The Emotional Impact of 'Study Drugs': Unsurprising and Unconvincing

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Vrecko's (2013) article highlights the significance of emotions in university student's experiences with "study drugs." Appealing as the idea may be, the case that Vrecko presents is insufficiently compelling to arrive at the sort of firm conclusions that he proffers.

While there seems to be general agreement on what constitutes cognition, there is less clarity on the definition of emotion (Dolan 2002; Frijda 2000; Pessoa 2008). Without providing a definition or even a framework regarding what he considers emotion to be, Vrecko argues that he "draw[s] out the emotional and affective dynamics that appear within users' accounts." Lacking clarity on this matter leaves the reader with a cloud of indistinct assumptions when the author discusses the "significance" of "emotional dynamics." Most relevant to the present account is the observation that experience is not the same as emotion, nor is an emotional state the same as feelings, which are the subjective counterpart of an emotional event (Damasio 2006; Dolan 2002). Vrecko's account freely mixes these concepts, and we find it difficult to square the data that he presents with the conclusions that he draws. To cite but a few examples among many, Vrecko quotes his students as saying, "..it feels like I'm reading it just one word after another, not like super fast, but really steadily—my eyes never leave the page"; "I start to do things and it feels so different, like I'm not actually tired, really"; and "I was a lot more motivated." Even when read in the context of the longer quotation, one is left wondering whether these comments are necessarily related to emotional changes. Being focused, tired, or alert are clearly not emotions, whereas it is controversial as to whether a change in motivation is an affective state (Frijda 2000). Indeed, stimulants, the common name for these "study drugs," are so named because they alter the functioning of one's brain, elevating mental energy and alertness. We would suggest that the primary feature that Vrecko is capturing in these reports is commentary about *the experience* of using a stimulant (Cunningham and Zelazo 2007); this is not the same as having an affective response toward that experience. It is entirely unsurprising that using stimulants will have an experiential dimension.

We are delighted that Vrecko has taken on the challenge of carrying out an empirical study on one aspect of cognitive enhancement; this is a fertile field of research that is underserved (Nadler and Reiner 2010). Having said that, the disconnect between the quotes included in the article and the observations made by the author raise concerns about the veracity of his claims. While the author claims his article to be designed to generate an "empirically rich account" and is careful about not "imposing preexisting hypothesis or conceptions on data," (6) Vrecko's task is complicated by the fact that the correlations among and within factors involved in affective responses are often contested or quite modest. While fully acknowledging that we do not have access to the full transcripts of the interviews, the quotes that were included in the article (which, presumably, represent the best evidence to support his conclusions) do not, in our view, justify the interpretation layered upon them. Even more troubling is the hyperbole used in describing the dimensions of the findings. Thus, we have Vrecko telling us that from his findings one can see how these are "in some crucial respects, quite different from the way that accounts of nonmedical stimulant drug use is framed within much existing literature" or that the data from the study shows "a dimension of stimulants' effects that are perceived as highly *significant* for users" (11, emphasis added). Even if we were to be generous in allowing latitude of interpretation and thereby concede that the findings demonstrate that user's perceptions fit into Vrecko's conception of emotional dynamics, it would be a stretch to say that users' experiences with stimulants were regarded as highly significant to them from an emotional perspective. The quotes included in this article are much too modest to support such claims. The strength of qualitative studies is that they can provide in-depth understanding of people's experiences, perspectives, and attitudes in the context of their personal circumstances or settings (Spencer et al. 2003). Qualitative studies should be carried out in a manner that does not leave the reader with the impression, even it is a false impression, that interpretation outstrips data (Onwuegbuzie and Leech 2004). Ensuring quality, rigor, and robustness of empirical results is fundamental to the flourishing of the young field of neuroethics.

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Why Students Bother Taking Adderall: Measurement Validity of Self-Reports

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This commentary will focuses on the psychological and methodological aspects of the article by Vrecko and how this might implicate the conclusions of the research. Working in experimental social psychology, I have determined the difference between assessing attitudes and opinions explicitly (i.e., via self-report), or implicitly (i.e., via unobtrusive measures) (Terbeck et al. 2012). In the following I argue that this methodological problem—namely, the direct/explicit measure of attitudes and experiences with performance enhancing drugs—might have impacted the results.

The article by Vrecko expands the debate on "cognitive enhancement" by discussing the emotional aspect of pharmacological performance enhancement. The author based the conclusions on evaluations of American students' experience of taking methylphenidate for enhancing purposes.

First, as is widely accepted in the neuroscience and psychopharmacological community, brain transmitter systems are complex, and there is currently no psychotropic medication with a single precise effect, such as enhancement of attention. Indeed, already in 1960 Kerenyi, Koranyi, and Sarwer-Foner (1960) reported mood-enhancing effects of methylphenidate in individuals with depressed mood and in patients with major depressive disorder. Additionally, it was found that noradrenaline-enhancing medication (e.g., serotonin–norepinephrine reuptake inhibitor [SNRI]: reboxetine) not only improved working memory but also increased positive affect (Norbury et al. 2006). Thus, it might first have been helpful to determine whether the participants in the study were suffering from depression or depressed mood. For example, Sarah's account might indicate higher levels of depressed mood: "I mean . . . even just getting to the library can be difficult. . . . Even if it's the morning, I feel like I need to go back to sleep."

Second and most important, however, is my criticism regarding the methodology used in the survey, and the conclusions made from this. I argue that it might be too quick to conclude that "emotional dynamics constitute a salient dimension for university students . . . *as a means* of improving academic performance." This conclusion seems problematic because of two main concerns that arise from research in psychopharmacology, and from lessons in experimental psychology.

First, recent research on dedicated mood-enhancing drugs such as selective serotonin reuptake inhibitors (SSRIs) could not consistently determine performance-enhancing effects of these pharmaceuticals (e.g., Koskinen and Sirvio 2001; Ruotsalainen et al. 1997;). For example, in animal models, Koskinen and Sirvio (2001) found that neither 5-HT_{2A} agonists nor antagonists affected indices of attentional performance. If the effect of performance enhancement was taken "*as means* of improving academic performance" then mood-enhancing drugs should produce similar performance effects.

Second, and most important, is the fact that students taking the drug with the intention of improving their performance at work would indicate that they must to some extent be motivated to do well. One might argue that peer pressure or the willingness to comply with their parents' values might lead them to remain at university, but since they are already undertaking the course and thus satisfying peers, parents, or others, why then would there be the need to perform well if they were not motivated?

An alternative explanation is that students' self-reports might not have been a reliable method to test attitudes and opinions. It is well known in psychology that self-report measures, especially of motivation, may be biased according to socially desired reposes (Terbeck et al. 2012). For example, students might have felt the desire to appear "cool" in front the researchers, complying with peer norms to regard academia as "boring." Indeed implicit attitudes and opinions might very well differ from what is assessed via self-report. Another example is that racial prejudice can be

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