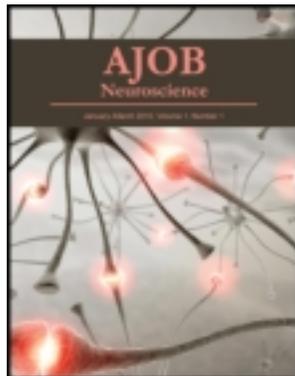


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Scott Vrecko ^a

^a King's College London

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Target Article

Just How Cognitive Is “Cognitive Enhancement”? On the Significance of Emotions in University Students’ Experiences with Study Drugs

Scott Vrecko, King’s College London

Numerous deliberations on the ethics of cognitive enhancement take as their primary case the nonmedical use of prescription stimulant drugs by university students seeking to improve their performance in relation to academic work. Almost without exception, such discussions suggest that these medications enable academic performance enhancement through effects on cognitive processes. This article reports findings from qualitative research with nonmedical users that indicate that stimulants’ effects on users’ emotions and feelings are an important contributor to users’ perceptions of improved academic performance. On the basis of these findings, the article suggests the conceptualization of nonmedical use of stimulants in terms of “cognitive enhancement” may fail to adequately capture the perspectives and experiences of individuals who use stimulant drugs as study aids.

Keywords: enhancement, cognition, emotion, students, stimulants

TROY I’ll wake up in the morning, go get breakfast at the dining hall, and try to fill up as much as possible, because later on I’m not going to be, I won’t think about food, I’ll just forget, you know. And then I’ll go straight to the library, and take the pill on the way. When I get there, I set myself up, and just open my book, and I’ll sort of start reading, a little . . . And then, pretty much all of a sudden, I’ll find myself really reading, just on it—

SCOTT So, what’s that like?

TROY Well, I’m looking at it, and I’ll find myself, it feels like I’m reading it just one word after another, and not like super fast, but really steadily—my eyes never leave the page. And that continues through the day. I’ll read, and make notes, and keep checking things over and making sure I’ve got everything . . . And it’s like that, until I’m done.

SCOTT And how long will that be, from start to finish?

TROY Well, assuming I take 20 milligrams, it would be about six hours or maybe seven.

SCOTT And that’s without a break?

TROY Yeah, that’s the thing. And it would just seem as though everything that I took in . . . A whole semester’s worth of stuff [snapping finger], I’d pretty much know in a day!

In the preceding passage, a male undergraduate provides a sketch of what he and some of his fellow students refer

to as an “Adderall day”—a day when a prescription stimulant medication is taken in order to help an individual do academic work for an extended period of time (which, depending on amounts of drugs taken, may range from 4 hours to 24, or even more). Such practices are part of a broader trend that has been noted by a range of scholars: Today, in societies of the West, pharmaceuticals are not only being prescribed and consumed to an unprecedented extent as treatments for mental illnesses, disturbances, and disabilities (Abraham 2010; Rose 2006; Wolf-Meyer 2009); they are also increasingly being used to enhance the mental capacities of “normal” individuals, that is, those who are not ill (Barondes 2003; Elliott 1998; Kramer 1992; Parens 1998; Quintero and Nichter 2011; Wolpe 2002).

While prescription medications over a wide range are increasingly consumed for unapproved, nontherapeutic purposes, the use of stimulant medications by individuals—particularly researchers and university students—seeking to boost their academic performance has become one of the main areas of focus within discussions of enhancement. This trend, observed in both the United States and the United Kingdom but more pronounced in the former (Arria 2008; Maher 2008; McCabe et al. 2005; Sharp 2009), raises a number of social, ethical, and policymaking issues, such as whether pharmaceutical enhancement constitutes a form of cheating; whether the use of prescription drugs for nontherapeutic purposes should be legalized;

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Address correspondence to Scott Vrecko, Department of Social Science, Health and Medicine, King’s College London, Strand, London WC2R 2LS, United Kingdom. E-mail: scott.vrecko@kcl.ac.uk

and whether individuals who do not use pharmaceutical enhancers may feel pressured to do so. Such issues have received a good deal of attention from bioethicists, scientists, and others (Chatterjee 2009; Farah et al. 2004; Greely et al. 2008; Harris 2009; Hyman 2011; Outram 2010), who have noted that the use of academic performance-enhancing pharmaceuticals is a significant issue not only for university students and academics (Butcher 2003; Sahakian and Morein-Zamir 2007), but also for other professionals (e.g., Warren et al. 2009), for governments and drug regulators (Cooper, Goswami, and Sahakian 2009; Fukuyama 2003; President's Council on Bioethics 2003), and for the general public (Appel 2008; Gebhardt 2005).

What is notably missing from such discussions, however, is an empirical account of the *actual* experiences, practices, and meanings that arise in relation to the real-world, everyday use of cognitive-enhancing pharmaceuticals (Singh and Kelleher 2010). Aside from a small number of qualitative analyses (e.g., DeSantis, Noar, and Webb 2009; Keane 2008; Racine and Forlini 2010), most existing considerations of social and ethical dimensions of academic performance enhancement are based on two areas of research: survey research, especially about demographic patterns and public attitudes (e.g., Hotze et al. 2011; Maher 2008; McCabe et al. 2005; Teter et al. 2006), and clinical and laboratory studies investigating how medications affect healthy individuals' performance on cognitive tests (e.g., Repantis et al. 2010; Robbins 2009; Smith and Farah 2011). This work has yielded important insight into some dimensions of cognitive enhancement; however, there is at present a lack of findings from in-depth, qualitative research that examines the everyday uses and users of medications. Understandings of the practices and experiences of those using stimulant drugs to boost mental performance thus largely consist of anecdotal media reports and online discussions of personal experiences (e.g., Elliott 2009; Foer 2005).

This article presents an analysis of empirical findings from a qualitative study designed to generate an empirically rich account of the medications that are most widely used for such purposes—that is, stimulant medications such as Ritalin and Adderall—and thus, to provide detailed insight into the everyday, practical ways that individuals use and think about “performance-enhancing” medications. In particular, the article focuses on one of the most significant results of the study, namely, that users' experiences of non-medical stimulant drug use seem, in some crucial respects, quite different from the way that accounts of nonmedical stimulant drug use are framed within much existing literature. Analyses of the practices of people like Troy, quoted earlier, have generally been framed as a form of “cognitive enhancement,” since the stimulants most frequently used by healthy students are medications usually prescribed for cognitive disorders like attention-deficit hyperactivity disorder (ADHD), and also because individuals use the interventions as means of boosting their abilities to perform intellectual work. This literature tends to portray ADHD medications as “smart pills” that only affect intellectual capacities like executive function, working memory, and in-

formation processes (e.g., Cacic 2009; see Smith and Farah 2011). Yet in contrast to what such framings may suggest, data from the study reported here indicate that the non-medical use of stimulant medications by healthy university students is associated with significant changes in emotional states. Moreover, alteration of emotions appears to be an important dimension of the drug effects that users perceive to enable improved academic performance.

METHODS AND ANALYTIC FRAMEWORK

In the following, I draw out the emotional and affective dynamics that appear within users' accounts of their experiences on stimulant medications. The findings presented have been generated from the results of a qualitative investigation of nonmedical use of prescription drugs by students attending an elite university on the East Coast of the United States. They are based on data from 24 semistructured interviews conducted by the author, which were designed to elicit informal conversation about the beliefs, practices, and experiences of participants. Interviews were held at locations on the university campus (mainly in the author's office and in a library), and the consent procedures, which were reviewed and approved by the university's institutional review board (IRB), consisted of recording the reading of and response to a verbal consent script; verbal rather than written consent was used in order to avoid creating a written record of any participants' personal information.

Initial participants were recruited through posters placed in student areas on the university campus, and through a call for participants circulated via an e-mail list-serve run by the university's Psychology Department for the specific purpose of subject recruitment; snowball sampling was also subsequently used, as participants informed friends, acquaintances, and colleagues about the study. Recruitment materials requested participants who had experience using Ritalin, Adderall, or similar medications as “study aids,” and in order to be included in the data set used for the following analysis, participants had to meet the following criteria: (1) be a former or current university student; (2) have experience using prescription drugs as a means of improving performance in academic work; and (3) consider themselves not to have ADHD or any other psychiatric condition associated with impaired academic performance (a diagnosis of ADHD was not in and of itself a criterion for exclusion, since some participants reported faking symptoms in order to obtain a diagnosis of ADHD, for the specific purpose of obtaining medications to use for non-therapeutic purposes).

Most students were registered in courses of undergraduate study at the time of the research, although several graduate and professional students participated, as did two former students engaged in full-time employment. The sample obtained a rough balance in terms of genders, and most respondents were of American nationality, although a few respondents were nationals of other countries. None of these variables appeared to be associated with significant differences in the accounts and experiences offered by

participants that are reported here. Given limitations of resources and the exploratory nature of the study, participants were not asked to self-report on ethnicity, socioeconomic status, or other demographic characteristics that might usefully be investigated in future research.

All interviews were recorded and transcribed in full, and textual data was analyzed using a grounded theory approach. Transcripts were imported into the qualitative analysis software NVivo (Bazeley 2007), and the data were then coded for general themes related to participants' experiences and practices relating to their use of medications. Consonant with a grounded theory approach (Charmaz 2006; Strauss and Corbin 1994), conscious effort was made to avoid imposing preexisting hypotheses or conceptions on data. Instead, analytic induction was used to identify categories and themes that emerge more directly from the data set itself. It should therefore be noted that the themes identified in the following ("feeling up," "drivenness," "interestedness," "enjoyment") have most definitely not been chosen with particular psychological ideas in mind, even though data appearing within these themes might be framed and explored with psychological concepts—for example, "interest" and "drive." Specific terms were chosen because they related to words that were often used by participants themselves, and because they seemed to reflect the sorts of emotional states and experiences that were reported by participants. The fact that participants would use words linked to psychological concepts may (or may not) reflect the widespread cultural influence of psychological concepts; in any case, participants invariably employed such terms in relation to everyday and nonspecialist connotations. (The suffix "ness" was added to two of the themes because this seemed to result in terms that were less formal, and thus better captured participants' perspectives. For example, participants did not necessarily express a belief that they possessed something like a general psychological "drive," but they did describe becoming more driven. Thus, "drivenness" seemed a more "experience-near" concept (Geertz 1993) than "drive").

RESULTS

As a result of preliminary analysis of data, the perception of improved emotional or affective states emerged as a central, overarching theme in users' narratives about experiences on stimulant medications and how such drugs enabled improved academic performance. Subsequent analysis, involving a comprehensive manual search for emotion-related statements in the interview transcripts, led to the identification of four categories of improved affect that each appeared within the majority of interviews, and that were linked to enhanced academic productivity arising through nonmedical stimulant use. It is important to note that a functional definition of "improvement" is used here—thus, an emotional change is considered an improvement if participants perceived it to enhance their capacities to conduct academic work and valued it for that reason. Such a definition thus encompasses feelings of tension or stress that in

and of themselves might be considered undesirable experiences, but are considered beneficial insofar as they are associated with increased productivity. It is also important to note that there is a degree of overlap between the themes identified—such themes should be considered to represent four "ideal types" of emotional experience, rather than four ontologically independent states—and that most participants accounts indicated changes in more than one state.

The first category of improved affect, "feeling up," refers to respondents' accounts of general increases in levels of energy (which might involve perceptions of physical as well as mental energization) and elevated senses of well-being. The second category, "drivenness," encompasses descriptions of feeling a strong need or desire to do something, as when respondents would report a need to engage in action in order to expend a surfeit of energy produced by stimulant use. It also encompasses needs or desires to get specific tasks accomplished, as when respondents would report perceptions of an urge to complete a particular assignment or set of assignments. The third category, "interestedness," relates to respondents reports of enhanced abilities to become emotionally invested in substantive issues related to their work—for example, theories covered in a course textbook, or an academic topic assigned for a written paper. Participants would report being able to make themselves "care" about such issues, and to feel that they were worthwhile or important. The final category, "enjoyment," refers to reports of users coming to experience academic labor as something that feels less like work forced upon them, and more like a pleasurable activity that one might willingly choose to engage in.

Feeling Up

Respondents often described the effects of stimulant use in ways that suggested that the medication enhanced general levels of energy and well-being. The very first effects to be perceived after taking medications, for example, were sometimes described in terms of "feeling up"—physically, mentally, or both—and sometimes in terms of increased "energy." In a typical account, a female undergraduate student who reports that Adderall enables her to do tasks like writing a paper or studying for an exam in half the time it normally would explains that this increased productivity is possible because "Your energy level is higher. You're not as tired, so you do things at a quicker pace. It's just easier to function at a highly productive level." Similarly, a female law student explains that it's easier to get work done because "You feel that things are just . . . I have more energy, that's the closest way I can express it, I guess. I don't mean energy, like leaping around, although maybe that, too."

Participants believed that increased energy resulting from stimulant use helped them get their work done, and often suggested that feelings of insufficient energy was something that made it difficult to work. However, it is notable that feelings of deficient energy or tiredness were usually not attributed to lack of rest or proper sleep. Instead,

these feelings were described as emerging when participants began to do, or to contemplate doing, academic work. For example, participants would describe waking up after a full night's sleep, and not feeling particularly tired—until it was time to begin studying, or writing an essay. Thus, the experience of a lack of energy seemed to reflect a sense that academic work itself, or even the idea of it, was mentally “draining.” Accordingly, stimulants could be understood as being used to overcome or counteract negative feelings associated with academic work.

The feelings of “upness” that respondents described as an effect of stimulants often involved not only feelings of energization, but also improvements in mood that were perceived to enhance abilities to study. For example, in the following interview extract, a female undergraduate describes how thoughts and feelings about engaging in academic work change as a result of her medication:

SARAH Everything seems better, and more doable. Sometimes, a lot of the time actually, I'll feel kind of, it's hard to do anything. When I'm walking to the library I'll think, if I didn't have it [Adderall], there's no way I'd get anything done. I'd just sit there in front of my computer, and be not doing anything.

SCOTT Nothing at all?

SARAH Yeah, I mean . . . even just getting to the library can be difficult, I just, it's the last place I want to be. It's like, “There's just no way. Not this again.” It makes me feel like shutting down, just thinking about it. Like, can't I just . . . Even if it's in the morning, I feel like I need to go back to sleep.

SARAH So how are things different, with Adderall?

SARAH Well, I take it usually when I'm just about at the library. And then I'll get there, and force myself to set things up—before it starts working, I'll get out my books, laptop, and stuff, but even that can be a challenge. But then, there's a point when all of a sudden I'll just be like, “Oh wait. I *can* do this. Actually, it's not that hard at all.” And then, I start to do things and it feels so different, like I'm not actually tired, really. And then I'll be like, oh, I can do this. I'm going to do it. Things aren't so bad.

In common with many other respondents, Sarah reports experiencing difficulties doing any work at all prior to taking Adderall; even the thought of work makes her tired. However, as the medication begins to take effect, she feels less tired, and things in general begin to feel as though they “aren't so bad.”

Drivenness

Reports of feeling up, or experiencing increased energy, were often linked to suggestions that energy did not merely increase, but would build up to a point at which there was a surplus or excess that needed to be discharged through activity. These surpluses were often described as resulting in feelings of an internal push, pressure, or being “driven”; one respondent, for example, described a “driving force” produced by Adderall. Respondents indicated that as their

medications took effect, they would feel a sense of wanting, or even needing, to “do something.” For example, a male undergraduate student explains that after taking Adderall, “you'll feel your body just kind of up, like you want to let it go. You just want to start doing stuff.” And similarly, when asked to describe the first sign of his medication taking effect, another participant said: “It's hard for me to describe, but it's like you're ready to go. Like you're ready to start running, you're ready to do something.”

As indicated in the preceding quotations, under the influence of medications, some participants would describe a feeling of being driven to action in a rather general way; they might feel like running, or cleaning, for example. For these participants, general feelings of drivenness could be consciously directed or channeled toward academic work. For example, a number of respondents offered accounts similar to the one offered by a male undergraduate in Business, who explained:

When I take it, I might feel like, “oh, I'm going to start cleaning my room,” or something else. So when it's kicking in, I have to make sure I start telling myself, “ok, it's work time. This is what you've got to do, this is why you're doing it.”

This participant, in common with others, would take steps to avoid being sidetracked as medication effects began to take hold. In addition to the use of specific internal dialogues, another commonly reported practice was to simultaneously take a pill, and begin “going through the motions” of studying (e.g., opening and staring at a textbook, or spreading out flash cards on a table), even if an individual might not feel a desire or ability to actually do work for the 20 or 30 minutes before the medication would start to “kick in.”

Other respondents experienced increased drivenness as something more directly linked to academic tasks—and in such cases medications were often perceived as causing individuals to become more goal-oriented. For example, while describing a session on medication, one participant explained:

I didn't want to stop what I was doing until it was completed up to a certain level of my satisfaction. So I wouldn't ever have to do something and just be, oh, I'm tired, I'll finish it in the morning. I would just finish it.

In a similar vein, another participant explains that while on Adderall, “You don't want to just like sit around and like watch the time passing or anything [. . .] You say, hey, I want to be productive, I want to do something.”

Despite these differences in users' perceptions about the precise connection between medication-induced drivenness and academic work, virtually all participants reported an increased sense of drivenness that pushed them to begin their work, and to continue to work steadily. The internal push resulting from medication use meant that individuals felt they would have to work less hard to push themselves—something that many individuals considered to be exceedingly difficult to do—and this was considered

an important factor in increasing productivity. A typical comment offered by a male undergraduate student captures the significance of this sort of effect: “I was a lot more motivated to get things done, rather than, sometimes I’d sit around and procrastinate. I was definitely a lot more go-getting,” he said, adding, “That was really the desired effect, so I could study more and be more productive.”

Notably, respondents valued the sense of “having to do things,” even though increased drivenness was sometimes portrayed as a somewhat negative emotional state. Consider, for example, one participant’s comments on why she uses Adderall:

I do find a really big difference when I’m doing it, taking the pills as opposed to not taking the pills, in the amount of work I’m able to get done, and just how I feel generally. [...] It’s weird. I’ll just sit down and do whatever it is I have to do and won’t feel okay until I finish it. And so I just found that it’s been . . . that it’s worked well in that sense.

The participant likes that she gets more work done on Adderall; however, the actual experience of working isn’t entirely positive—she “won’t feel ok” until work is finished.

Some participants would also associate increased energy and drive with feelings of tension or stress, and considered these emotional states as part of what propelled them to work. For example, one respondent who says that she’s normally “relaxed” about her work describes doing work while on Adderall as being “a lot more intense” than normal:

When I’m not on it I’m usually pretty relaxed about things. [...] When I’m on it it’s like more of a sense of urgency and more. . . I just get stressed. I just assume that everything is so important and I get like, “this needs to be finished in this manner and at this time.”

Some respondents indicated that such feelings would abate once specific tasks, such as writing an essay, were accomplished. Others reported that a sense of tension or urgency would continue until the medication’s effects wore off—regardless of whether there was more work to do or not.

Increases in drive and in task orientation were thus not necessarily experienced as pleasurable; nevertheless, even those who framed their experiences in somewhat negative terms like stress associated such effects with increased productivity. The changes thus might be described as “functional improvements,” which were valued even if the states experienced by participants were not themselves entirely desirable. The fact that unpleasant states were sought by some participants reflects the fact participants linked such states to increased productivity, which they considered to be the main means by which stimulant medications improved academic performance.

Interestedness

In addition to the general changes in emotional states already outlined, respondents’ discussions suggested that the

use of stimulant medications produced significant changes in how they felt about their work. In particular, users described becoming more interested in materials and tasks that they were assigned for their studies—an emotional change that appeared to be of significant benefit insofar as it allowed students to become more engaged with, and thus to more easily continue, their tasks and assignments.

Here, it is worth noting that respondents’ accounts frequently indicated a significant lack of interest in the kinds of work that they would use stimulants to help them execute. Participants would often describe not “seeing the point” of doing particular assigned tasks, such as writing an essay on a particular topic, or having to memorize a large amount of information that might be tested on an exam. Some would also express a lack of interest in academic work as a whole. For example, an undergraduate science major in her final year of study reported that she began using Adderall in her second year, after having not done well in her first year. When I asked why she thought she hadn’t done well, she told me she hadn’t been able to make herself “buckle down” and do work; she then explained the reason for being unable to do so, saying:

I don’t, I didn’t really care; I don’t know if I was trying. You know, [I was] not liking college much and just thinking, “I don’t really give a crap about academics at all.” I was taking courses that I didn’t, courses that I thought I should be taking [...] which are terrible courses and not at all interesting to me.

While this participant expressed distaste for academic work more strongly than many others, the experience of being unable to care about substantive academic matters was widely reported by respondents.

Doing academic work while on stimulant medications was often described in ways that contrasted sharply with the feelings of ambivalence regularly experienced while studying or completing assignments. Reports of struggles to fully engage in work would often be accompanied by the sort of sentiment described by one student, who said that without Adderall, “I’d be like, oh, I guess that’s kind of interesting but I don’t really care.” This student, like many others, reports coming to feel differently about things on Adderall. Recounting one particular experience, she reports that first she began to feel her heart beat faster, and then she felt her “general awareness rise”; after that, “It just got to where I felt like if I was staring at something I just couldn’t take my eyes away from it—it made studying more interesting.” Another participant offers a similar perspective when explaining that on Adderall, “You’re interested in what you’re doing even if it’s boring.”

The significance of these affective changes for academic performance often became clear as participants’ described improved abilities to remain continuously engaged in work—one of the behavioral changes most frequently reported by respondents. Many participants noted that stimulant use allowed them to eliminate interruptions to work that resulted from checking e-mail or webpages, and stated that it was generally difficult to study for more than about 15 minutes without taking a break to do so (or at least, being

tempted to do so). Participants often said that on stimulants they wouldn't check e-mail or webpages at all; this was because they didn't feel they had to take a break from uninteresting work. Indeed, participants would report going several hours without even thinking about checking e-mail. As one individual explained: "You just don't need to, like you're, you're interested in what you're reading."

Correspondingly, as interests in academic work increased, things unrelated to participants' work were often reported to be found less interesting than they would otherwise be. Not only would online activities seem less appealing than they usual, but social interaction would as well. Participants noted that informal chatting with friends and acquaintances within their vicinity, which was normally something to look forward to, became something one could treat with a take-it-or-leave-it attitude. One participant, for example, reported that while on Adderall she doesn't actively engage anyone in conversation, and that when others speak to her, she is much less talkative than normal: "You're just a little bit less interested," she explained. "You're still speaking and saying hello. It's just that you're not, 'oh, did you see this or this, so-and-so happened' . . . and it's just not important." In a similar vein, another participant notes that when Adderall starts to kick in, "speaking to that person or listening to that conversation behind me doesn't seem like a big deal any longer."

Enjoyment

As participants came to feel more interested in the materials they encountered, they also experienced a greater sense of enjoyment in their work than they normally would. Stimulant use enabled users to (as one participant put it) "latch on" to materials that they would otherwise feel little connection with, and (as another participant put it) "really get into it." One female undergraduate compares the process of becoming completely engrossed in her work to falling in love, for example: "You start to feel such a connection to what you're working on. It's almost like you fall in love with it—there's nothing else you'd rather be doing!" While most other respondents did not go quite so far, they nevertheless reported similar processes whereby intensified affective bonds with materials led to the experience of working being perceived as more enjoyable than it otherwise would be.

A wide variety of terms and phrases was used by participants to describe how work on stimulants felt different from normal experiences: Work came to seem "less tedious" or "not so bad"; "something that was sort of fun"; even "exciting," in some accounts. A typical experience was offered by an undergraduate intending to major in the biological sciences, who described how Adderall helped him engage when working on an assignment for an elective course:

I had this paper to write, for a class on art and Romanticism—pretty much the most boring topic I can imagine. Even just finding books in the library annoyed me, like, "why in the hell am I doing this?" But when I started reading [after having taken 20 mg of Adderall], I remember getting just completely absorbed in one book, and then another, and as I was writing I

was making connections between them . . . And I was like, this is really cool, actually enjoying the process of putting ideas together. I hadn't had that before.

Such accounts suggests that on Adderall individuals are able to come to enjoy working with ideas—sometimes, in a way that they had not previously experienced.

Corresponding with reports of increased enjoyment, participants often suggested that on stimulants, work comes to feel effortless—as something that in fact does not seem like work at all. Individuals would say that when completing an essay on Adderall, it would feel as though a paper was "writing itself," for example. And respondents often described working on stimulants in terms of "being in the zone," a state where, as one participant put it, "everything just happens, almost automatically." Linked to such states, individuals reported that time seemed to pass more quickly than it normally would. Several hours of work would feel like almost no time at all, and participants would sometimes smile or laugh when recalling occasions when they were surprised to notice how much time had gone by in a study session. One individual used the term "clock shock" to capture this common experience, which he said arises when "you look up from your book, and you think, there's *no way* it's that late already." While several participants reported being able to enter such states without stimulant use when engaging in hobbies and extracurricular activities, few felt able to do so when doing academic work.

Respondents also suggested that the experience of working could be improved as a result of observing oneself work on stimulants with levels of efficiency and productivity that were greater than would otherwise be possible. For example, one participant said that it "feels good to be so on-the-ball" while working on stimulants, while another confirmed the link between productivity and enjoyment by saying, "You definitely, seeing yourself get so much done, that propels you on." While the sense of accomplishment—or as one respondent put it, "knowing that you're killing it"—was not necessarily described as a direct effect of medication use, it nevertheless appeared as a significant element in increasing some individuals' enjoyment of their work, and thus their abilities to remain focused on it.

DISCUSSION

The preceding analysis suggests that emotional dynamics constitute a salient dimension of experience for university students who use stimulant-based medications as a means of improving their academic performance. Among study participants, alterations in individuals' emotional states did not necessarily arise exclusively through the direct actions of stimulants on users' central nervous systems—they also arose as users reflected on their experiences and practices of working under the influence of stimulants, for example. Nevertheless, these emotional dynamics, irrespective of precise origin, appear highly significant for the group of participants studied. Participants' narratives reveal consistent links between stimulant use and altered emotional states; moreover, participants' accounts suggest that the emotional

changes brought about by stimulant use are part of what makes stimulant drugs useful in relation to academic work.

This central significance of emotional dynamics for these users is further supported by the fact that most respondents seemed to consider themselves to possess adequate intellectual prowess for successfully complete academic work. They generally reported strong, and often exceptional, records in their studies, as well as on standardized tests, and it is worth recalling that these participants did not consider themselves to suffer significant impairment in such abilities (e.g., as might individuals who consider themselves to suffer from ADHD or any similar condition). Furthermore, most participants felt able to maintain focus and attention in relation to nonacademic activities that they themselves willingly chose to engage in—activities that would of course tend to involve focusing attention on things that participants found to be intrinsically interesting and worthwhile.

Many participants also expressed a belief that stimulants do not enable them to perform at an intellectual level that was higher than what they would be able to attain without medication. While such beliefs were sometimes only expressed indirectly, they were also sometimes made explicit, as when participants would say things like “Adderall doesn’t necessarily make you smarter” or “the main benefit, really, is that on it, I don’t mind doing work.” This again reflects the fact that while participants generally did not seem to consider themselves to lack intelligence or “smarts,” they often did describe a lack of interest in the materials they were required to engage with, and an inability to continuously apply themselves to forms of labor that they found unenjoyable.

While all of this supports the view that changing emotional dynamics constitute an important element of students’ experiences with study drugs, none of it should be taken as an indication that cognition is *not* influenced by stimulant drugs. In fact, participants’ discussions of drug effects, and benefits derived from stimulant use, would move seamlessly between thoughts and feelings, or cognition and emotion. For example, when asked directly about why they used stimulant drugs in relation to their studies, participants would often frame the functional benefits of stimulant use in cognitive-sounding terms, for example, by saying that a drug “helps me focus” or “helps me pay attention.” However, elaborations of experiences of increased focus or attention were typically bound up in discussions of changes in general emotional states, in sentiments about the materials they were required to engage with for their studies, and in feelings experienced while doing work. (Thus, improvement in an ability to focus on a book one was reading, as described by Troy in the extract of conversation earlier, was usually linked to descriptions of coming to feel more interested in what an individual was reading about.)

While the data and analysis presented here have focused almost exclusively on emotional dynamics—an important and warranted focus, given that it emphasizes dimensions of users’ experiences that have been all but unexplored and unacknowledged in existing literature—the fact that users’

perceptions of changes in cognitive functioning are interlinked and dependent on changes in affective states is an important issue to pursue in future research. The exploration of questions about exactly how changes in cognitive function are tied to changes in emotions (and more generally, further qualitative research on the nonmedical use of stimulant drugs by university students) would also benefit from incorporating research design elements that were lacking from the present study, such as the use of multisited research designs (the study presented was conducted on a single campus), and attention to the significance of variables such as ethnicity and socioeconomic status for users’ experiences and perspectives.

CONCLUSION

As noted at the outset of this article, existing bioethics literature that focuses most closely on the use of stimulant drugs by university students and others conducting forms of academic or intellectual work has largely framed this sort of nonmedical use of stimulant drugs in terms of “cognitive” enhancement. However, the research presented here suggests that effects of stimulant drugs that help individuals improve academic performance are not as purely cognitive as often seems to be assumed. Accounts offered by healthy subjects suggest that stimulants are indeed perceived to enable augmented academic performance, for example, by improving abilities to work efficiently and productively on academic work—but they also suggest that changes in emotional states are a crucial factor to include within accounts of how and why such drugs work.

The finding that significant emotional dynamics are involved in practices that are frequently labeled as “cognitive enhancement” may appear surprising to those familiar with bioethics literature—certainly, this is not something that is suggested in much of what has been written about the nonmedical use of stimulants by university students. However, the results reported here do appear entirely consonant with a range of scientific and social research, including: (1) reviews of clinical research indicating that stimulant drugs’ abilities to improve performance on cognitive tests may be quite limited (Lucke et al. 2011; Smith and Farah 2011); (2) pharmacological perspectives indicating that an important mechanism of the action of stimulant drugs relates to their ability to influence the functioning of the brain’s dopamine system—a system that is associated with attention, but also with pleasure and emotions (Brignell, Rosenthal, and Curran 2007; Volkow et al. 2012); and (3) the well-established potential for prescription stimulants to produce euphoric effects (DeSantis, Noar, and Webb 2009; Keane 2008; Racine and Forlini 2010; Rasmussen 2008). Thus, in some respects, the results described in the preceding analysis, which suggest that it is difficult to separate the cognitive and emotional effects of stimulant drugs, might be considered entirely predictable.

This makes the disjuncture between how healthy university students’ nonmedical use of stimulant drugs is framed in bioethics literature on the one hand, and how

it appears from the perspective of individuals' experiences on the other, all the more notable. At best, the conceptual framework of "cognitive enhancement," which assumes that individuals use stimulant drugs as a means to affect raw intellectual powers, may fail to capture a dimension of stimulants' effects that are perceived as highly significant for users. At worst, the framing might be taken to misrepresent or distort the phenomenon of increasing use of stimulant drugs by university students in a rather fundamental way. Given how central discussions of cognitive enhancement have come to be within bioethics literature, careful consideration of such possibilities—not to mention the very existence of the disjuncture in the first place—seems a well warranted avenue for future analysis and discussion.

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