supra* notes 10, 124, 281 and accompanying text.

389. See *supra* notes 282–86 and accompanying text.

390. See *supra* note 283 and accompanying text.

391. See Goodman, *supra* note 81, at 148–49; *supra* notes 287–90 and accompanying text.

392. See *supra* notes 360, 386 and accompanying text.

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