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Editor-in-Chief

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Learning objectives for this issue:

1. Summarize some of the issues to consider when deciding whether to prescribe cognitive enhancers to patients.
2. Detail the problem of malingering or faking ADHD.
3. Describe what's in one of the most popular energy drinks and what the research shows about whether it enhances performance.
4. Identify some best practices in treating patients with traumatic brain injury.
5. Describe how to evaluate ADHD symptoms in patients with addiction.
6. Evaluate some of the current research regarding addiction.

Cognitive Enhancers: Smart Drugs or Bad Idea?

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Dr. Bobrin has disclosed that he has no relevant financial or other interests in any commercial companies pertaining to this educational activity.

Most of us prescribe cognitive enhancers every day. Examples include stimulants for attention-deficit/hyperactivity disorder (ADHD) and various dementia medications. Modafinil (Provigil), which is prescribed for sleep apnea and shift work sleep disorder, probably fits the bill, too.

But today's conversation about "smart drugs" is fundamentally different and refers to the use of medications by people without psychiatric disorders who seek a boost or cognitive edge.

The use of drugs for both performance and physical enhancement is

Summary

- Cognitive enhancers are used as "smart drugs" by people without psychiatric disorders to get a boost or cognitive edge
- The evidence is mixed about whether they actually improve cognitive performance in healthy adults without psychiatric disorders
- Physicians prescribing these drugs to enhance cognition are doing so off-label and need to weigh possible harm to patients against possible benefits

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Malingered ADHD

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CATR: Malingering—in other words, faking it—is a common problem in ADHD assessment. Do we know how common it is?

Dr. Musso: The prevalence estimates vary significantly. In the United States, the numbers are between a third and almost a half of individuals (Suhr J et al, *Arch Clin Neuropsychol* 2008;23(5):521–530). And in Canada, studies have reported rates ranging from 8.3% to 14.6%. The numbers are probably all over the place because it's difficult to detect malingering. One study found that the Word Memory Test—considered by some the gold standard for identifying these individuals—only accurately identified about 58% of people who were asked to simulate, or fake, ADHD (Lee Booksh R et al, *J Atten Disord* 2010;13(4):325–338).

CATR: What do we know about the motivations for malingering?

Dr. Musso: There have been two primary motivations discussed in the literature:



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already occurring in other areas. Some professional athletes engage in doping and use performance enhancing drugs, most of which are banned by sports organizations. And some areas of medicine—most notably dermatology and plastic surgery—have moved well beyond treating illness into aesthetics and physical enhancement.

From that standpoint, cognitive enhancement—which some have described as cosmetic neurology or “Botox for the brain”—is a seemingly logical extension.

Who’s Using Them?

We have the most data on the use of cognitive enhancers by college students. The largest investigation surveyed a representative sample of undergraduates at 119 colleges and universities—some 11,000 students in total (McCabe SE et al,

Addiction 2005;100(1):96–106). About 7% admitted to non-medical stimulant use in their lifetime. Those rates of use were roughly 4% and 2% for the past year and past month, respectively.

Stimulant users in this study were more likely to be Caucasian, male, members of fraternities and sororities, and have lower grade point averages. Use was higher at colleges in the northeastern United States and institutions with more competitive admission standards. These students were also more likely to use alcohol, cigarettes, marijuana, illicit stimulants such as cocaine and Ecstasy, and engage in other risky behaviors.

Use of cognitive enhancers in non-student populations is less well-studied. An online survey conducted by *Nature* magazine found that about 20% of readers who responded—1,400 people from 60 countries—had used medications for non-medical purposes to augment cognitive performance (Maher B, *Nature* 2008;452(7188):674–675). Their stated reasons were to improve focus, concentration, or memory. Interestingly, use did not differ greatly with age. Methylphenidate (Ritalin and others) was the most popular medication (62% of users), followed by modafinil (44%), and beta-blockers (15%), with some overlap.

Can They Help?

Do cognitive enhancers, in fact, improve cognitive performance in healthy adults without psychiatric disorders? The available evidence is mixed. In the most comprehensive review published to date, researchers from the University of Pennsylvania found 45 relevant studies, most of which compared methylphenidate or amphetamines to placebo under highly controlled conditions (Smith ME & Farah MJ, *Psychol Bull* 2011;137(5):717–741). Here were their main findings:

1. **Long-term memory.** According to 22 studies, stimulants generally improve “declarative learning,” known more colloquially as rote memorization. Examples include memorizing the names of presidents or all of the steps in the Krebs cycle. Overall, stimulants improved

memorization, leading the authors to conclude that these medications “enhance learning in ways that may be useful in the real world.”

2. **Short-term memory.** Working memory, which roughly corresponds to short-term memory, includes tasks such as remembering a string of digits—for example, a telephone number—long enough to use it. There were 23 studies that tested various forms of working memory. In some cases stimulants appeared to improve this type of memory; in others, they were equivalent to placebo. In no cases, however, did stimulants negatively impact performance. This led the authors to this rather tepid conclusion: “Stimulants probably do enhance working memory, at least for some individuals in some task contexts, although the effects are not so large or reliable as to be observable in all or even most working memory studies.”
3. **Cognitive control/impulsivity.** Cognitive control, which is basically the opposite of impulsivity, is the ability to recognize when “the most natural, automatic, or available action is not necessarily the correct one.” Examples include resisting the urge to hit the brakes when your car starts skidding on ice or perhaps ignoring that e-mail alert that pops up on your computer screen. Here the authors found 13 articles “with slightly more null results than overall positive findings” and one study actually demonstrating impaired performance.
4. **Other executive functions.** Five studies measured the effect of stimulants on a mixed bag of executive functions. Examples include fluency tests—“Name all the words you can think of that start with the letter F”—and performing certain tasks according to defined rules. They found no consistent benefits or impairment.

Can They Hurt?

Every pill that we pop involves a

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EDITORIAL INFORMATION

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Cognitive Enhancers: Smart Drugs or Bad Idea?

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trade-off between benefits and harm. The psychiatric side effects of stimulants are many and include anxiety, insomnia, agitation, and mania. Other problems include anorexia, cardiac arrhythmias, high blood pressure, tics, and seizures—and, of course, addiction.

Micromedex, the drug resource, states that mixed amphetamine and dextroamphetamine (Adderall) causes anorexia in 33% of adults, followed closely by insomnia (27%) and anxiety (13%). For methylphenidate, the stated incidence of tics is 7%.

Should We Prescribe Cognitive Enhancers?

As you can see from the research, the risk-benefit ratio for cognitive enhancers is not yet clear. Nonetheless there is some evidence that doctors are receptive to using such medications themselves. In a survey of physicians in North America, over 75% reported drinking caffeinated beverages, with “mental alertness” being one of their primary reasons (Banjo OC et al, *PLoS One* 2010;5(12):e14322). Twenty-three percent of these physicians stated that they would personally take a cognitive enhancer if it was approved for such use, had demonstrated effectiveness, and had no significant side effects. Only 29% gave a definite “no” to the use of cognitive enhancers, with the remaining 48% responding “maybe.”

The American Academy of Neurology, while taking no official position, leaves the door open for individual prescribers. Its Ethics, Law and Humanities Committee acknowledged “strong arguments” for and against the use of cognitive enhancers and provided a 14-point framework for responding to patient requests (Larriviere D et al, *Neurology* 2009;73(17):1406–1412). It noted that prescribing medications for cognitive enhancement is neither legally nor ethically obligatory, neither legally nor ethically prohibited, and is legally and ethically permissible. In other words, you could, if so moved, prescribe cognitive enhancers on an off-label basis. (See “Recommendations on Prescribing Cognitive Enhancers” on this page.)

Ethical Issues

Cognitive enhancers raise a number of novel ethical questions starting with fairness. Significant health disparities already exist in the United States. Will cognitive enhancers, much like plastic surgery or cosmetic dentistry, only be accessible to those with the personal resources to afford them? If so, does this place the have-nots at further social disadvantage (Hyman SE, *Neuron* 2011;69(4):595–598)?

Or, what if cognitive enhancers substantially improved workplace productivity? (This isn’t too far-fetched: the military has been using stimulants for decades.) Could employers force their employees to take cognitive enhancers or face termination? Where do you draw the line between reasonable expectations—such as wearing a uniform to work—and coercion?

Finally, is using cognitive enhanc-

ers cheating? And, who exactly, is being cheated, particularly if there are positive outcomes for society?

CATR'S TAKE: Cognitive enhancers appear to improve long-term memory and might have a positive impact on working memory, depending on the person and situation. These benefits, which may be difficult to estimate for individual patients, need to be weighed against very real harm and the absence of a clear consensus concerning prescribing. Physicians inclined to prescribe these drugs will want to carefully consider available guidance from the American Academy of Neurology.

Dr. Bobrin is a psychiatrist who has been treating adults with addiction for the past 10 years. He is board certified in addiction medicine.

Recommendations on Prescribing Cognitive Enhancers

How should you respond when a healthy adult asks you for a prescription for a medication to improve their memory or other cognitive functions?

The American Academy of Neurology—while taking no official position—offered some guidance through its Ethics, Law and Humanities Committee:

- Prescribing medications for cognitive enhancement is legal in the U.S and is ethically permissible.
- Physicians aren’t legally or ethically required to prescribe medications for cognitive enhancement.
- From a documentation standpoint, consider the patient’s request for a cognitive enhancer their chief complaint.
- Use the same principles for prescribing cognitive enhancers as you would for other medications that you routinely prescribe.
- Informed consent should be obtained and documented.
- There is limited evidence on the efficacy and safety of medications prescribed to healthy adults without a psychiatric disorder for the purpose of cognitive enhancement.
- You can legally and ethically discontinue a prescription for a cognitive enhancer.

Source: Larriviere D et al, *Neurology* 2009;73(17):1406–1412 (full guidance is available at: <http://bit.ly/1paQGU6>).

Expert Interview: Dr. Musso
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one reason is to receive academic accommodations and the other is to obtain prescription stimulant medications.

CATR: Please tell us about the first—for academic accommodations.

Dr. Musso: In the United States there are several laws—including the Individuals with Disabilities Education Improvement Act, Section 504 of the Rehabilitation Act, and the Americans with Disabilities Act—that allow individuals with disabilities to receive accommodations. So individuals who don't have ADHD may be trying get these accommodations, which might include being provided with note takers in classes, receiving extended time to complete assignments, and in some cases even being allowed to take alternative courses. Those can be pretty strong motivators for people who may not be doing as well in school and would like extra help.

CATR: And what about people who want to get stimulant medications? Why do they want them?

Dr. Musso: For the most part, it seems like academic improvement is the primary motivation. In one study, 50% reported using stimulants to help them study—to improve concentration and alertness (Teter CJ et al, *J Am Coll Health* 2005;53(6):253–262). In another study of college students, about 54% reported using for academic reasons, 6% reported using exclusively for non-academic reasons, and 40% reported using for both (Rabiner DL et al, *J Atten Disord* 2010;13(3):144–153). In terms of recreational use, one study found about 13% of non-medical misusers and 24% of medical misusers reported using these medications to get high (Hartung CM et al, *Psychol Addict Behav* 2013;27(3):832–840). Other reasons are increased energy, to stay awake, or to lose weight.

CATR: Is there a typical patient profile or certain clinical features that make malingering more or less probable?

Dr. Musso: That's a really difficult question. Recent data suggest that there is a wide range of how much people fake and who fakes. In studies that use clinical data, it seems like malingerers might be more likely to be slightly older and have somewhat lower full-scale IQs—and when I say “lower,” in the college population, it is still very much in the normal range. Another study found no differences between age, gender, and full-scale IQ. So, really, what we know about it is that we don't know much about it.

CATR: You published an interesting study as part of your doctoral work. Please tell us about your research.

Dr. Musso: When I was in graduate school, the majority of the clinical work I did was in a university clinic where we did psycho-educational evaluations. Many times students came in and said they took a friend's Adderall and it helped, so they thought that they had ADHD. Or students were diagnosed with ADHD in the community, but when we did neuropsychological testing and assessed psychiatric functioning, it was depression or anxiety that were driving their attentional problems. And then, I had one particular case where an individual came in and was diagnosed with anxiety, not ADHD, and was told that we didn't recommend stimulant medications. He actually said, “I should have just come in here and lied and I would have gotten what I needed, but I was honest and now I can't.” Those kinds of cases made me interested in trying to determine who might be coming into our clinic and trying to fake ADHD because of external incentives.

CATR: So how did you go about your research?

Dr. Musso: For my dissertation work, I administered the Personality Assessment Inventory (PAI), a widely used personality test, to ADHD simulators—people asked to fake ADHD—and college controls. Then we compared their results to archival data to see if we could find any kind of pattern that would identify malingering. We looked at the PAI scales in general. I also tried to develop a new scale for malingering (Musso MW et al, *J Atten Disord* 2014:Epub ahead of print).

CATR: And did your new scale work?

Dr. Musso: We found improved sensitivity and specificity, but still a significant number of people who were asked to fake ADHD would have gotten away with it even with the new scale.

CATR: Could you describe the simulation studies that you used?

Dr. Musso: We recruited college students and asked them to fake a disorder, in this case ADHD. To be consistent with previous literature, we coached them with information—for example, by pointing them to Google's top hits for “Adult ADHD.” We figured that individuals who were going to come to a clinic to fake ADHD would most likely do some homework before they got there, so this would be realistic preparation.

CATR: So after they boned up on ADHD, what did they do for you?

Dr. Musso: We asked them to complete the PAI, as well as some of the embedded symptom validity tests from our neuropsychological tests, as though they were trying to fake ADHD. We gave the controls web pages on Mathematics Disorder and a scenario involving a friend who was diagnosed with Mathematics Disorder and did not understand his or her diagnosis. They were instructed, however, to respond honestly during testing.

CATR: What did you find?

Dr. Musso: ADHD simulators had higher scores on all of the scales compared to the other groups. However, their scores were within believable ranges. So basically simulators in general did not score so high that you would know he or she was faking.

CATR: Self-rating scales are commonly used during ADHD evaluations. Can they detect malingering?

Dr. Musso: There have been a number of studies that have examined both ADHD simulators and individuals from clinical populations believed to be faking symptoms. For the most part, they are able to produce profiles that are very similar to individuals with

Some studies have shown that for people who have failed three or more symptom validity tests, you can have confidence in diagnosing them as malingering.

Mandi Musso, PhD

Deconstructing Red Bull

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Dr. Frenz has disclosed that he has no relevant financial or other interests in any commercial companies pertaining to this educational activity.

Americans guzzled a mind-blowing 3.5 billion energy drinks in 2013, with sales totaling \$8.7 billion (Miller A, *Dairy Foods* 2014;115(3):22).

Red Bull, the brand that basically created the industry, commands a 39% market share, trailed closely by Monster. The market is now so large that business analysts segment it into energy drinks versus energy shots, the latter being small-volume concoctions such as 5-hour ENERGY.

But what, exactly, are energy drinks? Do they actually give you energy? And are they safe?

Brief History

Red Bull was created in the 1980s by

an Austrian named Dietrich Mateschitz. Mateschitz was reportedly inspired after trying an Asian beverage called KratingDaeng (which means “red bull” in Thai) and finding that it relieved his jet lag.

He reformulated the product and introduced it in Austria in 1987. Red Bull began entering foreign markets in 1992 and reached the United States by way of California in 1997 (Ingram F, *Red Bull GmbH*. In: Grant T & Ferrara MH, eds. *International Directory of Company Histories*, Vol. 60. Detroit: St. James Press;2004:252–254).

Currently, Red Bull has sold 40 billion cans since the company’s inception and now has about 10,000 employees in 165 countries (<http://bit.ly/1wgymMt>).

What’s In the Can?

A can of Red Bull lists 15 ingredients, including carbonated water, caffeine and taurine (the putative active ingredients), two sugars (sucrose and glucose), and a number of B vitamins.

A standard 8.4-ounce can contains

110 calories and 80 mg of caffeine. By way of comparison, a “short” Starbucks coffee contains 180 mg of caffeine, according to the website www.caffeineinformer.com. Caffeine is clearly an effective stimulant, although drinking half of a small Starbucks coffee doesn’t in itself give most people an energy rush.

According to Red Bull’s website, each can contains one gram of taurine, which, according to Natural Standard, an evidence-based resource on integrative therapies, is a “nonessential amino acid-like compound.” It was first discovered in ox bile and was thus named for *taurus*, which means bull in Latin.

Taurine is involved in several metabolic processes in various body tissues, including the brain and heart, and may have some antioxidant and detoxifying properties. However, it’s not clear that taurine supplements boost energy. Natural Standard gives Taurine a “C” rating for energy, cognitive performance, and exercise performance, where C means there is “unclear or conflicting scientific evidence.”

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ADHD. In some studies, they had higher scores and the differences reached statistical significance. But results were still in believable ranges, so nothing would really stand out and say this person is malingering.

CATR: So there’s really no reliable way to detect it.

Dr. Musso: Right. In a 2011 study, researchers developed an infrequency index for the Conners’ Adult ADHD Rating Scales (CAARS)—a widely used self-report instrument—and that showed some promise (Suhr JA et al, *Arch Clin Neuropsychol* 2011;26(2):1–7). However, this needs further validation before we can say for sure. So, for now, malingering will remain difficult to detect.

CATR: Are any of the current instruments more robust than others for sorting out ADHD versus malingered ADHD?

Dr. Musso: One study showed that with the Wender Utah Rating Scale (WURS)—which measures childhood symptoms of ADHD—only 65% of ADHD simulators were able to successfully simulate ADHD (Jachimowicz G & Geiselman RE, *Cog Sci Online* 2004;2(1):6–20). In that same study, 90% of the ADHD simulators were able to successfully fake symptoms on the CAARS. But another study found that the WURS may be more associated with dysfunctional personality traits than with inattention symptoms (Hill BD et al, *J Atten Disord* 2009;13(1):87–94).

CATR: How about neuropsychological testing?

Dr. Musso: In our literature review, we found that ADHD simulators, for the most part, are able to successfully fake symptoms even on neuropsychological testing (Musso MW & Gouvier WD, *J Atten Disord* 2014;18(3):186–201). Keep in mind that right now there isn’t even an agreed upon neuropsychological profile for ADHD. We use neuropsychological testing to document and quantify impairments, but we can’t look at a profile and definitely say that it is diagnostic for ADHD. And we certainly can’t look at a profile and say that it is diagnostic for malingered ADHD.

CATR: Nobody wants to screw up and label someone who actually has ADHD as malingering. But we also don’t want to get burned. Is there anything we can do?

Dr. Musso: There are several things. First, as a neuropsychologist, I would recommend incorporating symptom validity tests into the neuropsychological evaluation. Some studies have shown that for people who have failed three or more symptom validity tests, you can have confidence in diagnosing them as malingering.

CATR: What else?

Dr. Musso: I think it’s important to assess and treat other symptoms of psychopathology before definitively diagnosing ADHD and

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Substance Abuse Treatment for Individuals with Traumatic Brain Injury

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Mr. Reynolds has disclosed that he has no relevant financial or other interests in any commercial companies pertaining to this educational activity.



CATR: How common is traumatic brain injury (TBI) in patients with addiction?

Mr. Reynolds: In the state of Minnesota, where licensed treatment programs are required to submit data to a large registry, 2.6% of clients in 2012 had a traumatic brain injury. That number is probably on the low side. In Kentucky, where there is also mandatory reporting, 32% of clients had a history of TBI when they were specifically assessed using the Brain Injury Screening Questionnaire (Walker R et al, *J Head Trauma Rehabil* 2007;22(6):360–367). An older review of six studies found that between 38% and 63% of clients seeking substance abuse treatment reported a history of brain injury (Corrigan JD et al, *J Head Trauma Rehabil* 1995;10(3):29–46). The bottom line is that it's pretty common.

CATR: And what are the causes of TBI?

Mr. Reynolds: According to the Centers for Disease Control and Prevention, there were 2.5 million emergency department visits, hospitalizations or deaths related to TBIs in 2010 (<http://1.usa.gov/VljVoX>). The top cause—about 41% of cases—was falling. Unintentional blunt trauma accounted for 16% of cases, followed by motor vehicle accidents (14%). Another 11% of TBIs were due to assault.

CATR: Does addiction come before TBI or after?

Mr. Reynolds: It's well established that addiction is a risk factor for TBI and a lot of people are intoxicated at the time of their injury. There is also emerging evidence that causality cuts the other way—that TBI may increase the risk for developing later addiction (Bjork JM & Grant SJ, *J Neurotrauma* 2009;26(7):1077–1082). Some of this may be due to acquired problems with executive function, but part of it may also be the desirable effects of the substances themselves. This is especially true for methamphetamine or other types of drugs that give people with TBI the perception of being more alert and more in control.

CATR: Does TBI change the trajectory of substance use?

Mr. Reynolds: Studies have found that substance use decreases, often substantially, following TBI (Graham DP & Cardon AL, *Ann NY Acad Sci* 2008;1141:148–162). For those who continue to use substances, alcohol and other sedatives typically have a greater effect on a person who has cognitive impairment. They will be less likely to think clearly. Addiction can also get in the way of a person's recovery from their brain injury. When a person gets discharged from the hospital, they need to be able to engage in cognitive and vocational rehabilitation. All of that is often lost because of drinking and other drug use.

CATR: How do cognitive problems impact patients during addiction treatment?

Mr. Reynolds: Clients with TBI do not do well in a standard treatment program where they are sitting in group sessions that last an hour and a half to two hours. They can't sit still and concentrate for that long. Cognitively they are unable to track or follow the discussion. They get overloaded and fatigued easily. These clients may have aphasia or other reading difficulties, so the usual techniques like lectures and written treatment plans and assignments don't do a lot of good. Clients often are embarrassed by their disabilities, too. The more you cognitively try to push them, the more their wheels spin. They eventually say, "I can't do this anymore," and they leave treatment.

CATR: How do people with TBI do after completing addiction treatment?

Mr. Reynolds: Although this hasn't been extensively studied, there are some data from specialized centers. For example, in one investigation, 75% of clients were judged to have a positive substance use outcome at one year (Bogner JA et al, *J Head Trauma Rehabil* 1997;12(5):57–71). When you slice that number, 50% had varying periods of abstinence and the remaining 25% had reduced their substance use. Here at Vinland, we perform follow-up at six months where we call clients and ask them "Are you sober?" or "Have you reduced your substance use?" About 50% to 60% report that they are abstinent and another 20% to 25% say they have moderated their use.

CATR: What can a standard treatment program do to enhance the experience of patients with TBIs?

Mr. Reynolds: They can conduct shorter group therapy sessions of no more than 45 minutes, use simple treatment assignments, and provide more one-to-one therapy. There should not be a lot of distractions in group rooms and other care delivery areas. Sometimes symptoms of head injury are interpreted by clinicians as resistance to treatment. Frontal lobe disruption can impede planning, implementing plans and goals, and problem solving, which are characteristics of a motivated client.

CATR: What else?

Mr. Reynolds: As I mentioned, clients with TBI often don't find the group experience to be very beneficial because they become easily confused or flustered, and when two or three people start talking, they just zone out. So there should be more individual therapy with the client. Another thing is to keep assignments and concepts simple. Ask closed-ended questions. Sometimes a person with a head injury just can't put two and two together and come up with an abstract four. They need very concrete questions and

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Evaluating and Treating ADHD Symptoms in Patients with Addiction

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Dr. Mertz has disclosed that he has no relevant financial or other interests in any commercial companies pertaining to this educational activity.

CATR: Dr. Mertz, how prevalent is ADHD in patients with addiction?

Dr. Mertz: We know that with substance use disorders about 25% of patients have symptoms that meet the core criteria for ADHD (van Emmerik-van Oortmerssen K et al, *Drug Alcohol Depend* 2012;122(1–2):11–19). What we don't necessarily know is how much of that is a chronic issue versus how much of it might be due to substance abuse itself. Other mental disorders are obviously in the mix, too.

CATR: Do you think the true prevalence of ADHD in this population is higher or lower than that?

Dr. Mertz: I think, if anything, the actual prevalence of ADHD is probably lower. The various effects of chronic and severe substance abuse have a negative impact on cognition and behavior. Those symptoms are going to potentially look like ADHD.

CATR: What is the best way to evaluate cognitive complaints in patients with addiction?

Dr. Mertz: First, you need to differentiate cognitive problems brought on directly by the substance versus an underlying pathology such as ADHD. This is pretty hard to do retrospectively, so establishing and maintaining sobriety is important before you do any sort of formal screening.

CATR: So once someone is sober, how do you evaluate their cognition?

Dr. Mertz: You start by monitoring their cognition via interview responses, observed behaviors, the patient's own subjective report, and input from those who know them well. I think that is a key element that is often overlooked: the collateral observations of somebody who has known this person over their lifespan, such as a family member.

CATR: What types of screening instruments are good for detecting cognitive deficits that may be secondary to ADHD?

Dr. Mertz: A brief screening instrument that any practitioner could probably learn how to administer is the Montreal Cognitive Assessment (MoCA), which is free and can measure gross cognitive deficits. Keep in mind, however, that cognition is only one part of ADHD. It is mostly considered a behavioral disorder. So you can have someone who does quite well on cognitive screening and still meets full criteria for ADHD.

CATR: How do you get at those other pieces?

Dr. Mertz: Self-report and other-report inventories can look at the behavioral components of ADHD. For example, the Barkley Adult ADHD Rating Scale is a questionnaire that is filled out by the patient and also by someone who has known him or her well throughout their life. In using something like this, it's important to recognize that the questions are very face valid—that it's pretty easy to feign symptoms if someone is motivated to do so. Because of this, having collateral information from somebody else, provided they are reliable, is critical.

CATR: What are the indications for a neuropsychology consultation?

Dr. Mertz: I think it's called for anytime you have questions, or ADHD is not easily diagnosable, or if there are high risks involved. For example, you think a patient could really benefit from a psychostimulant but there is also a chance they could abuse it—that sort of Catch-22 situation. Having a more comprehensive evaluation could be helpful. The gold standard for ADHD assessment is probably still behavioral questionnaires that everyone fills out, but a neuropsychological assessment can provide valuable information.

CATR: How is a neuropsychology consultation performed?

Dr. Mertz: You start with a thorough psychiatric evaluation—a clinical interview, a review of all pertinent medical records and educational information, and hopefully a collateral interview with someone who knows the person well. Direct behavioral observations are also made. From there, the assessment is often a combination of the self-report inventories that we have been talking about and cognitive testing.

CATR: Testing seems pretty objective. Are there any limitations?

Dr. Mertz: Definitely. Neuropsychological testing is done in a controlled environment and a lot of times people with ADHD might do okay in that environment but not in natural settings such as a classroom or at work. So there is a risk of missing the diagnosis or underestimating the severity of symptoms.

CATR: Can you tell if someone is faking symptoms?

Dr. Mertz: To some extent, yes. Neuropsychological tests have many embedded measures of symptom validity, and there are stand-alone formal measures as well. If somebody is trying to exaggerate or fake cognitive deficits, these tests are pretty good at figuring that out. From that standpoint, neuropsychological tests are much better at identifying malingering than self-report inventories.

Expert Interview: Mr. Reynolds

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answers. And you often have to fill in the blanks—they struggle to deduce things from what you are telling them. And often there are memory issues. We give people planners and teach them to write down their daily tasks and appointments.

CATR: So individualizing treatment is critical.

Mr. Reynolds: Correct. For example, we had a client with alexia who couldn't recognize words anymore. The counselor would be writing on a board or showing clients how to do something, but he just couldn't get it. Fortunately, his receptive language ability to spoken voice was preserved. So, with that client, I sat next to him in groups and told him what we were talking about and sort of translated. This is just a concrete example of a general principle. There are usually ways around problems—it just takes more work. You have to slow it down, spend more time with the person, and give highly individualized care.

CATR: You mentioned that there can be problems with group therapy, which is traditionally the cornerstone of treatment. Should we be doing it at all?

Mr. Reynolds: Yes, but with modifications. We have small groups of perhaps six to 10 people, which is smaller in size than normal groups. And our sessions are only 45 minutes in length, which, again, is shorter than normal groups. We also have breaks between groups for clients to decompress, whereas traditional treatment schedules are pretty full.

CATR: How about the actual content of groups?

Mr. Reynolds: Our approach is grounded in Illness Management and Recovery, an evidence-based approach that has been popularized by the Substance Abuse and Mental Health Services Administration (<http://1.usa.gov/1wje1eL>). The content is simple and there is often a lot of repetition. For instance, a session may focus on medications. Clients will have a list of their medications and how often to take them. We will discuss medication minders—labeled with the days and times for taking medications—as a way of helping clients become more competent in self-management. Another session might focus on symptom recognition. And so on. At the end of each session, we ask clients to verbalize or write down what they learned. Hopefully, they can identify one concrete thing to add to their toolbox.

CATR: Are there other things that you think our readers should know about treating addiction in people with TBI?

Mr. Reynolds: A client was asked what he thought about his TBI and he said, “You know, they tell me that my TBI is mild, but it's not mild to me.” That illustrates how this can be a hidden disability. You often can't tell by looking at a client that they have trouble with numbers, sequencing things, or other cognitive difficulties. And they may be too ashamed to tell you. So it's important to maintain a high index of suspicion for TBI and assess clients for cognitive problems if you sense something is going on.

CATR: Thank you, Mr. Reynolds.

Expert Interview: Dr. Mertz

Continued from page 7

CATR: Some clinicians are dogmatic and, as a matter of course, they will never prescribe a psychostimulant to a person who has a history of addiction. Is this a reasonable posture or does it deprive some patients of an important therapy that could improve function?

Dr. Mertz: I don't think you can just lump everyone into a single category. Certainly, prescribing a stimulant to a person with a history of addiction could potentially set them up for relapse or other problems. But if there is true ADHD underlying everything that they are doing, addiction might just be a symptom of a larger issue—impaired executive function feeding into substance abuse. In these circumstances, a psychostimulant might improve general executive functioning, behavioral control, judgment, and reasoning, to the point where it may improve their overall function and reduce recidivism.

CATR: How do your reports read?

Dr. Mertz: It depends on what the results suggest. There are reports where I say with a lot of certainty, “I believe that this is bona fide ADHD and a psychostimulant would be beneficial.” That doesn't mean, however, that the patient won't misuse or abuse the medication—I can't predict that. But there are also other times where I am quite tentative and will say stimulants may be beneficial but add that I have much lower confidence about the degree of possible benefit.

CATR: Suppose I send somebody in for a consultation. The report comes back saying it is probably ADHD and my patient could potentially benefit from a psychostimulant. How do I determine whether the treatment is a success or failure?

Dr. Mertz: The best thing is observation over time—the clinician's observations, the patient's subjective report, and the impressions of other people in their life.

CATR: How about sending them back to the neuropsychologist for re-testing?

Dr. Mertz: Re-testing is an option, but the gold standard is still improved self-report and the observations of others.

CATR: What if I did send the patient back? Should their test performance improve on the psychostimulant?

Dr. Mertz: You may see some positive changes, especially on things such as a continuous performance test, where patients sit down in front of a computer and respond to stimuli in front of them over an extended period of time. But anyone—not just people with ADHD—will tend to perform better on those tests if they are taking a psychostimulant. So better test scores neither establish a diagnosis of ADHD nor prove the medication was effective in specifically treating ADHD.

CATR: Thank you, Dr. Mertz.

Deconstructing Red Bull

Continued from page 5

Does Red Bull enhance performance?

Regardless of the lack of clarity regarding the effects of its individual ingredients, the bottom line is whether Red Bull *works*. There is actually some science to guide us here.

Driving Performance

Overall, studies have shown that drinking Red Bull improves driving performance. In one investigation, 12 healthy volunteers were randomized to 8.4 ounces of Red Bull, an equivalent amount of sparkling water (placebo), or no beverage (Yamakoshi T et al, *Springerplus* 2013;2(1):215). Orange juice was added to both the Red Bull and placebo to maintain blinding. Study subjects were then placed in a driving simulator and subjected to 90 minutes of monotonous driving. Each subject completed all three experimental conditions with two- or three-day rest periods between tests.

Subjective sleepiness increased substantially for all three conditions during the driving task with no statistically significant differences between Red Bull and the controls. Driving performance was measured objectively with electronic sensors, and while performance deteriorated for all subjects over time, it deteriorated significantly less for the Red Bull condition.

These results extended prior studies dealing with sleep-deprived drivers that found significantly less “lane drifting,” less subjective sleepiness, and slightly

faster reaction times in study subjects who drank Red Bull compared to placebo (Horne JA & Reyner LA, *Amino Acids* 2001;20(1):83–89; Reyner LA & Horne JA, *Physiol Behav* 2002;75(3):331–335). The authors, who previously studied caffeine using an identical experimental protocol, observed that Red Bull “is much more effective than coffee with the same amount of caffeine.”

Athletic Performance

Studies testing the effects of Red Bull on athletic performance have been mixed. In one investigation, semiprofessional soccer players consumed about 2.5 cans of Red Bull or a placebo beverage and were then monitored with high-tech electronics (Del Coso J et al, *PLoS One* 2012;7(2):e31380). Those treated with Red Bull covered more distance during a soccer game—an average of 430 meters (0.27 miles)—and spent more time running and sprinting and less time walking compared to controls.

However, other studies have yielded conflicting results. As an example, Red Bull improved the ability to lift weights in one investigation (Forbes SC et al, *Int J Sport Exerc Metab* 2007;17(5):433–444) but could not be replicated by others (Eckerson JM et al, *J Strength Cond Res* 2013;27(8):2248–2254).

Is It Safe?

Red Bull increases blood pressure, heart rate, respiratory rate, and cardiac output in healthy subjects (Grasser EK et al, *Eur J Nut* 2014;Epub ahead of print). It also decreases blood flow velocity in

the brain. This led investigators to conclude that, “one can of [Red Bull] could aggravate pre-existing health problems and warrants further studies using appropriate patient groups.”

But one expert, testifying at a public hearing convened by the Institute of Medicine, noted that someone would have to drink *gallons* of Red Bull to risk toxicity (Roehr B, *BMJ* 2013;347:f6343). For a child, the number is about 28 cans, jumping to 93 for an adult.

This seems to comport with field data. Of 2.4 million calls to the National Poison Data System during a one-year span from October 1, 2010, to September 30, 2011, only 4,854 (0.2%) were related to energy drinks (Seifert SM et al, *Clin Toxicol (Phila)* 2013;51(7):566–574). Drinks classified by investigators as “caffeine-only” beverages such as Red Bull accounted for 946 of those calls. In only six cases, was there a “major effect,” defined as “life-threatening signs or symptoms or marked residual disability.” The majority of these events were seizures and cardiac arrhythmias.

CATR'S TAKE: Red Bull probably improves performance of certain tasks such as driving. It's unclear whether this is due to its caffeine content alone, or other ingredients such as taurine. When used in moderate amounts—maybe a can or two per day—Red Bull is likely safe, given the very small number of major poisonings reported in the literature.

News of Note

Two Old Drugs Made New

Naltrexone, which first hit the US market in 1984 as a treatment for alcohol dependence, continues to find new uses. Its latest incarnation, Contrave, was just approved by the Food and Drug Administration (FDA) in September as a weight loss medication.

Contrave also contains another old medication, bupropion, which is better known as the antidepressant Wellbutrin. It received initial FDA approval in 1985.

Contrave is approved for the treat-

ment of obesity, which is defined as a body mass index (BMI) of 30 kg/m² (the ratio of a person's weight and height). It can also be prescribed to people who are overweight (BMI ≥ 27) if they have weight-related problems such as high blood pressure or diabetes.

In clinical trials, patients lost more weight with Contrave than placebo (Greenway FL et al, *Lancet* 2010;376(9741):595–605; Wadden TA et al, *Obesity (Silver Spring)* 2011;19(1):110–120). There have been

no head-to-head comparisons with other weight loss medications.

Each extended-release tablet of Contrave contains 8 mg of naltrexone and 90 mg of bupropion. The manufacturer suggests ramping up over four weeks to a target dose of four tablets per day. In the maintenance phase, the total dose of naltrexone is thus less than the typical 50 mg used to treat alcohol dependence (the dose of bupropion falls in the usual antidepressant range).

Research Updates

OPIOID ADDICTION

Buprenorphine Reduces Total Cost of Care

Buprenorphine (Suboxone and others) is an effective medication for treating patients with opioid addiction. Research has shown that it works better than standard psychosocial or “abstinence-based” treatments. (See the May 2014 issue of *CATR*.) But is the cost of the drug worth the extra therapeutic benefit?

Researchers at Kaiser Permanente, a large integrated healthcare system, set out to answer this question. Their study was a retrospective review of approximately 6,000 patients. Patients were divided into three groups: 1) buprenorphine plus addiction counseling, 2) addiction counseling alone, and 3) a control group that received little or no addiction treatment. The average cost incurred by Kaiser per patient per year was determined over a two-year period beginning in 2007. Buprenorphine was prescribed in office-based settings.

Total healthcare costs were substantially higher for patients with untreated addiction (\$31,035 per patient per year) compared to those receiving buprenorphine plus addiction counseling (\$13,578) and addiction counseling alone (\$17,017). Differences between the latter two groups were not statistically significant, although the authors noted that generic buprenorphine products were not yet available during the study period.

Patients with untreated addiction and those in the counseling-only group had more primary care and emergency department visits than patients who received buprenorphine plus addiction

counseling, and those differences were statistically significant (Lynch FL et al, *Addict Sci Clin Pract* 2014;9:16).

CATR's Take: This study shows that skimping on treatment is a losing proposition because untreated patients incur so many additional medical expenses. It also hints that adding buprenorphine to counseling costs less in the long-term than providing counseling alone. Presumably, if the study were done today with cheaper generic buprenorphine, the cost advantage of meds-plus-therapy would be even greater. Bottom line: encourage your opioid-addicted patients to add buprenorphine to their treatment plan.

INTERNET ADDICTION

More Questions Than Answers About New Addiction

New technology has brought with it a new addiction. Clinicians may now face the challenge of how to treat the growing problem of internet addiction, where patients experience online-related, compulsive behaviors that interfere with daily life, work, and relationships.

Perhaps the biggest problem for clinicians trying to help patients with this addiction is accurately conceptualizing what they are actually struggling with—let alone offering them effective treatment.

A recent commentary from Patricia Wallace, PhD, of Johns Hopkins University, described three varieties of internet addiction: 1) problematic internet use; 2) gaming disorder, which is buried at the end of *DSM-5*; and 3) mobile phone addiction. And even

this breakdown doesn't parse things far enough. For example, some games involve aggression and violence, where others emphasize cooperation and social rewards. Patients who get sucked into the former are very likely to be different than those tripped up by the latter.

Stepping back, Wallace notes that two features—negative outcomes and compulsive use—distinguish internet addiction from normal use. Here's a question for your patients: Has internet use negatively affected your schoolwork or job performance? Examples might include bad grades or daytime fatigue because of inadequate sleep. And another question: Have you attempted to spend less time online but weren't able to?

The study also emphasizes the need for careful consideration of a patient's symptoms. For example, some people with apparent internet addiction are actually addicted to gambling or sex and the internet is just the delivery vehicle. For others, Facebook and Twitter are one manifestation of a larger problem with narcissism. In other cases, the driver for internet use might be social phobia (Wallace P, *EMBO Rep* 2014;15(1):12–16).

CATR's Take: Most of us don't know where to start when it comes to concerns about possible internet addiction. This review article, while highlighting many unanswered questions, gives us some general direction. Much like substance use disorders, we need to zero in on consequences and compulsive use. From there, we need to determine whether internet use is the primary problem or just one feature of another mental disorder. We typically have some treatments for the latter.

News of Note

Continued from page 9

This product introduction is similar to Qsymia, another medication retread for weight loss that was approved in 2012. Qsymia contains phentermine and topiramate, both of which have been available as generics for years.

Insurance coverage for Contrave is iffy. *The Wall Street Journal* noted that Medicare doesn't pay for diet pills and only half of private insurance plans

provide coverage. Healthcare providers could theoretically prescribe naltrexone and bupropion individually, however, exact equivalents aren't available (ditto for Qsymia). Big pharma is likely betting on patients paying cash.

Alcohol Responsible for 10% of Adult Deaths in US

A new report from the Centers for

Disease Control and Prevention (CDC) says that in adults ages 20 to 64, one in 10 deaths are the result of excessive drinking. Causes of death range from indirect effects of alcohol such as violence and car accidents, to direct long-term effects such as liver disease and certain cancers.

The report used data collected with

CE/CME Post-Test

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Below are the questions for this month's CE/CME post-test. This page is intended as a study guide. Please complete the test online at www.carlataddictiontreatment.com. Note: Learning objectives are listed on page 1.

1. In what population is the use of cognitive enhancers most prevalent (Learning Objective #1)?
 a) Medical professionals b) College students c) Scientists d) Senior citizens
2. A review by University of Pennsylvania researchers found which of the following was most improved by cognitive enhancers, leading them to conclude that these medications “enhance learning in ways that may be useful in the real world” (LO #1)?
 a) Long-term memory b) Short-term memory
 c) Cognitive control/impulsivity d) Other executive functions
3. Statistics show that malingered ADHD occurs infrequently and “fakers” are easy to detect (LO #2).
 a) True b) False
4. A 2005 study found that 50% of people using stimulant medications for non-medical reasons took them for what reason (LO #2)?
 a) To help them study b) To get intoxicated or “high” c) To lose weight d) To relieve anxiety
5. What does the research show about Red Bull’s impact on driving performance (LO #3)?
 a) Drinking Red Bull improves driving performance
 b) Drinking Red Bull worsens driving performance
 c) Red Bull is not as effective as coffee in keeping drivers alert
 d) Red Bull makes no difference when compared to placebo
6. According to Duane Reynolds, LSW, LADC, which one of the following treatment modifications does NOT enhance the experience of patients with traumatic brain injury (LO #4)?
 a) Shortening group therapy sessions to no more than 45 minutes
 b) Using simple treatment assignments
 c) Providing more one-to-one therapy
 d) Groups consisting of at least a dozen patients
7. According to Christopher B. Mertz, PsyD, a neuropsychology consultation is indicated when ADHD is not easily diagnosable (LO #5).
 a) True
 b) False
8. Researchers at Kaiser Permanente found that total health care costs were substantially higher in which of the following groups of patients (LO #6)?
 a) Patients receiving buprenorphine plus addiction counseling b) Patients receiving addiction counseling only
 c) Patients receiving little or no addiction treatment d) There were no differences between groups

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News of Note

Continued from page 10

the Alcohol-Related Disease Impact (ARDI) tool between 2006 and 2010. ARDI helps researchers gather information on alcohol use and 54 alcohol-related outcomes, state-by-state and nationally.

Researchers found that excessive alcohol use shortened the lives of those who died by an average of 30 years. The CDC defines “excessive alcohol use” as binge drinking (≥5 drinks for men and

≥4 drinks for women in one sitting); heavy alcohol consumption (≥15 drinks/week for men or ≥8 drinks/week for women); and any alcohol use by pregnant women or those under age 21.

Seventy percent of deaths from alcohol occurred in working-age adults, highlighting the impact of alcohol-related disease to the national economy and workforce. The CDC report estimates that excessive drinking cost the US about

\$224 billion in a single year (2006) from deaths and lost productivity among heavy drinkers.

The state with the greatest number of deaths from drinking was New Mexico (51 deaths per 100,000 population), and the lowest was in New Jersey (19.1 per 100,000). The report can be found online in the June 26, 2014, issue of *Preventing Chronic Disease* (<http://1.usa.gov/1ljjpOS>).

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This Month's Focus:
Stimulant Abuse

Next month in *The Carlat Addiction Treatment Report*: Risk and Reimbursement

Expert Interview: Dr. Musso
 Continued from page 5

prescribing stimulants. With other common disorders—depression and anxiety, for example—some of the diagnostic criteria include difficulty concentrating, psychomotor agitation, restlessness, or feeling keyed up. So a lot of times students would come to our clinic and say that they thought they had ADHD when they were really experiencing symptoms of something else. In addition, it's important to obtain collateral information whenever possible. In college students that can be rather challenging, but if they give permission to call a parent it can be helpful to get their perspective on symptoms, particularly the childhood symptoms of ADHD.

CATR: Could someone who is malingering ADHD be mistakenly diagnosed with another mental disorder?

Dr. Musso: That's very possible. In my dissertation work, we saw that malingerers were elevated on all of the scales on the PAI. Someone may look at that and say, "You know, this is a cry for help." So it's possible that they would get misdiagnosed with another psychiatric disorder if the data were consistent with that, rather than being diagnosed as malingering. At this time, it is really hard to tell.

CATR: Thank you, Dr. Musso.

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