THE IMPACT OF PERSONALITY TRAITS AND STUDY MODE ON MENTAL HEALTH AND STIMULANT USE AMONG UNIVERSITY STUDENTS DURING COVID-19 PANDEMIC

Katarzyna Markiewicz(A,B,C,D,E,F) (iD)
Bożydar L.J. Kaczmarek(A,D,E,F) (iD)
Zbigniew B. Gaś(E,F,G) (iD)
Institute of Psychology and Human Science, WSEI University, Lublin, Poland

SUMMARY

Background: The COVID-19 pandemic has significantly increased feelings of insecurity and anxiety for the health of oneself and those of one's loved ones, as well as for the future, which has led to an increased level of stress. This has resulted in a tendency to use alcohol and drugs. Studies show that such behaviors are triggered both by external and internal factors. Therefore, the study has looked for interrelations between personality traits, mental state, and learning mode (online versus hybrid) and the frequency of stimulants and tranquilizers consumption in the last 6-12 months of the COVID-19 pandemic.

Material/ Methods: The study involved 113 university students aged 19-34. Due to pandemic-related limitations, 51.3% of students took online courses, while 48.7% were involved in hybrid learning. The participants were all asked to complete an online questionnaire that included 17 questions regarding mental health, drug and alcohol use. Additionally, the TIPI questionnaire was used to assess personality traits.

Results: The study found that online learning as well as feelings of loneliness and emptiness resulted in increased use of alcohol, antidepressants and sleeping pills. On the other hand, personality traits such as extraversion, agreeableness and emotional stability helped to limit the use of this type of stimulants.

Conclusions: Online learners more often reported deterioration in their mental state, related to difficulties in adapting to pandemic-related conditions. This group was also more likely to use sedatives, sleeping pills, and antidepressants, with a significant difference in means, compared to hybrid students. In contrast, hybrid learners frequently reported a sense of the loss of meaning as well as worrying about the fate of loved ones, thinking back to a situation no longer under their control, and difficulties in making decisions. At the same time, most respondents of this group reported a positive vision of their future and a high sense of responsibility.

Key words: the COVID-19 pandemic, stimulants, personality traits, emotions, university students, hybrid learning

INTRODUCTION

Humans' reactions to the environment depend to a considerable degree upon their type of personality. Many factors contribute to it, including the way of understanding other people, the world, emotional reactions, the manner of communicating with others, needs, desires, aspirations, fears, limitations. Nowadays most frequently used test of personality is The NEO-PI-R Inventory (Costa & McCrae, 1992). This inventory is based on the personality model called the "Big Five" since it comprises five factors: neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. These traits represent cross-cultural and age-independent most general dimensions that give a complete and comprehensive characterization of personality. Yet the original Big Five test proved to be too long to administer, especially if several variables are taken into consideration. Hence, its shorter version called the Ten-Item Personality Inventory (TIPI) that enables the measurement of our ability to cope with a wide variety of life situations was created. Research shows that this two-minute test is a relatively valid and reliable tool for measuring personality (Nunes, Limpo, Lima & Castro, 2018).

Evaluation of personality traits is of particular importance due to threats that appeared with the outbreak of the COVID-19 pandemic. It had a negative impact on the daily lives of people all over the planet. Fear for their lives and the lives of their loved ones and drastic measures to prevent the spread of infection also affected the mental health of thousands of people. Even individuals not directly affected by the coronavirus-related manifest fear, anxiety, and somatomorphic disorders.

Findings from China revealed that more than one-quarter of the general population has experienced moderate to severe stress – or anxiety – related symptoms in response to COVID-19. It was also noted that pandemic–related psychological disorders such as elevated levels of post-traumatic stress, general stress, anxiety, health anxiety, and suicidality may last well beyond the course of the pandemic (Nikčević, Marino, Kolubinski, Leach & Spada, 2021). Consequently, the life quality of both those infected with COVID-19 as well as of their partners and other family members was lowered since it forced significant alternations in every day routines (Shah et al., 2021). Most studies, however, concentrated on survivors (Hansel et al., 2022; Poudel et al., 2021; Smith et al., 2023), hence, we decided to assess how the pandemic has affected the lives of healthy population.

It might be also worth mentioning that long before the COVID-19 pandemic correlations between personality traits and the levels of the experienced anxiety and depression symptoms were observed. Most common are such traits as pessimism, lack of self-confidence, excessive criticism of oneself and others, perfectionism, excessive dependence on the approval and acceptance of others, and an inability to express anger (Klein, Kotov & Bufferd, 2011). Bunevicius et al. conducted a study on a randomly selected populations of 338 medical and 73 humanities to evaluate symptoms of anxiety and depression with the use of the Hospital Anxiety and Depression Scale (HADS), Big-Five personality dimensions using the Ten-Item Personality Inventory (TIPI), and vulnerability to stress

using the Stress Vulnerability Scale (SVS) (Bunevicius, Katkute, & Bunevicius, 2008). The results clearly indicated that high levels of emotional stability reduced anxiety, depressive and other negative symptoms in both study groups. Another study found that neuroticism predicted a higher risk of depressive mood, while emotional stability was inversely correlated with depression (Gosling, Rentfrow, & Swann, 2003).

Studies conducted in different countries indicated that with the outbreak of the COVID-19 pandemic, feelings of insecurity, threats to one's own and loved ones' health and lives increased, leading to increased psychological distress (Fang, et al. , 2022; Mosazadeh, 2023). The consequence of the perceived stress was the use of more or less effective, adaptive or maladaptive forms of coping. Maladaptive strategies do not eliminate the causes and do not lead to 'healthy' functioning and psychological well-being. They do, however, provide a short-term sense of relaxation and temporarily reduce anxiety. Yet the feeling of fear, anxiety and discomfort remain resulting in significant lowering of the comfort of life (Broche-Pérez, 2020; Markiewicz, 2021).

Another ways of coping with the excessive unbearable stress combined with the unforeseeable events is denial. The disbelief in the pandemic is prompted by the fact the virus is an invisible enemy and it is further strengthened by fake news that appear on the Internet. Even if nonbelievers realize the threat of getting ill, they often state that it will not affect them personally. At the same time, a study found that those who denied the pandemic threat often expressed their concern about a possibility of the development of serious medical and psychological sequelae of the disease (Kaczmarek & Gaś, 2021). These concerns are not without reason since COVID infection often results in severe health problems and may even lead to the development of Posttraumatic Stress Disorder (Pąchalska, 2022).

The lack of predictability in the organization of classes and the isolation caused by successive waves of the pandemic sometimes led to feelings of anxiety or to boredom. All students used to be sent to quarantine even in person in a class appeared to be infected. Distance learning was enforced by the government or university authorities. Consequently, different universities or departments offered full-time classes, online classes, mixed classes (e.g., large groups of online lectures and smaller full-time classes) or hybrid classes (some students attend full-time classes and others, e.g., due to quarantine, attend online classes at the same time) (Drelich-Zbroja et al., 2021).

These formal restrictions on interpersonal contact contributed to a higher prevalence of alcohol use, turning to psychoactive drugs and psychotropic substances than before the pandemic, especially among university students (Lesser, 2021). Hence, we decided to find out whether and how such behaviors among adolescent college students might be related to learning styles and whether and how they are related to personality characteristics.

Therefore, we posed three research questions:

• What is the relationship between mental state and feelings associated with the pandemic and the frequency of stimulant and antidepressant use?

- Has the mode of study predicted students' propensity to use stimulants and antidepressants in the last 6-12 months of the COVID 19 pandemic?
- Have personality traits predicted students' propensity to use stimulants and antidepressants in the last 6-12 months of the COVID 19 pandemic?

MATERIAL AND METHODS

Participants

Questionnaire responses from 113 participants (62.8% females; 37.2% males) aged 19-34 years (M=22.62; MD=22.00; SD=2.34) were analyzed. Due to pandemic-related limitations, 51.3% of students took online courses, while 48.7% were involved in hybrid learning (χ^2=0.080, p=0.778). Total of 32 students reported COVID infection, of which 34.5% belonged to the online group, and 21.8% were hybrid learners. However, 27.6% of the online group and 25.5% of the hybrid group were unsure if they had contracted COVID.

Procedure

The study was conducted online in June 2021 and was approved by the University Research Ethics Committee of the WSEI University in Lublin. A self-designed questionnaire consisting of 17 questions was placed on the Google platform. In addition, the TIPI questionnaire was used to assess personality characteristics. E-mails were sent to students participating in study clubs, asking them to participate in the study and to encourage other students to participate.

All subjects gave free and informed consent to participate in the study and were informed that they could withdraw from participation at any time during the study without incurring any liability.

Measures

The Self-designed questionnaire

The Self-designed online questionnaire included 17 questions. Five of them asked about sociodemographic variables such as age, gender, place of residence, type, and mode of study, which enabled the evaluation of covariances. Nine questions concerned mental state, thinking about the future, fear for loved ones, decision-making problems, thinking back to a situation no longer under your control, and a sense of responsibility. The following three questions asked about the frequency of use of drugs or legal highs, alcohol and sleeping pills, tranquilizers, or antidepressants in the past 6-12 months of the COVID 19 pandemic (results are summarized in Table 1). The resulting Cronbach's α reliability coefficient for three questions on drug, alcohol, and medication use was satisfactory at 0.629. Students gave answers using a 4-point Likert scale (where 1 meant not at all or definitely rarely and 4 meant definitely often).

Personality test

The Ten-Item Personality Inventory is currently one of the most popular short-form measures of the Big Five dimensions (or five-factor model) (Nunes et al., 2018). This model suggests that most individual personality differences can be described based on five broad core domains: extraversion, agreeableness, conscientiousness, emotional stability, openness to experience. The authors of the TIPI point out that one of the most severe problems for contemporary researchers is the need to use brief measurement instruments, of which the TIPI is one. The authors significantly reduced the number of questions that allowed assessing the constellation of traits defined in the original five-factor model. There are two statements for each factor that respondent's rate on a 7-point scale from 1 (strongly disagree) to 7 (strongly agree). The TIPI takes approximately 1-3 minutes to complete. Cronbach's α reliability coefficients are 0.68 for the Extraversion scale; 0.40 for Agreeableness; 0.50 for Conscientiousness; 0.73 for Emotional Stability; and 0.45 for Openness to Experience. A low alpha coefficient value does not indicate the weakness of the instrument. According to Gosling et al. (2003) given that the individual factors were constructed based on only two questions, the resulting reliability results speak in favor of their content validity and are an example of *how validity can trump reliability (indexed by alpha)* (p. 516). For the adapted Polish version of the questionnaire, the reliability indices for individual factors were 0.68 - Extraversion, 0.58 - Agreeableness; 0.75 - Conscientiousness; 0.72 – Emotional stability; 0.44 – Openness to experience, respectively (Sorokowska, et al., 2014).

RESULTS

Detailed sociodemographic data, including the impact of the COVID pandemic on participant wellbeing and way of coping with the difficulties that arose are in Table 1.Table 1 shows pandemic had a negative effect on the examined students wellbeing. Although the impact of the pandemic situation on participants mental state was higher among online learners since they reported a deterioration in 56.9%, while among hybrid learners, it reached 40%, the difference between the groups means was not statistically significant (0.223, p=0.123). At the same time, 58.6% online learners and 54.6% hybrid students experienced difficulties in adapting to the new situation. Again, the difference between mean scores was not statistically significant (-0.052, p=0.724). Loneliness was a serious problem since 56.9% online learners and 50.9% hybrid learners reported these feelings. The difference in mean scores between groups was also found to be insignificant (0.095, p=0.506). Also, 37.9% online students and 43.6% hybrid learners reported loss of meaning. Yet, the difference in mean scores was not significant (-0.071, p=0.637).

In the case of more positive outlooks differences between the examined groups were more pronounced. Only in the case of a positive vision of their future the difference in groups means was not significant (-0.153, p=0.182) since it was reported by 75.9% online learners and 78.2% hybrid learners. Concern

for their loved ones was expressed by 43,1% of online learners and 52.7% of hybrid learners. In this case, the difference in mean scores was statistically significant (-0.359, *p*=0.021). Problems with decision-making were reported by 39.6% online students and 49.1% hybrid learners. The difference in mean scores was statistically significant (-0.431, *p*=0.014). Thinking back to a situation no longer under your control was reported by 43.1% of online learners and 54.5% of hybrid learners. The difference in means was significant (-0.381, *p*=0.024). Sense of responsibility was reported 79.3% online learners and 96,4% hybrid learners, and the difference in means was significant (-0.324, *p*=0.05).

In addition, the survey explored how the pandemic situation affects students propensity to use maladaptive ways of coping with difficult situations. We had taken into consideration these answers that indicated frequent occurrences of a particular behavior. It revealed that about 40% of both online and hybrid learn-

Table 1. Sociodemographic characteristics of respondents

Demographic variables			Online mode		Hybrid mode	
			N	*%*	*N*	*%*
Gender		females	28	48.3	43	78.2
		Males	30	51.7	12	21.8
Field of study		Medical	2	3.4	51	92.7
		science	37	63.8	2	3.6
		social network	19	32.8	2	3.6
Place of residence		village	12	20.7	10	18.2
		small town	0	0.0	6	10.9
		middle town	7	12.1	7	12.7
		big city	39	67.2	32	58.2
Covid infection		yes	20	34.5	12	21.8
		no	22	37.9	29	52.7
		I don't know	16	27.6	14	25.5
Deterioration of mental state after the outbreak of the pandemic		yes	33	56.9	22	40.0
		no	25	43.1	33	60.0
Difficulties adapting to life in pandemic settings		yes	34	58.6	30	54.6
		no	24	41.4	25	45.4
A feeling of loss of meaning		yes	22	37.9	24	43.6
		no	36	62.1	31	56.4
Feeling of loneliness		yes	33	56.9	28	50.9
		no	25	43.1	27	49.1
A positive vision for the future		yes	44	75.9	43	78.2
		no	14	24.1	12	21.8
Concern for loved ones		often	26	43.1	29	52.7
		rarely	33	56.9	26	47.3
Problems in decision making		often	23	39.6	27	49.1
		rarely	35	60.1	28	50.9
Thinking back to a situation no longer under your control		often	25	43.1	30	54.5
		rarely	33	56.9	25	45.5
Sense of responsibility		yes	46	79.3	53	96.4
		no	12	20.7	2	3.6
Use of	Alcohol	Often	24	41.4	22	40.0
		Rarely	34	58.6	33	60.0
	drugs, legal drugs	Often	5	8.6	3	5.5
		Rarely	53	91.4	52	94.6
	sedatives, sleeping pills, antidepressants	Often	8	14.5	1	1.8
		Rarely	50	86.2	54	98.2

ers sought a solution to the problems that arose in alcohol consumption, drugs, or legal highs were used by 8.6% of online students and 5.5% of hybrid learners. Only in the case of the use of sleeping pills, sedatives, and antidepressants, there was a statistically significant difference in means between the examined groups (0.336, p = 0.05) since the online group reached for these drugs in 14,5%, while the hybrid group reported only 1,8 %. It suggests that the groups under study did not differ much in their ways of coping with the difficulties arising from the pandemic.

To get a clearer picture of the examined interdependencies we performed statistical analysis using IBM SPSS Statistics 22.0 for Windows. Correlation analysis aimed to determine the relationships between the variables concerning the mental state of respondents and the use of stimulants (drugs, alcohol) and antidepressants. A regression analysis was conducted to assess the predictive role of personality traits and learning style on three variables related to stimulant and antidepressant use. Next, the analysis of variance comparing the scores of online and hybrid mode students was performed in order to evaluate whether and how the mode of learning predicted the propensity to use stimulants and antidepressants. The distribution was checked with the Kolmogorov-Smirnov test for the whole group (N>100) and with the Shapiro-Wilk test for all variables (N<100).

Since the distributions of all examined variables were significantly skewed we used the Levene's test to determine their homogeneity. The test revealed that the effect of homogeneity of variance was obtained for most of the variables analyzed, except for the frequency of use of alcohol, sleeping pills, sedatives, and antidepressants and the personality trait: emotional stability. To assess the relationship between mental state and feelings associated with the pandemic and the frequency of stimulants and antidepressants the r-Pearson correlation analysis was conducted (see Table 2).

The data summarized in Table 2 show that it is primarily a sense of loss of meaning that has driven young people to use drugs and legal highs as well as alcohol and sedatives, sleeping pills, or antidepressants. The correlations are positive, with weak to moderate strength. Drugs or alcohol users tend frequently to think back to a situation no longer under their control. Correlation coefficients are positive and of low reliability. Reaching for legal drugs and sedatives, sleeping pills, or antidepressants is negatively correlated with feelings of responsibility. In addition, students with a positive vision of the future were less likely to use drugs and alcohol. The strength of the correlation is low or moderate. Alcohol was primarily used by respondents who had serious decision-making problems and experienced feelings of loneliness and emptiness. At the same time, alcohol, sedatives, sleeping pills, and antidepressants were more commonly used by participants who rated their mental state as worse during the pandemic. No significant correlations were found between feelings of worry about loved ones and the frequency of stimulant and drug use.

In order to answer the questions, if learning mode predicted students' propensity to use stimulants and antidepressants in the last 6-12 months of the COVID-19 pandemic, and whether personality traits predicted students' propensity to use

Table 2. Analysis of the relationship between mental state and feelings about the situation in COVID-19 in the last 6-12 months of the pandemic and the frequency of stimulant and antidepressant0 use

		Drugs or legal highs	Alcohol	Sleeping pills, sedatives or antidepressants?
Deterioration of mental state	Total	0.127 (0.180)	**0.285 (0.002)**	**0.296 (0.001)**
	Online	0.192 (0.150)	0.256 (0.053)	**3.276 (0.036)**
	Hybrid	0.009 (0.946	**0.355 (0.008)**	**0.287 (0.033)**
A positive vision of your future.	Total	**-0.209 (0.027)**	**-0.244 (0.009)**	-0.172 (0.068)
	Online	**-0.281 (0.032)**	**-0.319 (0.015)**	-0.198 (0.135)
	Hybrid	-0.133 (0.334)	-0.207 (0.129)	-0.106 (0.439)
Fears/anxieties related to loved ones.	Total	0.175 (0.063)	0.094 (0.323)	0.152 (0.108)
	Online	0.182 (0.172)	0.232 (0.080)	**0.338 (0.010)**
	Hybrid	0.230 (0.091)	-0.104 (0.451)	0.032 (0.817)
Decision-making problems	Total	0.046 (0.631)	**0.309 (0.001)**	0.057 (0.552)
	Online	0.071 (0.595)	0.247 (0.062)	0.141 (0.292)
	Hybrid	0.066 (0.634)	**0.391 (0.003)**	0.100 (0.470)
Thinking back to a situation no longer under your control	Total	**0.190 (0.044)**	**0.232 (0.013)**	0.064 (0.502)
	Online	0.162 (0.225)	0.138 (0.302)	0.131 (0.328)
	Hybrid	**0.291 (0.031)**	**0.341 (0.011)**	0.136 (0.321)
Difficulties adapting to life in a pandemic	Total	0.099 (0.296)	0.061 (0.518)	0.079 (0.408)
	Online	0.028 (0.836)	0.087 (0.514)	0.176 (0.186)
	Hybrid	0.205 (0.134)	0.025 (0.854)	-0.058 (0.671)
Sense of responsibility	Total	**-0.239 (0.011)**	-0.129 (0.173)	**-0.312 (0.001)**
	Online	-0.237 (0.073)	-0.241 (0.068)	**-0.393 (0.002)**
	Hybrid	-0.202 (0.139)	0.004 (0.977)	0.046 (0.740)
Increased feelings of loneliness and emptiness	Total	0.084 (0.375)	**0.270 (0.004)**	0.136 (0.151)
	Online	0.090 (0.502)	0.180 (0.177)	0.161 (0.228)
	Hybrid	0.070 (0.614)	**0.394 (0.003)**	0.086 (0.534)
Feeling of loss of meaning of life	Total	**0.257 (0.006)**	**0.329 (0.000)**	**0.222 (0.018)**
	Online	0.234 (0.077)	**0.362 (0.005)**	**0.319 (0.015)**
	Hybrid	**0.309 (0.022)**	**0.308 (0.022)**	0.176 (0.198)

stimulants and antidepressants in the last 6-12 months of the COVID-19 pandemic, a regression analysis was performed. The results are summarized in Table 3.

Table 3 shows that only the learning mode significantly predicted behavior related to the use of sleeping, sedative, or antidepressant drugs. A variance analysis was also conducted for the two study groups in order to assess which of the groups differentiated by learning mode was more likely to use these types of drugs. The comparison of means indicated that the online students were the ones who were more frequently supported by sleeping, sedatives, or antidepressants during the last 6-12 months of the pandemic. The difference in means between online and hybrid students was 0.336.

An analysis of the frequency of drug or booster use, controlling for personality characteristics, suggests that agreeableness and conscientiousness predict this behavior. A negative correlation was found, which indicates that the high intensity of these personality traits favors control and reduces the use of these types of stimulants. However, the strength of the relationship was weak to moderate. On the other hand, participants with low levels of coherence, conscientiousness, and emotional stability were more likely to use alcohol, as evidenced by the negative correlation. Again, the strength of the relationships was found to be weak.

Table 3. Regression analysis testing the predictive role of personality traits on the explanatory variables

	R^2	β	$F_{(1,111)}$	t	p
	Drugs or legal highs				
Mode of training	0.008	-0.91	0.926	-0.962	0.338
Extraversion	0.015	-0.124	1.740	-1.319	0.190
Agreeability	0.059	**-0.242**	6.933	-2.633	0.010
Conscientiousness	0.119	**-0.345**	14.992	-3.872	0.000
Emotional stability	0.012	0.109	1.330	-1.153	0.251
Openness to experience	0.003	-0.056	0.345	-0.588	0.558
	Alcohol				
Mode of training	0.003	0.056	0.346	0.589	0.557
Extraversion	0.010	-0.102	1.159	-1.077	0.284
Agreeability	0.048	**-0.219**	5.585	-2.363	0.020
Conscientiousness	0.037	**-0.193**	4.304	-2.075	0.040
Emotional stability	0.048	**-0.220**	5.626	-2.372	0.019
Openness to experience	0.001	0.027	0.081	0.284	0.777
	Sleep aids, sedatives, or antidepressants.				
Mode of training	0.068	**-0.260**	8.053	-2.838	0.05
Extraversion	0.184	**-0.429**	25.091	-5.009	0.000
Abreeability	0.077	**-0.278**	9.318	8.614	0.003
Conscientiousness	0.026	-0.162	2.987	-1.728	0.087
Emotional stability	0.037	**-0.193**	4.287	-2.071	0.041
Openness to experience	0.037	**-0.194**	4.320	-2.079	0.040

Extraversion, agreeableness, emotional stability, and openness to experience were also predictors of a tendency to use sleeping pills, sedatives, or antidepressants. The correlations were negative, indicating that the greater the intensity of these personality traits, the lower the potential propensity to use these types of drugs. The strongest relationship was found with extraversion. It suggests that sociable students with an optimistic outlook on life, willing to maintain contact with other people, were less likely to use antidepressants during the 6-12 months of the pandemic.

DISCUSSION

The study found significant predictions only for behaviors associated with taking sleep aids, sedatives, or antidepressants. Online students were more likely to support themselves with sleeping pills, sedatives, or antidepressants than hybrid learners. At the same time, an analysis of the frequency of stimulant or antidepressant use showed that respondents who manifest a high degree of agreeableness and conscientiousness were able to control and limit the use of this type of stimulant. Alcohol use was more prevalent among students with low levels of agreeableness, conscientiousness, and emotional stability. Respondents with high levels of extraversion, agreeableness, emotional stability, and openness to experience were less likely to use sleeping pills, sedatives, or antidepressants. Also, students who were extraverted, optimistic, and sociable, and sought to maintain contact with others, were less prone to use antidepressants.

Our findings explain to some degree the contradictions in the results of studies on the use of stimulants and addictive behaviors during the COVID-19 pandemic. Although the general impression was that the use of stimulants increased during lockdown, surprisingly two independent studies carried among college students indicated reduced alcohol consumption during the COVID-19 pandemic and highlighted the importance of living situation for drinking behaviors (White et. al, 2020). Another study reported that challenges associated with distance learning were the only COVID-19-related stressors, which resulted in larger alcohol consumption. However, such observation was true only within the group of students who were drinking alcohol prior to the pandemic (Fruehwirth, Gorman & Perreira, 2021).

Lechner et al. (2020) attribute a tendency to alcohol use as a function of psychological distress following COVID-19 related university closings. To no surprise, students subjected to greater levels of anxiety and depression exhibited the propensity to consume larger amounts of alcohol. Interestingly, social support did not moderate the effects of psychological distress on increased alcohol consumption over time. At the same time, Canadian research did not show increasing numbers of alcohol users, but it exhibited a growing frequency of alcohol consumption (Statistics Canada, 2021).

Some other common stimulants, like marihuana, were investigated as well. Dumas et al. (2020) observed an increase in the number of substances using days, however, the total percentage of users decreased during the COVID-19 pandemic. On the contrary, over half of young adults in one study reported increased marijuana use by their peers during the COVID-19 pandemic in contrast to the reports given before the pandemic. However, the marihuana consumption remained unchanged among most young adults (Graupensperger et al., 2021).

It might be worthy to recall the definition proposed by Larsen and Buss who wrote: "Personality is a set of psychological characteristics and internal mechanisms that are organized and relatively stable and that influence an individual's interactions and adaptations to his or her intrapsychic, physical, and social environments" (Larsen & Buss, 2008: 4). It emphasizes that personality relies on a person's mental and neurophysiological resources and is strongly related to personal well-being and subjectively perceived health (Ozer & Benet-Martínez, 2006; Roberts, et al., 2007). Poropat (2009) emphasizes the significance of personality traits in educational achievement and academic success. He also stresses the contribution of personality traits to adaptation, especially when living conditions prove to be difficult. The extent to which individuals are influenced by their environment is determined by their genotype and temperamental factors. Yet each person tends to seek environments and conditions that match her/his genetically determined characteristics. Students do not have the option to choose their mode of learning. They obey and comply with official and organizational regulations regardless of their personal predispositions and preferences. Also, our study confirmed Gottesman's observations concerning the significant contribution of personality traits in regulating adaptive behavior (Gottesman, 1963).
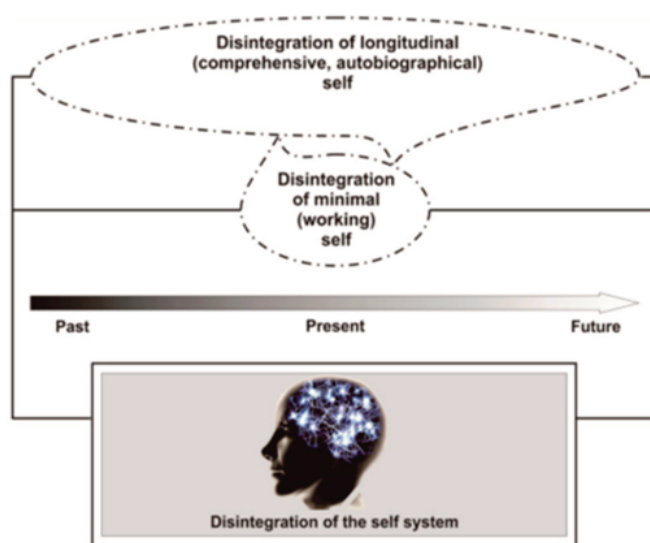
Fig. 1. Disintegration of the self system
Source: Pąchalska (2023), with permission

On the other hand, environmental factors may lead to significant changes of personality. Most dramatic alternations occur in cases of the frontal lobe lesions, which may result not only in personality impairment but also the loss of identity (Pąchalska, Kaczmarek, & Bednarek, 2020) or even desintegration of Self system (see; fig. 1), whether biological, emotional, or cognitive (Pąchalska et al 2023). They can also affect the social Self (breakdown of social ties) and cultural Self (disintegration of the value system) (cf. Pąchalska 2022)

Of particular importance is that dire disturbances were observed as a consequence of COVID-19 infection, hence, the term neuroCOVID was coined (see Pąchalska, 2022). Descriptions of neuroCOVID cases and undertaken successful therapy can be found in volume 20, number 3 of *Acta Neuropsychologica*.

CONCLUSIONS

The SARS-COV-19 pandemic is leaving its mark on most of us. Our study found that online learners were more likely to report deterioration in mental state, related to difficulties in adapting to pandemic-related conditions. This group of students was also more likely to use sedatives, sleeping pills, and antidepressants, with a significant difference in means, compared to hybrid students. In contrast, hybrid learners frequently reported a sense of loss of meaning as well as worrying about the fate of loved ones, thinking back to a situation no longer under their control, and difficulties in making decisions. At the same time, most respondents of this group reported a positive vision of their future and a high sense of responsibility.

Analyses showed that participants who rated their mental state as impaired during the pandemic tended to seek solace in various drugs. On the other hand, participants with a positive vision of the future were less likely to use both stimulants and alcohol. No significant correlations were found between feelings of fear for loved ones and frequency of stimulant and drug use.

Also, personality traits turned out to be significant predictors of substance use. Low levels of agreeableness, conscientiousness, and emotional stability correlated with high alcohol consumption, while low levels of extraversion, agreeableness, emotional stability, and openness to experience provoked the use of pills, sedatives, or antidepressants. On the other hand, students who were agreeable, emotionally stable, extraverted, optimistic, and sociable were less prone to substance use disorders.

The pandemic has also resulted in a deterioration of the life quality of both individuals directly affected by COVID and those who did not fall ill. It was due not only to many factors connected with the serious consequences of the disease but also to the lockdown and related restrictions. It calls for a need of a holistic support system that would enable early diagnosis and treatment of mental health problems and promote long-term resilience.

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Address for correspondence:

Katarzyna Markiewicz

Institute of Psychology and Human Science, WSEI University,

Projektowa 4, 20-209 Lublin,

Lublin, Poland

e-mail: k.markiew@wp.pl