Performance Enhancement & Health xxx (2018) xxx–xxx

Contents lists available at ScienceDirect

Performance Enhancement & Health

journal homepage: www.elsevier.com/locate/peh

Religious faith, academic stress, and instrumental drug use in a sample of Western-African University students

Wanja Wolff*, Sandra Asantewaa Boama

University of Konstanz, Department of Sport Science, Sport Psychology, Universitätsstraße 10, 78464, Konstanz, Germany

ARTICLE INFO

Article history:
Received 8 February 2018
Received in revised form 5 July 2018
Accepted 12 July 2018
Available online xxx

Keywords:
Neuroenhancement
drug instrumentalization
Ghana
religion
academic stress
prevalence

ABSTRACT

Background: Neuroenhancement (NE), the use of substances in order to improve cognitive performance, has received considerable scientific attention in recent years. Broadening this NE concept, people can use drugs as instruments (DI) to improve various aspects of performance. Whereas such functional drug use is well-researched in Western countries, there is a lack of research on this phenomenon in African countries.
Objectives: We will provide a first estimate of the frequency by which freely available lifestyle drugs, prescription drugs, and illicit drugs are used for DI and NE purposes in a sample of Western-African university students. Further, we investigate the association of religious faith and academic stress with functional drug use.
Methods: Participants were 669 (mean age 22.58 ± 3.89 years) university students from Ghana. Academic stress and religious faith were measured using self-reports. DI – and its' facet NE - was measured with a questionnaire that assesses the lifetime prevalence of 3 × 9 DI combinations.
Results: The frequency of DI varied as a function of the specific drug × goal combination between 0.6% and 24.7%. Religious faith was associated with less DI for all measured substance classes and academic stress was only associated with prescription drug DI. Religious faith and academic stress interacted in predicting lifestyle drug DI and prescription drug DI.
Conclusions: In general, the frequency of DI in Ghanaian students was markedly lower than in Western samples and this was also the case for DI goals most closely related to NE. In addition, religious faith was associated with less drug use, supporting the claim that religion might serve as a buffer against drug use.

1. Introduction

The use of drugs as a means to improve academic performance has received considerable attention in recent years (e.g., Dietz, Striegel et al., 2013; Maier & Schaub, 2015; Sattler & Wiegel, 2013; Wolff & Brand, 2013, 2017). Such functional drug use has been called *Neuroenhancement* (NE; e.g., Wolff & Brand, 2013), *Cognitive Enhancement* (CE; e.g., Dietz, Striegel et al., 2013), *Pharmacological Cognitive Enhancement* (PCE; e.g., Maier et al., 2015) or *non-medical use of stimulants* (Racine & Forlini, 2010), and has been defined as "healthy individuals' use of (psychoactive) substances under the assumption of these substances being functional means in order to enhance his or her already proficient cognitive capacities" (Wolff, 2014, p. 20). At the core of this *behavioral definition*[1] of NE lies the idea that people use drugs as a means to an end (Wolff & Brand, 2013). Thus, they take a drug they assume to be functional for achieving a desired goal. On a subordinate level, a differentiation of different NE variants based on a substances' legal status has been proposed: *lifestyle drug NE* (e.g., Red Bull®), *prescription drug NE* (e.g., Ritalin®) and *illicit substances NE* (e.g., Speed; Wolff & Brand, 2013).

Depending on the NE variant, the reported prevalence rates vary widely (Wolff, 2014). While NE by means of freely available lifestyle drugs appears to be quite common among university students (up to 89%; Mache, Eickenhorst, Vitzthum, Klapp, & Groneberg, 2012), the reported rates for NE by means of prescription drugs (2.2 - 8%; Forlini, Schildmann, Roser, Beranek, & Vollmann, 2015; McCabe, Knight, Teter, & Wechsler, 2005; Sattler & Wiegel, 2013;

* Corresponding author at: University of Konstanz, Universitätsstraße 10, 78464, Konstanz, Germany.
E-mail addresses: wanja.wolff@uni-konstanz.de (W. Wolff), asantewaa.boama@uni-konstanz.de (S.A. Boama).

[1] As opposed to a substance-based definition (For a discussion on this topic, please see Wolff, 2014).

https://doi.org/10.1016/j.peh.2018.07.001
2211-2669/

Teter, McCabe, Cranford, Boyd, & Guthrie, 2005) or illicit drugs are markedly lower (0.3%–2.3%; Franke et al., 2011; Mache et al., 2012). Most studies have targeted student samples in Western countries and even within Western countries prevalence differences have been found (e.g., Kudlow, Naylor, Xie, & McIntyre, 2013; Mazanov, Dunn, Connor, & Fielding, 2013; Schelle et al., 2015). Few studies have investigated NE behavior in non-Western countries. A recent study among South African medical students found that around 7.5% were using methylphenidate for academic performance (Jain et al., 2017). While this study indicates that NE is relevant in African countries too, its' focus on one specific substance and one narrowly defined population renders broader inferences from these findings difficult. In another study, a 15.43% 12-month prevalence of prescription drug NE has been reported among Jordanian teachers (Wolff, Sandouqa, & Brand, 2016). However, this study only targeted prescription drug NE and did not assess lifestyle and illicit drug NE. The high numbers observed by Wolff et al. can partly be explained by the use of a randomized response technique (Petróczi et al., 2011) that reduced the likelihood of social desirable responding (for similar results in German samples, please see Dietz, Striegel et al., 2013; Dietz, Ulrich et al., 2013).

Taken together, methodological and definitional inconsistencies in the extant research thwart a precise estimate of NE prevalence and researchers have cautioned against a media hype regarding NE (Partridge, Bell, Lucke, Yeates, & Hall, 2011). Still, irrespective of definition and scope most published empirical studies suggest that functional substance use is a behavior with a non-zero prevalence in Western countries with inconsistencies pertaining primarily to the lower and upper bounds of NE prevalence. The scarce evidence from non-Western countries indicates that this behavior is not solely a Western phenomenon. However, there still is a clear lack of research on NE in non-Western countries.

1.1. Correlates of NE

Parallel to investigating the prevalence of NE, researchers have investigated situational and psychological correlates of NE (Dietz, Soyka, & Franke, 2016; Jensen, Forlini, Partridge, & Hall, 2016; Sattler & Schunck, 2016; Wolff, Baumgarten, & Brand, 2013). Two factors that might be differentially associated with NE are (academic) stress and religiosity. Academic stress or high job demands are frequently associated with higher rates of various forms of NE (e.g., Mache et al., 2012; Weyandt et al., 2009; Wolff & Brand, 2013). One study (Wolff, Brand, Baumgarten, Lösel, & Ziegler, 2014) showed that NE use might even be associated with an exacerbation of the proposed relationship between job demands and burnout (Bakker & Demerouti, 2014).

So far, most research has focused on identifying factors that are linked with a higher rate of NE. Factors that are associated with reduced rates of NE have been investigated less thoroughly so far. One such factor might be religiosity. Religiosity and drug use appear to be inversely related (e.g. Sebena, El Ansari, Stock, Orosova, & Mikolajczyk, 2012). For example, higher religiosity has been associated with reduced alcohol consumption (Galen & Rogers, 2004; Ghandour, Karam, & Maalouf, 2009; Sebena et al., 2012), less cocaine use (Moreira-Almeida, Lotufo Neto, & Koenig, 2006), less cannabis (Isralowitz et al., 2017), and less nicotine use (Isralowitz et al., 2017). Religiosity has even been discussed as a coping strategy (Daugherty & McLarty, 2003) that buffers against substance abuse (Wills, Yaeger, & Sandy, 2003). However, without an empirical test these findings cannot be translated to the realm of NE: While religiosity buffers against societally unaccepted forms of substance abuse, the attitudes towards NE differ widely (Schelle, Faulmüller, Caviola, & Hewstone, 2014). In fact, whether or not NE represents an acceptable behavioral choice is a hotly debated topic in the field of neuroethics (an assessment of the acceptability vs non-acceptability of NE is beyond the focus of this paper, but for informative accounts on the topic, please see for example; Forlini & Hall, 2015; Greely et al., 2008). Thus, it is a viable research question to explore if – and in what direction – religiosity is associated with NE.

1.2. Broadening the NE concept

Recently it has been suggested to broaden the NE concept beyond the realm of improved cognitive functioning (e.g., Brand, Wolff, & Ziegler, 2016; Müller & Schumann, 2011): People use drugs as means for achieving a diverse set of goals. For example, an athlete can use erythropoietin to improve endurance performance or a shy person might drink a beer to facilitate social interactions. Drug Instrumentalization theory (*DI theory*; Müller & Schumann, 2011) addresses the fact that most drug users are not addicted to a drug and provides a framework for non-addictive drug use. According to DI theory, people deliberately use certain drugs as means for achieving certain goals. DI theory proposes a non-exhaustive list of instrumentalization goals that people might try to achieve by means of certain drugs (see Table 1). A recent study empirically tested if DI towards these proposed goals occurs among university students (Brand et al., 2016). They showed that the lifetime prevalence of DI varied substantially between the different goals and as a function of the substances used. Goals that most closely resembled the NE concept were the most frequent target of DI (*counteracting fatigue* = 89%; *improving cognitive performance* = 78.1%). The remaining goals were targeted to a lesser extent (range: 21.13% - 89%). This supports the broader conceptualization of instrumental drug use proposed by DI theory.

Taken together, the NE concept can be conceptually and empirically subsumed under the broader DI concept but research on psychological and situational correlates of DI behavior is lacking. As the NE related goals appear to be the most common goals for DI, it is plausible that correlates for NE (e.g., academic stress, religiosity) are relevant for DI too.

1.3. The present research

The present cross-sectional self-report study aims at addressing two research gaps. First, there is a lack of studies on NE in non-Western countries. As no NE research has yet been conducted in Western African countries, we try to address this gap by investigating NE among a convenience sample of Ghanaian university students. We further investigate how a known correlate of high NE (academic stress) and a plausible correlate of low NE (religiosity) are linked to NE in our sample. Religion might play a role in cross-cultural differences in NE prevalence: Data from the Association of Religion Data Archives (ARDA, 2018) show that the proportion of agnostic people is substantially lower in Western Africa compared to Western countries (e.g., Western Europe, the USA) where most NE research has been conducted so far. In light of the protective role ascribed to religion, it is conceivable to expect lower NE rates in our Ghanaian sample. Second, conceptually and empirically it has been suggested to widen the NE concept and investigate functional drug use according to the broader concept specified by DI theory. To our best knowledge, only one study (Brand et al., 2016) has tested the empirical applicability of the goals specified by DI theory so far. We aim to replicate this study and investigate NE behavior as part of the broader DI concept.

2. Methods

2.1. Setting, sample and Procedure

We identified 45 Ghanaian universities and approached 21 university or class representatives (for the remaining universities no

Please cite this article in press as: Wolff, W., & Boama, S.A. Religious faith, academic stress, and instrumental drug use in a sample of Western-African University students. *Performance Enhancement & Health* (2018), https://doi.org/10.1016/j.peh.2018.07.001