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ASSESSMENT OF PSYCHOACTIVE SUBSTANCE USE AND ATTENTION DEFICIT AMONG UNIVERSITY STUDENTS IN MOROCCO

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University students may turn to psychoactive substances for various reasons, including stress relief, social integration, curiosity, or perceived cognitive enhancement. However, regular or excessive use can impair attention, memory, and executive functioning, potentially affecting academic performance and long-term mental health. Understanding the patterns and motivations behind substance use in this population is essential for developing effective prevention and intervention strategies.

Material/Methods:

A sample of 239 university students, aged between 18 and 35 years, was recruited to participate in the study. The selection aimed to reflect a diverse cross-section of young adults in higher education, encompassing various academic disciplines and socioeconomic backgrounds. Each participant was asked to complete a series of standardized questionnaires designed to assess the frequency, intensity, and context of tobacco, alcohol, and cannabis use. In addition to substance use metrics, participants provided demographic information and personal history through structured information sheets, which included questions about family background, peer influence, and psychosocial factors potentially linked to substance consumption.

Results:

Among university students who reported substance use, a statistically significant positive correlation was observed between scores on the Fagerström Test for Nicotine Dependence and the Cannabis Abuse Screening Test (CAST), with a correlation coefficient of $r = +0.27$ ($p < 0.001$). This finding suggests that individuals with higher nicotine dependence may also be more prone to problematic cannabis use, pointing to potential shared behavioral or neurobiological mechanisms underlying substance dependence. Further analysis using Pearson's correlation revealed significant differences across age categories in several cognitive performance indicators measured by the d2-R test. Specifically, younger and older students differed in their levels of concentration (CC), accuracy (E%), and processing speed (CCT), with all comparisons yielding $p < 0.05$. These results imply that age may play a moderating role in how substance use affects attentional control and cognitive efficiency.

Conclusions:

To address the risks associated with psychoactive substance use, targeted strategies should be implemented on Moroccan university campuses. These should include awareness campaigns and psychosocial support services tailored to students' diverse backgrounds, with particular attention to vulnerable groups. Moreover, the results obtained in this study can be meaningfully interpreted through the lens of the **microgenetic theory of symptom formation**, which posits that cognitive and behavioral symptoms emerge through dynamic, moment-to-moment processes in the brain. This framework helps explain the observed correlations between substance use and attentional performance, suggesting that even subtle disruptions in neurocognitive processing—such as those linked to psychoactive substances—may reflect deeper, evolving patterns of dysfunction.

Key words: psychoactive substances, attention deficit, cognitive performance, psychosocial support

SUMMARY

INTRODUCTION

Psychoactive substances (PAS) are psychotropic compounds, more commonly referred to as drugs. The term PAS encompasses all substances that affect brain function – including alcohol and tobacco – regardless of their legal status, when used for non-therapeutic purposes.

The **World Health Organization (WHO)** defines a psychoactive substance as any compound that, “when ingested or administered, alters mental processes such as cognitive functions or affect.” There are several ways to classify PAS depending on their intended purpose. The issues surrounding PAS lie at the intersection of multiple disciplines: medical, pharmacological, social, and legal. These classifications are complementary and may be based on factors such as:

- Legal status
- Origin (synthetic, semi-synthetic, or natural)
- Use (recreational or medical)
- Chemical structure
- Mechanism of action
- Therapeutic indications
- Addictogenic potential (CCDUS, 2016; Pulver, Davison, and Pickett, 2014)

Numerous studies have been conducted among young adults worldwide, particularly in Morocco, regarding the use of psychoactive substances. However, few studies focus on their use to enhance physical or intellectual performance and concentration in academic environments. Young people in this age group are especially vulnerable to such behaviors. These practices pose a significant challenge for university authorities and health professionals, as students often trivialize them, believing they are widespread on campus.

A better understanding of the most commonly used substances, the socio-economic factors associated with their use, and the motivations behind such behaviors is essential for developing effective strategies in information, education, prevention, and intervention targeting university students. It is crucial to assess the prevalence of these substances – especially the most commonly used ones – in their local context and to understand the reasons behind their use (Thoër, C., 2014).

The use of psychoactive substances is well known – particularly for enhancing intellectual performance, concentration, or physical ability – these purposes are not entirely independent of one another. The consequences of using such substances are numerous, affecting mental and physical health as well as social well-being. The severity of these consequences depends on several factors, including the type of substance consumed, its quantity and quality, and the characteristics of the user (e.g., age, gender). The effects on the central nervous system can vary significantly and may, in some cases, be harmful.

Although the objective of this work focuses on the self-assessment of attentional capacity and the consumption of psychoactive substances, it is essential to consider the broader role of attention in cognitive functioning. In an environ-

ment where individuals are constantly overwhelmed by external stimuli, attention is defined as a mental mechanism that enables a person to prioritize and organize incoming information. It determines how stimuli from the outside world are perceived and processed.

Attention plays a crucial role in learning, as it partially determines whether information is processed deeply or superficially. This consideration led us to investigate the relationship between the consumption of psychoactive substances and attention, as well as their impact on cognitive function. Specifically, we ask to what extent the attention paid in class influences academic success.

MATERIALS AND METHODS

Study Population

This study is a cross-sectional, qualitative, and quantitative investigation. Participants were selected from various academic institutions, including:

- Faculty of Science
- Faculty of Legal, Economic and Social Sciences
- Faculty of Arts and Humanities
- ENSA
- ENCG Kenitra
- Faculty of Medicine, Pharmacy and Dentistry in Fez

Students from all semesters were eligible to participate. Inclusion criteria required participants to be Moroccan men or women aged 18 years and older. Exclusion criteria included individuals who declined to participate, those with hearing impairments, and those who were partially sighted.

Data Collection Tools

Data were collected using an information sheet and standardized scales designed to measure the consumption of tobacco (nicotine or cigarettes), cannabis, and alcohol.

The Fagerström test

The Fagerström Test is a widely used tool for assessing and quantifying the level of tobacco dependence in smokers. It consists of a series of questions about smoking habits and is often used to guide smoking cessation strategies.

Originally introduced in 1978 by Karl Olov Fagerström as the *Tolerance Questionnaire*, the test comprised eight questions (Fagerström, 1978). In 1991, it was modified – two questions were removed and two others revised – and renamed the *Nicotine Dependence Test* by Heatherston and colleagues (Heatherston et al., 1991). In 2012, Fagerström renamed it the *Cigarette Dependence Test*, although the questionnaire itself remained unchanged (Fagerström, 2012).

Two questions are considered particularly significant and are sometimes used in a simplified version of the test:

- The number of cigarettes smoked per day
 - The time elapsed between waking up and smoking the first cigarette
- The simplified test yields a score ranging from 0 to 6. Based on the score, tobacco dependence is categorized as:
- **0** – No dependence
 - **1-3** – Moderate dependence
 - **4-6** – Strong dependence

The CAST questionnaire test

The CAST (Cannabis Abuse Screening Test) is a 6-item scale describing consumption behaviour. It was first carried out in 2002 as part of the ESCAPAD survey (*Enquête Française de Santé et d'Usage à l'Appel et à la Préparation de la Journée de la Défense*). The CAST questionnaire consists of 6 items covering the past 12 months (linked to the past year): 1. Have you smoked cannabis before midday? 2. Have you smoked cannabis when you were alone? 3. Have you had memory problems when smoking cannabis? 4. Have friends or family members told you that you should cut down or stop using cannabis? 5. Have you tried to cut down or stop using cannabis without success? 6. Have you had any problems because of your cannabis use (arguments, fights, accidents, poor school results, etc.)?

All items are answered on a 5-point scale (0 'never', 1 'rarely', 2 'sometimes', 3 'quite often' and 4 'very often'). In the original version (Legleye et al., 2007), the thresholds for positive responses vary according to the questions. The threshold was set at 'from time to time' for the first two questions because they do not filter problems but frequencies of use in different contexts, and at 'rarely' for the second and third questions.

The Audit Questionnaire Test

The **Cannabis Abuse Screening Test (CAST)** is a six-item scale designed to assess patterns of cannabis consumption. It was first implemented in 2002 as part of the **ESCAPAD survey** (*Enquête Française de Santé et d'Usage à l'Appel et à la Préparation de la Journée de la Défense*), which focused on health and substance use among young people in France.

The CAST questionnaire evaluates cannabis use over the past 12 months through the following six items:

- Have you smoked cannabis before midday?
- Have you smoked cannabis when you were alone?
- Have you experienced memory problems while using cannabis?
- Have friends or family members suggested that you should cut down or stop using cannabis?
- Have you tried to cut down or stop using cannabis without success?
- Have you experienced any problems due to cannabis use (e.g., arguments, fights, accidents, poor academic performance)?

Each item is rated on a five-point scale:

- 0 – Never
- 1 – Rarely
- 2 – Sometimes
- 3 – Quite often
- 4 – Very often

In the original version (Legleye et al., 2007), thresholds for positive responses vary depending on the item. For the first two questions, the threshold was set at “from time to time,” as these items reflect frequency of use rather than direct consequences. For the remaining questions, the threshold was set at “rarely,” since they are more indicative of problematic behavior.

D2-R ATTENTION TEST

The d2-R Attention Test is designed to assess an individual’s ability to discriminate fine details under time pressure, requiring a high level of concentration. It specifically measures focused visual attention and processing speed. Originally developed to evaluate driving aptitude, the d2-R has since become a benchmark tool for assessing concentration across various domains. Importantly, the test does not depend on intelligence, but rather on the individual’s ability to accurately and rapidly discern visual details. As a diagnostic tool, the d2-R allows for comparison of results with normative data based on age, enabling a clear answer to the question: “*Does this person have an attention deficit?*”

The test involves a detail discrimination task. Participants are presented with a list of letters – **d** and **p** – each accompanied by one to four small strokes. The target characters are only the letter “d” with exactly two strokes. All other combinations serve as distractors. The participant must quickly and accurately cross out the correct targets. Since its revision, the test has become easier to administer and score. It is considered predictive of success in professions that demand sustained visual attention and concentration (Brickenkamp et al., 2015).

Statistical analysis

In this study, student characteristics were analyzed using descriptive and inferential statistics. Qualitative variables were expressed as percentages. Quantitative variables were presented as means \pm standard deviations. To compare variables: the Chi-square test was used for categorical data; the Student’s t-test was applied to continuous variables. A p-value < 0.05 was considered statistically significant. Data analysis—including the creation of tables and graphs—was performed using: Microsoft Word 2013; Microsoft Excel 2013; Statistical Package for the Social Sciences (SPSS), Windows version 21 (SPSS Inc., Armonk, New York, USA).

Socio-demographic data are presenting in Table 1.

Table 1. Socio-demographic data

Variables	Frequency	
	n = 239	n = %
Sex		
Men	65,3% (n=156)	
Women	34,7% (n=83)	
Sex-ratio	1,87	
Age (yr)		
Mean	22,61±3,07	
Median		
Extremes	18 et 35	
Laterality		
right handed	227	94,9 %
Left	12	5,02 %
institution		
(ENCG) National School of Commerce and Management Kenitra	29	12,13 %
(ENSA) National School of Applied Sciences Kenitra	25	10,46 %
faculty of sciences of kenitra	78	32,63 %
Faculty of Economics and Management/Faculty of Legal and Political Sciences-Kénitra	57	23,85 %
Faculty of Letters and Human Sciences of Kennitra	30	12,55 %
Faculty of Medicine and Pharmacy Fez	20	8,37 %

RESULTS

The sample included 239 Moroccan students who were consumers of psychoactive substances. Men represented 65.3% (n=156) of the sample, while women represented 34.7% (n=83). The mean age of the participants was 22.61 ± 3.07 years. Almost all participants consumed tobacco, with a mean score of 4.40 ± 1.68 on the Fagerström scale. The age of onset of consumption was more represented among students in the 15-18 age group, i.e. 52.30% with a mean of 18.42 ± 1.68. The analysis of the results shows that the majority of tobacco (nicotine) consumption, i.e. 62.34%, is due to the influence of parents who consume tobacco (family history), 47.69% due to the environment or frequented by friends and 35.56% due to personal problems that affect the person. Furthermore, the results are classified by score from 2 to 5 then 6 to 10.

Results of Fagerström test are presented in Table 2.

Table 3 illustrates the results of the CAST questionnaire test, with 59.42% (n=142) also reporting consuming cannabis, with a mean score of 7.30 ± 4.78 on the CAST scale. On the CAST scale, the analysis of the results shows that the majority of men consume cannabis with a score higher than 7, i.e. 42.25%. Furthermore, at the level of factor and family history, the frequented environment and personal problems are in the majority with a score of 3 to 6.

The statistical analysis of our results and the chi-square test, among students who consume substances, a positive correlation $p < 0.001$; $r = +0.27$ is highlighted between the scores of the Fagerström scale and the CAST scale.

Table 4 shows the analysis of the results of alcohol consumption, that is, 34.72% (n=83) of students who consume alcohol, with an average score of 7.46

Table 2. The results of Fagerström test

Fagerström test		Frequency (n)	Score (2 à 5)	Score (6 à 10)	Mean
Total		239			
Sex	Men	65,27% (156)	0	0	
	Women	34,72 % (83)	0	0	
Factors and family history influencing tobacco consumption	Yes	62,34 % (149)	27,19 % (65)	35,14% (84)	4,64 ±1,63
	No	37,65% (90)	24,68% (59)	12,97% (31)	4,08 ±1,62
Factors and environment influencing tobacco consumption	Yourfriends and environment	47,69% (114)	27,61% (66)	20,08% (48)	4,16 ±1,6
	Problems at school (academic failure)	12,55% (30)	5,02% (12)	7,53% (18)	4,1 ±1,59
	Personal problems or curiosity	35,56% (85)	16,31 % (39)	19,24 % 46	4,45±1,61

Table 3. CAST questionnaire test

CAST questionnaire test		Frequency (n)	Score 3 à 6	Score >7	Mean
frequency (n)		239			
Total cannabis consumer		142			7,32 ±4,76
Sex	Men	74,64% (106)	32,39% (46)	42,25% (60)	7,858 ±4,97
	Women	25,35% (36)	16,19% (23)	9,15% (13)	6,01 ±3,79
Factors and family history influencing cannabis use	Yes	66,90% (95)	27,46% (39)	39,43% (56)	8,01 ±4,50
	No	33,09% (47)	21,12% (30)	11,97% (17)	6,127 ±5,13
Factors and environment influencing cannabis consumption	Yourfriends and environment	52,11% (74)	20,42% (29)	31,69% (45)	7,73 ±4,69
	Problems at school (academicfailure)	19,01% (27)	13,38% (19)	5,63% (8)	7,71 ±3,02
	Personalproblemsor curiosity	42,25% (60)	29,57% (42)	12,67% (18)	7,75±5,25

± 5.70 on the AUDIT scale. Out of 239, it appears that 83 consume alcohol, low rate, with a predominance (majority) of the male sex that is 72.28%, moreover most have been influenced by the environment or environment frequented and during parties or ceremony, dance party. Excessive alcohol consumption can lead users to spend nights away from home, become victims or perpetrators of assault, be involved in road accidents, and suffer negative impacts on their student life and cognitive function.

Table 4. The AUDIT questionnaire test

AUDIT questionnaire test		Frequency (n)	Mean
Average/Mean	239	83	7,47 ±4,67
Sex	Men	72,28% (60)	
	Women	27,71% (23)	
Factors and family history on alcohol consumption		16,86% (14)	7,88 ±4,6
Factors and environment influencing alcohol consumption	Yourfriends and environment	68,67% (57)	7,464 ±4,5
	During parties, night clubs, ceremonial occasions	50,60% (42)	8,214±5,4

Table 5. Distribution of average scores for the d2-R Attetionn Test

	n	Mean	Standard deviation	Median
Exactness	100	15,13%	14,449%	9,46%
Ability to concentrate	100	174,99	57,313	169,00
Rythme de traitement	100	233,01	68,598	221,50
Processing rate				

Table 6. Distribution of average scores on the D2-R attention test by gender.

		Exactness	Ability to concentrate	Processing rate
Man	Mean	15,71%	160,57	211,43
	Standard deviation	16,638%	61,612	61,702
Women	Mean	14,79%	183,46	245,68
	Standard deviation	13,126%	53,328	69,730
Total	Mean	15,13%	174,99	233,01
	Standard deviation	14,449%	57,313	68,598

Distribution of average scores for the d2-R Attetionn Test is presented in Table 5.

The Table 6 shows the total average scores of the different d2R test parameters of the subjects consuming psychoactive substances, out of 239 participants in the study only 100 who responded to the d2R test, i.e. a total average of: 174.99 ± 57.313 for the concentration capacity (CC); 15.13% ± 14.449% for the accuracy E% and 233.01 ± 68.598 for the processing rate (processing speed) (CCT).

GENDER-BASED ANALYSIS

The table presents an analysis of the mean scores for various **d2-R test parameters** by gender:

- Accuracy (E%): Both boys and girls scored higher than the overall mean, with girls showing a slightly greater increase.
- Concentration Ability (CA): Boys scored above the overall mean, whereas girls scored below it.
- Processing Rate (PCR): Boys scored lower than the overall mean, while girls scored higher.

Table 7. Distribution of average scores on the D2-R attention test according to age

		Exactness	Ability to concentrate	Processing rate
[20-25]	Mean	16,92%	169,27	231,55
	Standard deviation	15,641%	60,549	66,107
[26-30]	Mean	11,65%	186,09	235,85
	Standard deviation	11,205%	49,405	74,139
Total	Mean	15,13%	174,99	233,01
	Standard deviation	14,449%	57,313	68,598

According to the Student’s t-test, all results showed a statistically significant difference between boys and girls in terms of concentration ability (CA), processing rate (PCR), and accuracy (E%). Despite these differences, the motivations for using psychoactive substances were generally consistent across genders, though they varied in intensity. The most commonly reported reasons included:

- Improving concentration or overcoming distraction
- Reducing stress
- Achieving better academic performance, particularly during exams

Distribution of average scores on the D2-R attention test according to age is presented in Table 7.

AGE-BASED ANALYSIS

An analysis of the average scores for the various d2-R test parameters across age categories reveals the following:

- Accuracy (E%): The average score for the age group 20–25 is higher than that of the 26–30 age group.
- Concentration Ability (CA): The average score for the 20–25 age group is lower than that of the 26–30 age group.
- Processing Rate (CR): Similarly, the 20–25 age group scored lower than the 26–30 age group.

According to the Pearson correlation analysis, there were statistically significant differences between age categories in:

- Concentration scores (CC) – $p < 0.05$
- Accuracy (E%) – $p < 0.05$
- Processing rate (CCT) – $p < 0.05$

Overall, the data presented in Table 8 indicate a statistically significant difference between age groups and individuals without such disorders in terms of the prevalence of psychoactive substance use.

DISCUSSION

This study aims to assess the frequency of psychoactive substance use among university students. In addition to tobacco, cannabis, and alcohol, other psychoactive substances – whether over-the-counter or illicit – are often used to enhance concentration, as well as intellectual and physical performance. Se-

veral validated instruments for assessing problematic psychoactive substance use are available globally. In this study, we selected a range of assessment tools, along with a socio-demographic information sheet, to evaluate substance use patterns.

The findings reveal that the majority of participants are users of psychoactive substances, with tobacco (nicotine) being the most commonly used, followed by cannabis **and** alcohol.

Gender distribution: Men represented 65.3% of the sample (n = 156), while women accounted for 34.7% (n = 83).

Tobacco use: Nearly all participants reported tobacco use, with an average Fagerström score of 4.40 ± 1.68 , indicating moderate to strong nicotine dependence.

Reported reasons for tobacco use included:

- Family history (62.34%)
- Environmental influence (47.69%)
- Personal problems (35.56%)

These results suggest a significant level of nicotine dependence among student users.

COMPARATIVE INSIGHTS

Our findings align with previous studies showing a male predominance in smoking behavior:

- Diarra B.S. at the University of Bamako (FLASH): 77.3% male vs. 22.7% female
- Ouane I. at Cheikh Anta Diop University in Dakar: 94% male vs. 5.4% female
- Issiaka Traore at the Faculty of Medicine and Dentistry in Mali: 67.5% male vs. 32.5% female

In contrast, Simmart L. reported a female predominance (79% female vs. 21% male) at a Parisian university. These differences may be attributed to sociocultural factors specific to Morocco and other African countries.

Analysis shows that 59.42% (n=142) of participants reported using cannabis, with an average CAST score of 7.30 ± 4.78 . The majority of male users scored above 7 (42.25%). Environmental and familial factors, as well as personal problems, were the main contributing factors, reflected in CAST scores ranging from 3 to 6.

These findings align with those of F. Manoudi et al. (2010), who reported regular hashish use in 51.2% of cases and occasional use in 48.8%. Oulaada N. (2006) reported 34% regular and 66% occasional consumption. Zarrouqa B. et al. (2017) found that psychoactive substance use among Moroccan students was associated with male gender and age over 20, with 55.8% of users being male. The lifetime smoking prevalence was 29.5%. For psychoactive substances, alcohol had the highest lifetime prevalence (17.4%), followed by cannabis (16.1%) and non-prescription psychotropic drugs (5.1%).

The Chi-square test revealed a statistically significant relationship between Fagerström and CAST scores, indicating a positive correlation between nicotine dependence and cannabis use. Regarding alcohol consumption, 34.72% of students ($n = 83$) reported using alcohol, with an average AUDIT score of 7.46 ± 5.70 . Alcohol use among students was relatively low, primarily occasional, and typically occurred during social events such as parties or when away from parental supervision. The majority of users were male (72.28%), and their consumption was largely influenced by social environments. These findings are consistent with F. Manoudi et al. (2010), who reported that 89% of alcohol consumption cases were occasional. Across all substances, students' use of psychoactive substances was strongly influenced by peer groups.

ATTENTION AND COGNITIVE PERFORMANCE

Analysis using the d2-R test revealed a clear correlation between attention span and psychoactive substance use. In some users, both attention span and processing speed deteriorated during the test. A negative outcome – fewer correct responses at the end compared to the beginning – suggests a decline in sustained attention **and** cognitive performance over time.

Gender-based analysis showed statistically significant differences in:

- Concentration capacity (CC)
- Processing rate (CCT)
- Accuracy (E%)

According to the Student's t-test, females outperformed males across all three parameters. Additionally, Pearson correlation analysis revealed significant differences across age groups ($p < 0.05$), with excessive psychoactive substance use linked to reduced concentration and impaired cognitive function.

AGE-BASED PERFORMANCE TRENDS

Age group comparisons revealed:

- Students aged 20–25 scored higher in accuracy (E%) than those aged 26–30.
- However, the 20–25 group scored lower in concentration capacity (CC) and processing rate (CCT) compared to the older group.

These findings suggest that younger students may be more precise, while older students exhibit stronger sustained attention and processing efficiency, possibly due to greater maturity or academic experience.

COGNITIVE LOAD AND MOTIVATION

Previous research (Boujon & Quaireau, 1997; Mialet, 1999; Mackworth, 1958; Richard, 1980) highlights that sustained attention fluctuates depending on task duration, complexity, distractions, and novelty. The d2-R test, which demands rapid and accurate visual discrimination under pressure, may enhance motivation due to its unfamiliar and cognitively demanding nature. Dweck et al. (2004) de-

monstrated that motivation significantly influences attentional performance. Novel tasks can improve sustained attention, especially among students who typically struggle with disengaging or repetitive schoolwork (Houart & Romainville, 2003; Hirsbrunner, 2003).

ACADEMIC SUCCESS AND INFLUENCING FACTORS

While attention is a key component of academic success, Potvin (2012) emphasized that multiple factors contribute to student achievement, including:

- Academic engagement
- Homework diligence
- Extracurricular involvement
- Emotional attachment to school
- Peer group belonging
- Independent learning skills
- Relationships with teachers and peers

These elements interact with cognitive performance and motivation, shaping students' academic trajectories.

ALCOHOL CONSUMPTION TRENDS

The MedSPAD survey of adolescents aged 15–17 found that 12.8% had consumed alcohol at least once. According to Manoudi F. (2010) and Refaat A. (2004), alcohol consumption among students varies significantly by country:

- Morocco: 17.5%
- Egypt: 4.1%

In contrast, Akmatov M.K. et al. (2011) reported much higher prevalence rates – 49% to 90% – in countries such as the USA, Sweden, China, and Germany, likely due to greater social acceptance of alcohol.

RISKY BEHAVIORS IN THE UNIVERSITY ENVIRONMENT

The university setting has long been recognized as a context where risky behaviors are prevalent. Students frequently engage in the use of tobacco, cannabis, **and** alcohol, among other substances. Excessive consumption can lead to serious consequences, including:

- Drunk driving
- Academic disengagement
- Aggressive behavior
- Mental health issues that impair both cognitive and physical functioning

These findings underscore the importance of targeted prevention strategies and support systems within academic institutions.

LINKING THE DISCUSSION TO THE MICROGENETIC THEORY OF SYMPTOM FORMATION

It is indeed possible to link the findings of this study to the microgenetic theory of symptom formation, particularly in the context of how psychoactive substances affect attention, concentration, and cognitive functioning (Paçhalska 2019; Ko-uadio 2025). According to the microgenetic theory (Paçhalska, MacQueen, Brown, 2012), the mental state is not a singular event but a dynamic process that unfolds over time through successive phases of brain activity. Each cognitive, emotional, or motor act originates in the deep, phylogenetically older structures of the brain (e.g., brainstem, limbic system) and then progresses through increasingly newer layers (e.g., neocortex) until it becomes conscious or is expressed in behavior. Fig. 1 illustrates two key phases:

- T1 – Developing mental state: the moment when a thought, emotion, or action begins to form. This marks the emergence of the minimal working self – a transient sense of self that arises in response to a stimulus.
- T2 – Renewing mental state: the moment when this state is updated or reorganized, for example, through new information, reflection, or emotional change.

Symptom as a Disruption in the Microgenetic Cycle

In this framework, a psychological symptom (e.g., attention deficit, anxiety, impulsivity) can be understood as a disruption in the microgenetic cycle of mental state formation. If dysfunction occurs at any point – such as between T1 and T2 – due to psychoactive substances, stress, or trauma, the “minimal self” may become distorted, and the cognitive process may not be fully realized.

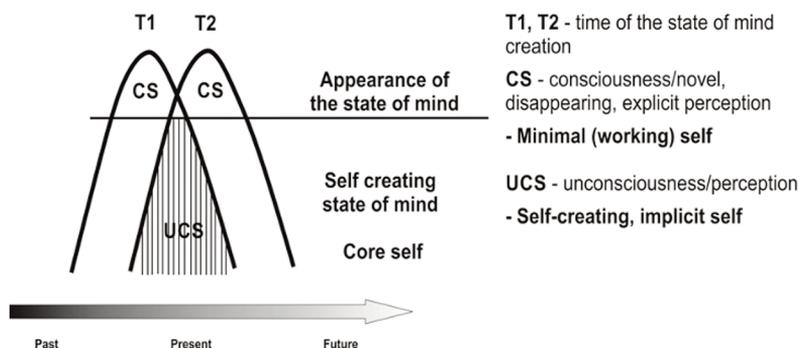


Fig. 1. Developing (T1) and renewing (T2) mental state in time: the birth of the minimal (working) self
Source: Paçhalska, MacQueen and Brown (2012), modified

Application to Our Study

In our study, students showed a decline in attention and information processing (e.g., in the d2-R test) under the influence of psychoactive substances. This may indicate that their mental state formation at T1 does not smoothly transition to T2, resulting in a symptom – such as reduced cognitive performance. The minimal working self fails to fully form, which may lead to difficulties in decision-making, learning, or emotional regulation.

It should be pointed out, that, the microgenetic theory posits that psychological symptoms (e.g., attention disorders, impulsivity, anxiety) do not emerge suddenly but rather develop gradually over time through dynamic interactions between neuropsychological processes, environmental factors, and individual experiences (Łubianka et al. 2024). A symptom is viewed as a process, not a static condition (see also Pachalska 2025).

In the context of this research: psychoactive substance use can be understood as a modulating factor in the microgenetic development of symptoms. For example: long-term nicotine use may lead to subtle changes in attention mechanisms that, over time, evolve into persistent deficits. Alcohol and cannabis may impair executive functions, which – according to microgenetic theory – could gradually result in the formation of symptoms such as concentration difficulties, impulsivity, or memory disturbances. The d2-R test, which measures selective attention and information processing, can reveal microgenetic moments in symptom formation – points at which compensatory mechanisms fail and cognitive deficits become observable. Gender and age differences in test performance may reflect distinct microgenetic trajectories. For instance, female students may show greater cognitive resilience to substance effects, delaying or altering the symptom formation process.

PRACTICAL IMPLICATIONS

The results of this study may be interpreted as **microgenetic risk profiles** – students with lower concentration and higher substance use may be in the early stages of symptom development, even before full-blown disorders manifest. Integrating this theory into the discussion allows for a more dynamic and process-oriented understanding of the problem, rather than viewing symptoms as binary (present/absent).

CONCLUSION

This study analyzed and assessed the alarming prevalence of psychoactive substance (PAS) use—specifically tobacco (nicotine), cannabis, and alcohol—among university students, confirming their widespread use within this population. The results reveal significant consumption patterns, with notable variations based on gender, social context, and academic stressors.

The analysis of cognitive impacts demonstrated that these substances significantly impair attention and concentration, both of which are critical for acade-

mic success. Alcohol and cannabis appear to disrupt executive functions, while nicotine, although sometimes used as a stimulant, contributes to harmful long-term addiction.

These findings underscore the urgent need to:

- Strengthen prevention campaigns targeting students
- Integrate addiction and psychosocial support services within university settings
- Implement harm reduction strategies tailored to the student population

In conclusion, this study highlights a major public health concern and opens avenues for more effective interventions to support students' well-being and academic performance. Furthermore, a longitudinal study would be valuable in evaluating the long-term effectiveness of awareness programs in reducing psychoactive substance use among students.

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