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Title

Predicting students' intention to use stimulants for academic performance enhancement

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Abstract

Background: The non-medical use of stimulants for academic performance enhancement becomes a more and more common practice among college and university students.

Objective: The objective of this study is to gain a better understanding of students' intention to use stimulant medication for reasons of enhancing their academic performance. Based on an extended model of Ajzen's theory of planned behaviour, we examined the predictive value of attitude, subjective norm, perceived behavioural control, psychological distress, procrastination, substance use and alcohol use on students' intention to use stimulants to improve their academic performance.

Methods: The sample consisted of 3589 Flemish university and college students (mean age: 21.59, SD: 4.09) who anonymously participated in an online survey conducted in March/April 2013. Structural equation modeling was used to investigate the relationships among the study variables.

Results: Our results indicate that subjective norm is the strongest predictor of students' intention to use stimulant medication, followed by attitude and perceived behavioural control. To a lesser extent, procrastinating tendencies, psychological distress and substance abuse contribute to students' intention.

Conclusions/Importance: Based on the findings, we provide several recommendations on how to curtail students' intention to use stimulant medication for purpose of academic performance. In addition, we urge researchers to identify other psychological variables that might be related to students' intention.

1. Introduction

The years that students spend at university or college are viewed as a time of transition, experimentation and risk-taking, especially with regard to substance misuse (Ford & Arrastia, 2008; Quintero, Peterson, & Young, 2006). During the past decade, the increase in the misuse of stimulant drugs – mainly methylphenidate, such as Ritalin®, prescribed to treat Attention Deficit Hyperactivity Disorder (ADHD) – has resulted in considerable scientific attention (McCabe, Knight, Teter, & Wechser, 2005; Ponnet, Wouters, Van Hal, Heirman, & Walrave, 2013; Smith & Farah, 2011). A growing body of literature suggests that the nonmedical use of stimulants becomes more common among university and college students for reasons of enhancing academic performance (Kroutil et al., 2006; Weyandt et al., 2009; White, Becker-Blease, & Grace-Bishor, 2006). Estimations of prevalence rates of nonmedical use differ from study to study, but taken together, the results of most studies indicate that the practice is often commonplace (Smith & Farah, 2011), with past year prevalence rates from approximately 2% (e.g. Herman-Stahl, Krebs, Kroutil, & Heller, 2007) to 11% (e.g. Arria, O'Grady, Caldeira, Vincent, & Wish, 2008; Shillington, Reed, Lange, Clapp, & Henry, 2006). However, the misuse of stimulant medication can have severe adverse consequences. Primarily, there is a risk of addiction, and reported physical side-effects of high dose misuse include cardiovascular complications, increased blood pressure, gastro-intestinal discomfort, and headaches (Clegg-Kraynok, McBean, & Montgomery-Downs, 2011; Leonard, McCartan, White, & King, 2004; White et al., 2006). Furthermore, nonmedical users of prescription stimulants like methylphenidate are more likely to report higher rates of polydrug use (Barrett, Darredeau, Bordy, & Pihl, 2005; McCabe et al., 2005; McCabe & Teter, 2007).

Despite the growing body of literature on nonmedical use of stimulants, some areas of this research field remain undeveloped. In particular, identifying factors that predict students' intention to use stimulant medication for academic performance enhancement may broaden

our understanding (Judson & Langdon, 2009; Weyandt et al., 2009), because intention is a very strong determinant of actual behaviour (Ajzen, 2002). Therefore, the aim of the present study is to test an *extended* model based on the Theory of Planned Behaviour (TPB, Ajzen,1991). TPB is currently one of the most predictive behavioural models in health psychology (Taylor, 2006). This theory proposes that a certain set of motivational factors, including personal attitudes, subjective norm, and perceived behavioural control affect the intention to perform a behaviour (Ajzen, 1991). Attitude refers to people's evaluation or appraisal of the target behaviour. Subjective norm is defined as the perceived social pressure to perform or not perform the behaviour. Perceived behavioural control refers to the perceived ease or difficulty of performing a behaviour. As a general rule, the more favourable the attitude, subjective norm and the greater the perceived behavioural control, the stronger the person's intention to perform the behaviour in question (Ajzen, 1991, 2002). Based on the TPB literature, we derive the following hypotheses (H):

H1: There is a positive association between students' attitude (H1a), subjective norm (H1b), perceived behavioural control (H1c) and their intention to use stimulants for academic performance enhancement.

Besides of the three TPB components, it can be assumed that students' intention to misuse stimulants for academic performance enhancement will be predicted by psychological determinants as well. For instance, a study conducted by Dussault and Weyandt (2013) found that students' anxiety

significantly predict nonmedical stimulant use. In a study conducted by Weyandt et al. (2009), findings suggest that students who have a high degree of internal or mental restlessness or who are experiencing higher rates of psychological distress may be at greater risk for misusing prescription stimulants. Therefore, we expect that:

H2: Students with more psychological distress are more inclined to use stimulants for academic performance enhancement.

We also included procrastination as a predictor in our model. Procrastination can be defined as the tendency to delay initiation or completion of important tasks to the point of discomfort (Solomon & Rothblum, 1984) and is common among university and college students (Richardson, Abraham, & Bond, 2012). Procrastination is often presented as a time management problem (Pychyl, Morin, & Salmon, 2000). Just prior to a deadline procrastinators suffer from worry, high levels of anxiety and low levels of self-control (Burns, Dittmann, Nguyen, & Mitchelson, 2000; Ferrari, Johnson, & McCown, 1995). One way to eliminate these feelings might be by using stimulants like methylphenidate. Although no studies have – to the best of our knowledge – investigated the relationship between procrastination and the intention to use stimulants, we expect that:

H3: Students with higher levels of procrastination are more intended to use stimulant medication for academic performance enhancement.

Finally, our model also included information on substance use and alcohol use, since several studies have found an association between elevated levels of alcohol and substance use and the nonmedical use of ADHD medications (for an overview, see Wilens et al. (2008)). Moreover, in a panel study conducted by Rabiner et al. (2009) was found that students' reports of substance use in their first semester predicted the onset of nonmedical ADHD medication use over the next three semesters. Based on these studies, we expect that:

H4: Students who report substance use (H4a) and higher levels of alcohol use (H4b) are more intended to use stimulants for academic performance enhancement.

In summary, the purpose of the present study is to gain a better understanding of students' intention to use stimulants to enhance academic performance. In order to supplement the current literature, we examined the predictive value of attitude, subjective norm, perceived

behavioural control, psychological distress, procrastination, and substance and alcohol use on students' intention to use stimulants for academic performance enhancement.

2. Method

2.1. Procedure and participants

Our analyses are based on data from the third wave of an anonymous internet-based questionnaire among Flemish university and college students. This survey took place for the first time in 2005, including students of the Association University and Colleges of Antwerp (Boot, Rosiers, Meijman, & Van Hal, 2010). In 2009, a follow-up was done (Van Damme et al., 2013). In March 2013, the third wave of the survey was performed. All students of the University of Antwerp and Karel de Grote University College (*n* = 22274) received a personal e-mail asking them to participate in an online cross-sectional study on substance use. The link to the questionnaire was active for eight weeks. No reminder email was sent. The study was conducted in accordance with the ethical standards of the American Psychological Association and was approved by the ethics committee of the Medicine and Health Sciences Faculty of the University (EC UZG 2013/065).

The survey consisted of a structured questionnaire with questions on the prevalence and frequency of licit and illicit drug use (alcohol, tobacco, medical drugs, illicit drugs such as cannabis, amphetamines, ecstasy and cocaine). In total, 4145 students filled out the questionnaire, resulting in a response rate (i.e. 18.6% or 4145/22274) that is consistent with other large scale online survey among college students (Boot et al., 2010; Van Damme et al., 2013). Specifically for the purpose of the present study, a module has been included which deals with students' intention to use stimulant medication like Ritalin® for academic performance enhancement The questions to assess the constructs in the theory of planned behaviour (i.e. attitude, subjective norm, behavioural control) were developed in line with the recommendations by Ajzen (2011). Of the 4145 participants, 86.6% (*n* = 3589) filled out this

module. The average age of the students was 21.59 years (*SD* = 4.09), with 30.2% males (*n* = 1083) and 69.8% females (*n* = 2506). Regarding the living situation, 62.4% (*n* = 2236) of the students lived at home and 37.5% (*n* = 1345) lived on their own (e.g. on rooms, with or without peers). 4.8% (*n* = 173) of the students answered affirmative on the question "Have you ever used stimulant medication (Ritalin®, Concerta®, …) without a prescription?".

2.2. Measures

Attitude. Respondents rated their attitude by means of the following three semantic differential 7-point scales, ranging from 1 to 7: "The use of stimulants like Ritalin® among students without ADHD in order to increase their academic performance is …?" Item 1: Bad - Good; Item 2: Irresponsible - Responsible; Item 3: Harmful - Not Harmful. The reliability of the scale was good (α = .81).

Subjective norm. Two items measured the respondent's own estimate of the social pressure to perform the target behaviour. The items are "People who are important to me, would approve of me taking stimulants like Ritalin® in order to enhance my academic performances" and "People expect me to take stimulants like Ritalin®, if it allows me to enhance my academic performances". The items were scored along a 5-point Likert scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*. The internal consistency of the items was good (α = .91).

Perceived behavioural control. Two items measured students' confidence that they are capable of obtaining stimulants to perform the behaviour: "It is easy for me to obtain stimulants like Ritalin®" and "I am confident that I can obtain stimulants like Ritalin® if I want to". Both items were scored on a 5-point Likert scale, ranging from 1 = *strongly disagree* to 5 = *strongly agree*. The reliability of the scale was good (α = .80).

Psychological distress. The 12-item General Health Questionnaire (GHQ-12) is a widely used instrument to measure one's psychological distress (Goldberg et al., 1997). Examples of

the items include "Have you recently felt you couldn't overcome your difficulties?" and "Have you recently been feeling unhappy or depressed?" Each item is accompanied by four responses: 0 = *not at all*, 1 = *no more than usual*, 2 = *rather more than usual*, and 3= *much more than usual*. The total possible score on the GHQ 12 ranges from 0 to 36. The reliability of the scale was good (α = .87.).

Procrastination. To assess procrastinating tendencies in college students, we used the following three items of Tuckman's procrastination scale (Tuckman, 1991): "When I have a deadline, I wait till the last minute", "I needlessly delay finishing jobs, even when they're important" and "I am an incurable time waster". The items were scored along a 5-point Likert scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*. The internal consistency of the items was good (α = .87).

Intention. To measure the intention to use stimulants, students were asked to score the item "I intend to use stimulants like Ritalin® to improve my academic performance" along a 5-point Likert scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*.

Substance and alcohol use. Students' substance use was questioned binary (no/yes): "Have you ever used cannabis (marijuana, weed, hashish, …), amphetamines (pep pills, speed, …), cocaine (coke, snow, …) or other drugs?". Students' alcohol use was questioned with an item "How often do you have a drink containing alcohol?", ranging from 0 = *never*, 1 = *monthly or less*, 2 = *once a week or less*, 3 = *2-3 times a week*, 4 = *4 or more times a week.*

Descriptives of the variables are presented in Table 1.

Insert Table 1 here

2.3. Analytic strategy

To investigate the relationships among the study variables, structural equation modeling (SEM) was applied to the collected data using Mplus 6 (Muthén & Muthén, 2010). The analyses were carried out in the following way. Firstly, we built a measurement model and

examined whether the observed variables reliably reflected the hypothesized latent variables in the research model. The latent constructs attitude, subjective norm, perceived behavioural control, and procrastination were created using the above-mentioned manifest variables. Secondly, we estimated a structural model with attitude, subjective norm, perceived behavioural control, procrastination, psychological distress, substance use and alcohol use as predictor variables and behavioural intention as the endogenous variable. Age and gender of the students, and whether they lived at home or on their own were included as covariates in the model. Structural equation modeling results were obtained with maximum likelihood mean adjusted, because preliminary tests suggested that self-reported intention was a not normally distributed dependent variable.

Insert Figure 1 here

3. Results

As shown in Figure 1, measurement and structural models provided an adequate fit to the data. All factor loadings of the latent constructs were significant and above .70. Our analyses revealed that the study variables together with the covariates explained 37% in total variance of students' intention to use stimulants in order to enhance their academic performance. The attitude (H1a), subjective norm (H1b), and perceived behavioural control (H1c) are significantly related to the intention to use stimulants to improve the academic performance. Subjective norm had the strongest relation with intention ($\beta = .45$, $p < .001$), followed by attitude ($\beta = .18$, $p < .001$) and perceived behavioural control ($\beta = .15$, $p = .001$). Thus participants who perceived more social pressure from important others in their lives, those with a more favourable attitude and those who perceived it is easy for them to take the stimulant are more likely to show intention to take stimulants for academic performance enhancement. In line with H2, our analyses revealed that students with more psychological distress are more inclined to use stimulants for academic performance enhancement ($\beta = .05$,

p = . 01). Furthermore, we found that procrastinating tendencies in students are positively related with the intention to use stimulants (β = .06, p < . 001), suggesting that students who tend to delay beginning or completing a task have more intention to use (H3). Finally, we found that substance use (H4a: β = .09, p < . 001) but not alcohol use (H4b: β = -.01) is significantly related to intention.

With regard to the covariates, only sex was significantly related to intention (β = -.05, p < . 01), suggesting that female students have less intention to use stimulants for academic performance enhancement. Results further revealed that sex was significantly related to attitude (β = -.23, p < . 001), subjective norm (β = -.10, p < . 001), perceived behavioural control (β = -.26, p < . 001), procrastination (β = -.18, p < . 001), substance use (β = -.14, p < . 001), and psychological distress (β = .16, p < . 001), suggesting that female students have lower scores on these predictors compared to men, with the exception of psychological distress on which female students score higher than their male peers. Furthermore, age was significantly related to attitude (β = -.11, p < .001) and procrastination (β = -.07, p < .01), with higher age resulting in a less positive attitude and less procrastinating tendencies. Finally, results indicated that students who live at home have lower scores on attitude (β = .07, p < . 001), perceived behavioural control (β = .09, p < . 001), substance use (β = .13, p < . 001) and alcohol use (β = .08, p < . 001).

4. Discussion

The past decade, the nonmedical use of stimulants for reasons of enhancing academic performance became more common among university and college students (Smith & Farah, 2011). Therefore, it is important to determine factors that predict students' intention to use stimulant medication and to examine the predictive value of these factors. To achieve this, the current research tested an extended model based on the theory of planned behaviour. Our

results indicate that subjective norm is the strongest predictor of students' intention to use stimulants, followed by attitude and perceived behavioural control. Furthermore, procrastinating tendencies, psychological stress and substance abuse also contribute – although to a lesser extent – to students' intention. Finally, we found that there are several differences between male and female students with regard to the predictors and the intention, and that students who live on their own have a more positive attitude towards nonmedical use of stimulants and perceive it as easier to take stimulants.

What can be done to curtail students' intention to use stimulants for academic performance enhancement? A number of potential intervention strategies can be proposed. First, intervention programmes that want to decrease students' intention to use stimulants should primarily focus on alleviating the perceived social pressure to misuse stimulant medication and on converting neutral or positive attitudes towards nonmedical stimulant use into negative attitudes. One way to do this is by informing students that only a minority of their peers take stimulants for cognitive enhancement, and by educating students on the potential negative consequences of using stimulants for academic performance enhancement. An early study by Perkins and colleagues (Perkins, Meilman, Leichliter, Cashin, & Presley, 1999) has demonstrated that college students often have the misperception that the vast majority of their peers use several drugs. Elevated misperceptions about the prevalence of drug use among college students can be attributed to the mass media's portrayal of abuse. Misperception of reality however contributes to increased levels of acceptance of abusive drug behaviour, students' norms for abuse, and higher level of abuse (Boot et al., 2012; Hansen, Moum, & Shapiro, 2007; McAlaney et al., 2012). Second, our findings suggest that procrastinating tendencies are to some extent related to students' intention to use stimulants: the more students procrastinate, the more they are intended to use stimulants. A possible solution to this is learning students – in particular freshman students –to create a personalized (and realistic)

study plan, i.e. an organized schedule that outlines study times and learning goals. Creating a study plan may help students become more organized and may alleviate some of the academic stress that students experience. The latter is also important in light of our finding that psychological distress has a negative impact on students' intention. Third, our results indicate that male and female students differ with regard to attitudes, norms, perceived behavioural control, procrastinating tendencies, psychological distress, substance use and the intention to misuse stimulant medication. As such, it might be useful to tailor education campaigns and intervention programs differently for male and female students. For instance, personalized and thus gender-specific online social norms feedback could be given when using the Social Norms Approach (Pischke et al., 2012).

Notwithstanding the merits of our study, some limitations have to be acknowledged. First, the survey data are cross-sectional in nature, which entails that inferences with respect to causality should be made with caution. Although the use of a theory and prior research to guide this study lend support to the inferences, the time ordering among the variables is not clear. A second limitation is sampling bias, which may limit the external validity of the study findings. Although the survey was sent to all students of the University of Antwerp and Karel de Grote University College, there is no guarantee that the sample represents the population from which it was drawn. Alternative participant recruitment and data collection strategies may be needed to minimize sampling bias in future studies. Finally, we attempted to include as many interesting predicting factors as possible in the proposed study, but due to questionnaire length only a limited set of variables was included. It would be interesting for future research to verify which additional variables can be included in the model. Future research could, possibly inspired by qualitative research efforts or new revelations in literature, consider including additional psychological variables (e.g. sensation seeking, perfectionism, …) in the model to increase the explained model variance.

5. Conclusions

Based on a large sample of university and college students, findings of this study indicate that subjective norm is the strongest predictor of students' intention to use stimulant medication for academic performance enhancement, followed by attitude and perceived behavioural control. To a lesser extent, procrastinating tendencies, psychological distress and substance abuse contribute to students' intention.

6. Conflicts of Interest

None declared

7. References

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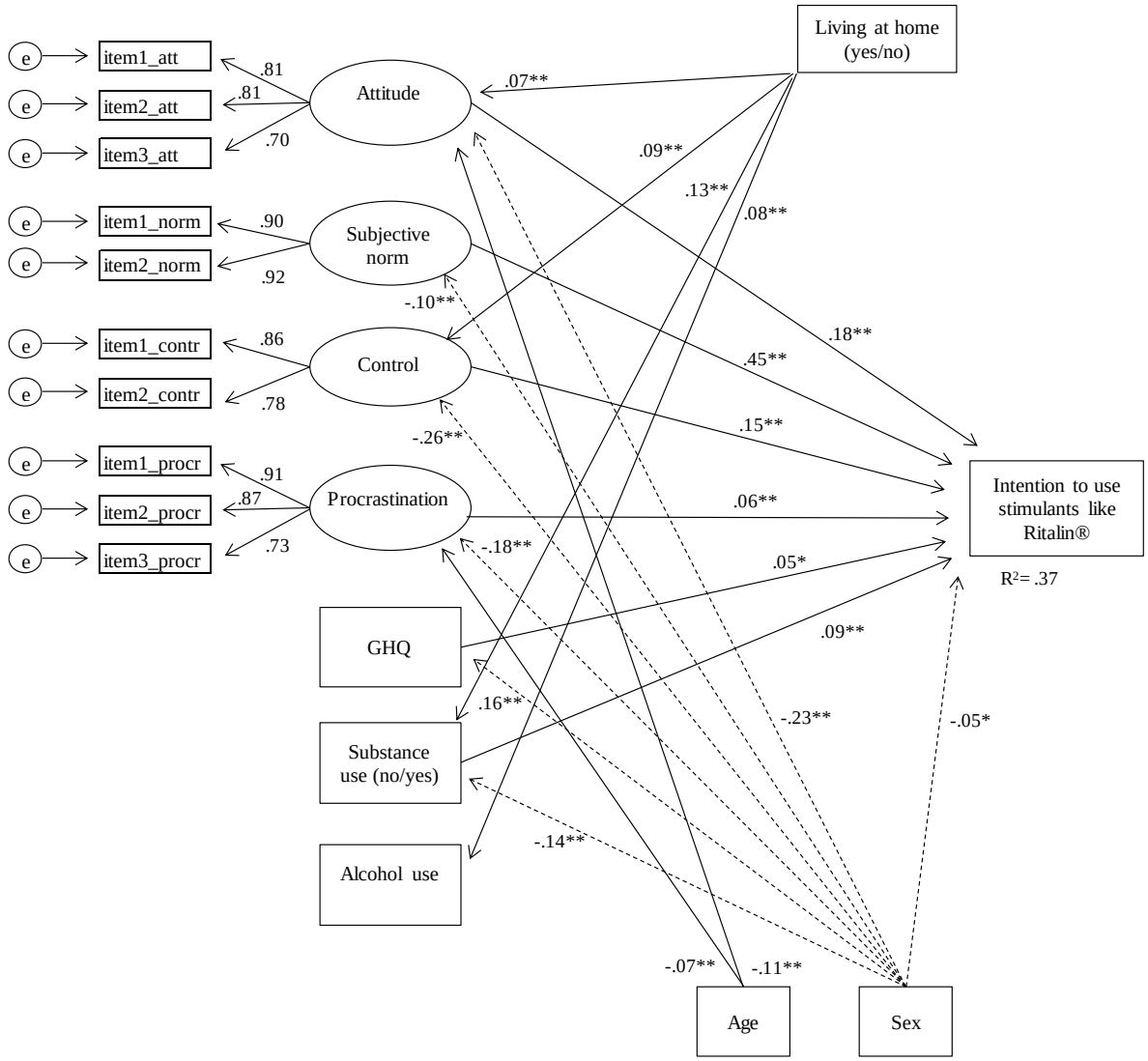
Table 1.

Descriptives of the variables

	M	*SD*
Attitudes		
Item 1. Bad - Good	1.91	1.29
Item 2. Irresponsible - Responsible	2.06	1.38
Item 3. Harmful - Not Harmful	2.25	1.45
Subjective norm		
Item 1. People expect me to take stimulants like Ritalin®, if it allows me to enhance my academic performances	1.67	0.96
Item 2. People who are important to me, would approve of me taking stimulants like Ritalin® in order to enhance my academic performance	1.20	0.54
Perceived behavioural control		
Item 1. It is easy for me to obtain stimulants like Ritalin®	2.17	1.29
Item 2. I am confident that I can obtain stimulants like Ritalin® if I want to	2.86	1.43
Procrastination		
Item 1. When I have a deadline, I wait till the last minute	2.75	1.26
Item 2. I needlessly delay finishing jobs, even when they're important	2.64	1.24
Item 3. I am an incurable time waster	2.73	1.22
Psychological distress	13.04	5.88
Substance use (yes %)	40.6% (*n* = 1456)	
Alcohol use	1.98	0.94
Intention	1.30	0.75

Figure 1.

Structural model for the determinants predicting students' intention to use stimulants for academic performance enhancement



Note.

Measurement model fit: $\chi2(29) = 113.07$, $p < .001$, CFI = .99, TLI = .99, RMSEA = .03, SRMR = .02; Structural model fit: $\chi2(89) = 890.31$, $p < .001$, CFI = .95, TLI = .93, RMSEA = .05, SRMR = .06; GHQ = General Health Questionnaire; All reported coefficients are standardized values. Non-significant paths are not included. Lines are dashed or full for reasons of clarity; *$p < .01$; **$p < .001$