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Problematic overstudying, Big Five personality, and music performance anxiety: associations with well-being and GPA

BACKGROUND

Problematic overstudying is a compulsive and pathological overinvolvement in studying leading to harm and considerable functional impairments. It is conceptualized as "study addiction," a precursor to work addiction. It has been investigated within the addictive behaviours framework in general populations of students for over a decade. A previous study analysed the problem among young musicians as a particularly vulnerable group. It found some important differences in potential personality risk factors among music academy students compared to general populations of students and showed an important role of social anxiety. The current study aimed to validate these findings in a separate larger sample and extend them by investigating the role of music performance anxiety (MPA).

PARTICIPANTS AND PROCEDURE

The study was conducted among 213 students of music academies. Valid and reliable measures of study addiction, MPA, Big Five personality and well-being were used.

RESULTS

The results showed that MPA played a similar role as social anxiety in terms of being a predictor, mediator, and moderator of the main replicated effects supporting the hypothesised mechanisms regulating study addiction. However, extraversion was not associated with study addiction in multiple hierarchical regression analysis, but conscientiousness and neuroticism were. Study addiction was associated with indicators of decreased well-being, above and beyond MPA, and personality.

CONCLUSIONS

These results show that MPA plays an analogous role to social anxiety and that the role of Big Five personality in study addiction among young musicians requires further investigation due to inconsistent findings.

KEY WORDS

academic performance; learning engagement; personality; musical performance anxiety; study addiction

BACKGROUND

Problematic overstudying has been conceptualized as an early form of work addiction which has a relatively long-standing history of research (Atroszko, 2015, 2022a). Problematic overstudying has also been called "study addiction" (Atroszko et al., 2015) or "compulsive study behaviour" (Woropay-Hordziejewicz et al., 2022). So far, systematic studies, including cross-cultural longitudinal surveys, substantiate that study addiction is an early form of work addiction (Atroszko et al., 2016a; see Atroszko, 2022a). It shares the high time and effort involved with learning engagement and consequently is correlated with it (Atroszko, 2015; Atroszko et al., 2015; Czerwiński et al., 2023; Lawendowski et al., 2020; Wróbel, 2020). However, learning engagement is positively associated with well-being and academic/school performance, while study addiction is consistently related to deteriorated psychosocial functioning. Because of that, previous studies showed that associations of learning engagement with other variables are confounded by study addiction and vice versa (Atroszko, 2015; Wróbel, 2020). Study addiction is relatively prevalent among undergraduate and high school students, with estimates between 6.4% to 16.0% depending on the country and sample characteristics (detailed analysis can be found in Atroszko, 2022a).

Professional musicians dedicate significant effort and commitment to mastering their performing skills, which can lead to physical and psychological issues (Spahn et al., 2017). Nowadays, performing skills are not the only concern of a musician because financial stability achieved through music usually demands a lot of additional work put toward marketing and management by the artists themselves (Everts & Haynes, 2021). Research highlights them as a group vulnerable to health problems, imbalanced personal lives, addictions, stress, and lower quality of life (Breitenfeld et al., 2014; Mula & Trimble, 2009; Vaag et al., 2016). Examination of autobiographies of professional musicians shows problematic substance use (mostly alcohol and opiates) as a frequent theme in musicians' lifestyles (Oksanen, 2013). The health problems associated with a professional musical career seem universal for most creative professions, including art students (Vaag et al., 2021). Recognizing the similarities between overinvolvement in musical training and work addiction, a study by Lawendowski et al. (2020) investigated the potential of applying the theory of behavioural addictions to understand the challenges professional musicians face.

Lawendowski et al. (2020) found that study addiction could be validly and reliably measured among musicians, that 16% of all participants could be classified as at high risk or addicted, and that study addiction was associated with higher perceived stress and lower quality of life, general health, and sleep quality. Unexpectedly, only low extraversion was associated with study addiction, and it showed no relationship with consciousness and neuroticism, which were consistently associated with it in previous studies on general populations of students (see Atroszko, 2022a). It was suggested that this particular finding might be explained by the fact that professional musicians are characterized by high perfectionism (Mor et al., 1995) and higher anxiety levels (Vaag et al., 2016), so the limited variance of scores affected measures of association. Moreover, social anxiety was established as an important factor regulating mechanisms underlying many cases of study addiction. It mediated between personality factors (neuroticism and extraversion) and study addiction. Also, the relationship between social anxiety and academic performance measured by last semester's grade point average (GPA) became negative only when accompanied by high levels of study addiction.

These results provided more in-depth analyses of the potential regulatory mechanisms of study addiction and empirical substantiation of the model conceptualizing it as an ineffective coping strategy (Atroszko, 2015). This model assumes that vulnerable individuals characterized by low emotional stability, high conscientiousness, and low extroversion (especially among musicians; Kemp, 1996; Marchant-Haycox & Wilson, 1992) may experience more social and performance anxiety and make efforts to compensate for it by increasing their involvement in studying (Lawendowski et al., 2020). However, these excessive efforts, together with unresolved underlying problems (e.g., social isolation), lead to chronic and high stress, resulting in mental and physical health problems (Woropay-Hordziejewicz et al., 2022) and deteriorated academic performance (Atroszko, 2015).

Growing literature examining the hardships of a professional career in music allows researchers to assess the problem with precision so that universities can be a supportive community for students. Huang and Yu (2022) highlighted the importance of teacher guidance to enhance resistance to MPA and present many multifunctional strategies embedded in pedagogical practice, such as visual rehearsals and simulations of performances. The authors stated that the majority of students exposed to MPA actively seek support from their peers before a concert and are able to form groups freely so that they can perform alongside their friends.

MUSIC PERFORMANCE ANXIETY AND SOCIAL ANXIETY

Music performance anxiety (MPA) is the experience of marked and persistent anxious apprehension related to musical performance that has arisen through specific anxiety-conditioning experiences (Kenny,

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2011). MPA can be observed through disruption of attention, and engagement in unproductive behaviours, which often makes it difficult and even impossible to complete the performance successfully. According to DSM-5 (APA, 2022, p. 203), performance anxiety is a symptom of social anxiety disorder (SAD). Studies showed that MPA is closely associated with social anxiety (Dobos et al., 2019).

Nevertheless, MPA and social anxiety are not exactly the same constructs. While those with performance anxiety fear evaluation, people with social anxiety fear being scrutinised (Stoeber & Eismann, 2007). MPA also has distinctive aspects, such as failure of task mastery (Wilson, 2002) and attempts at tasks that go beyond the performer's abilities (Fehm & Schmidt, 2006). Although it has been conceptualised that performance anxiety is a manifestation of SAD (Hook & Valentiner, 2006) and should be considered its sub-type, considering them equal is an oversimplification (Dobos et al., 2019; Wiedeman et al., 2021).

THE PRESENT STUDY

The study aimed to validate the previous findings concerning associations among Big Five personality, social anxiety, study addiction and well-being, and academic performance (Lawendowski et al., 2020) in a separate larger sample and extend them by investigating the role of MPA as a crucial variable in the psychology of music. While MPA is closely related to social anxiety, the important question is to what extent the previous findings can be attributed to general anxiety in social situations or performance-specific factors. Also, the current study used the Mini International Personality Item Pool (Mini-IPIP; Donnellan et al., 2006) for measuring Big Five personality. Psychometrically it performs considerably better than the previously applied Ten Item Personality Inventory (TIPI), which sometimes shows limited criterion validity and some internal consistency problems (Credé et al., 2012).

HYPOTHESES

Based on previous theoretical frameworks and empirical research into work addiction and study addiction (Lawendowski et al., 2020), it is hypothesised that study addiction will be negatively associated with extraversion (H1); study addiction will be positively associated with MPA (H2); study addiction will be positively associated with stress and negatively associated with quality of life, health, and sleep (H3); study addiction will be negatively associated with academic performance (H4); study addiction and learning engagement are different entities, showing opposite relationships with psychosocial functioning

(H5); MPA will mediate between neuroticism and extraversion and study addiction (H6); study addiction will moderate the relationship between MPA and academic performance (H7).

PARTICIPANTS AND PROCEDURE

PARTICIPANTS

A convenience sample was recruited, consisting of 213 music academy students: 135 (63.4%) were female, 73 (34.4%) were male, and 5 (2.3%) individuals did not report their gender. The participants' mean age was 22.74 years (SD = 3.31). They had attained a mean of 11.25 years (SD = 4.76) of formal musical education. The participants studied at three music academies in Poland. Study addiction was not associated with age or gender in the current sample (see Table 1). There were no significant differences in mean levels of study addiction (F(2, 210) = 0.07, p = .933) across the three academies: the Stanisław Moniuszko Academy of Music in Gdansk (M = 18.07, SD = 5.00), the Feliks Nowowiejski Academy of Music in Bydgoszcz (M = 18.36, SD = 5.94), and the Department of the Fryderyk Chopin University of Music in Białystok (M = 18.32, SD = 5.36). A detailed description of the sample is provided in Supplementary materials. The sample size was based on three premises: i) it should be able to detect previously found effect sizes in a sample of n = 132 (Lawendowski et al., 2020), ii) it should approach the size required for stable estimates of associations among variables (Schönbrodt & Perugini, 2013), and iii) it should be possible to gather practically, considering the relatively small number of music academies' students in Poland.

INSTRUMENTS

All used psychometric tools showed good validity and reliability in numerous previous studies and are described in detail in Supplementary materials. Reliability coefficients in the current sample are presented in Table 1. Most of these tools are among the most commonly used measures of the studied variables (study addiction, MPA, stress, personality, and quality of life).

Demographics. Respondents were asked about their age and gender as well as to provide estimates of the total number of hours they devote every week to studying at the university, both in and outside classes (e.g., at home or the library).

Study addiction. Study addiction was measured using the Bergen Study Addiction Scale (BStAS; Atroszko et al., 2015).

Learning engagement. Learning engagement was measured using a single item, the question "How

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engaged in learning are you?" (Atroszko, 2014), with responses ranging from 1 (*I am not at all engaged*) to 7 (*I am completely engaged*).

Big Five personality traits. The Mini-IPIP (Donnellan et al., 2006) was used to measure the Big Five personality traits.

MPA. The Kenny Music Performance Anxiety Inventory – Revised (K-MPAI-R; Kenny, 2009) was used to measure MPA.

Perceived stress. The short version of the Perceived Stress Scale (PSS-4; Cohen et al., 1983) was used as a measure of perceived stress.

General quality of life, general health and quality of sleep. Three single-item measures of different aspects of quality of life, developed on the basis of the WHOQOL-BREF (Skevington et al., 2004), were used.

GPA. The students were asked to provide information about their grade point average (GPA) from the semester prior to the study as accurately as possible.

PROCEDURE

Data were collected in May 2019 using a paper-and-pencil cross-sectional survey. Students were invited to participate anonymously and voluntarily during lectures or classes. No monetary or other material rewards were offered. Completion of the survey was regarded as proof that the participant had given their informed consent. The estimated response rate was above 95%.

STATISTICAL ANALYSES

Descriptive statistics. Means, standard deviations, percentages, and reliability coefficients were calculated.

Correlational analysis. To examine the associations between the study variables, point-biserial and Pearson product-moment correlation coefficients were calculated in accordance with the measurement scale employed.

Regression analyses. Six hierarchical multiple regression analyses were conducted, where study addiction, stress, general quality of life, general health, sleep quality, GPA from the last semester of studies were dependent variables. The independent variables introduced in subsequent steps can be found in Tables 2-4. The same sequence of steps as in the previous study was followed (Lawendowski et al., 2020). For all linear regression analyses, preliminary analyses were conducted to ensure no violation of normality, linearity, multicollinearity, and homoscedasticity assumptions.

Mediation and moderation analyses. Two mediation analyses were performed, in which extraversion and neuroticism were independent variables, MPA was the mediator, and study addiction was the dependent variable. Moderation analysis was performed, in which MPA was the independent variable, study addiction was the moderator, and GPA from the last semester of studies was the dependent variable. All tests were two-tailed, and the significance level was set to $\alpha = .05$. Unstandardized regression coefficients are reported. All analyses were conducted using IBM SPSS 24.0 and the PROCESS macro (Hayes, 2013). The moderation plots were prepared using the interactions 1.0.3 package (Long, 2020) and the R language in version 4.0.3 (R Core Team, 2020).

ETHICS STATEMENT

The study was carried out in accordance with the Declaration of Helsinki and the guidelines of the Ethics Committee at the Institute of Psychology of the University of Gdańsk. It did not include ethically doubtful procedures, sensitive data, or vulnerable populations. Participants were given detailed information about the study and their role in it, told that they could withdraw at any point, and told that their participation was anonymous.

RESULTS

DESCRIPTIVE STATISTICS

Table 1 presents the reliability coefficients, mean scores, standard deviations, percentages, and correlation coefficients for the study variables.

PREDICTORS OF STUDY ADDICTION

The regression analysis for study addiction (see Table 2) showed that the independent variables explained a total of 12.6% of the variance, $F(8, 194) = 3.48$, $p < .001$. The significant independent variables in Step 3 were conscientiousness and MPA.

STUDY ADDICTION AS A PREDICTOR OF PSYCHOSOCIAL FUNCTIONING

The regression analysis for perceived stress (see Table 3) showed that the independent variables explained a total of 33.4% of the variance, $F(10, 192) = 9.62$, $p < .001$. The significant independent variables in Step 4 were study addiction, conscientiousness, and neuroticism. The regression analysis for general health (see Table 3) showed that the independent variables explained a total of 15.7% of the variance, $F(10, 192) = 3.58$, $p = .019$. The significant independent variables were age and neuroticism. The regression analysis for sleep quality (see Table 3) showed that

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Table 1

Mean scores and standard deviations (SD), percentages, reliability coefficients, and correlation coefficients (Pearson product-moment/point-biserial) between study variables

Variable	Mean (SD)/ Percentages	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Gender[a]	63.4% females	–															
2. Age	22.74 (3.31)	.26**	–														
3. Study addiction	18.18 (5.27)	-.11	-.11	.76													
4. Learning engagement	4.87 (1.27)	-.07	.01	.42**	.77												
5. Time spent on studying	13.07 (9.94)	.07	-.12†	.24**	.24**	–											
6. GPA	19.57 (1.90)	-.15*	.02	.14*	.32**	.14†	–										
7. Extraversion	13.34 (3.65)	-.03	.07	-.14*	-.11	-.08	.09	.74									
8. Agreeableness	16.63 (2.43)	-.21**	.01	-.10	.07	-.03	-.03	-.27**	.61								
9. Conscientiousness	12.99 (3.93)	-.03	-.07	.12†	.20**	.11	.16*	-.20**	-.01	.77							
10. Neuroticism	13.92 (3.52)	-.35**	-.19**	.21**	.09	.03	.05	-.11	.03	.01	.71						
11. Intellect	15.96 (2.81)	-.05	.00	-.04	.04	.12	-.18*	-.19**	.18**	-.03	.14*	.64					
12. MPA	110.74 (35.76)	-.24**	-.13†	.27**	-.06	-.04	-.11	-.22**	.04	-.12†	.49**	-.17*	.93				
13. Stress	11.48 (3.07)	-.17*	-.13†	.22**	-.03	-.02	-.11	-.06	-.01	-.16*	.52**	-.03	.39**	.78			
14. General health	5.71 (2.06)	.15*	-.08	-.16*	.04	.12†	.00	-.04	.02	.10	-.27**	-.09	-.27**	-.37**	–		
15. Sleep quality	4.77 (2.26)	.06	-.07	-.18*	.04	.12†	.05	-.07	-.04	.10	-.19**	-.04	-.20*	-.36**	.54**	–	
16. Quality of life	6.86 (1.49)	.02	-.00	-.24**	.18**	.03	.08	.10	.07	-.03	-.31**	.14*	-.34**	-.40**	.43**	.28**	–

Note. GPA – grade point average; MPA – music performance anxiety; [a] point-biserial correlation coefficient (0 – female, 1 – male). Reliability coefficients in the present sample are reported on the diagonal in italics. †p < .10, * p < .05, ** p < .01. All means, reliability coefficients, standard deviations, and correlations except the variable "time spent on studying" were published previously in Czerwiński et al., 2023.

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Table 2

Results of hierarchical multiple regression analyses in which, age, gender, Big Five personality traits and MPA were regressed upon study addiction

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Predictor	β	ΔR^2	Tolerance	VIF
Step 1		.02		
Gender[a]	−.08		.93	1.07
Age	−.08		.93	1.07
Step 2		.08**		
Gender[a]	−.05		.81	1.24
Age	−.04		.91	1.10
Extraversion	−.08		.85	1.18
Agreeableness	−.10		.87	1.15
Conscientiousness	.11		.94	1.06
Neuroticism	.20**		.83	1.20
Intellect	−.00		.91	1.10
Step 3		.03**		
Gender[a]	−.03		.80	1.25
Age	−.03		.91	1.10
Extraversion	−.04		.81	1.24
Agreeableness	−.13†		.86	1.17
Conscientiousness	.15*		.90	1.12
Neuroticism	.09		.64	1.56
Intellect	.05		.85	1.18
MPA	.22**		.64	1.58
Total R^2		.13**		

Note. MPA – music performance anxiety; [a] 0 – female, 1 – male. †$p < .10$, *$p < .05$, **$p < .01$.

the independent variables explained a total of 12.7% of the variance, $F(10, 192) = 2.78$, $p = .020$. The significant independent variables in Step 4 were study addiction, age, and neuroticism. The regression analysis for general quality of life (see Table 3) showed that the independent variables explained a total of 26.3% of the variance, $F(10, 192) = 6.85$, $p < .001$. The significant independent variables in Step 4 were learning engagement, study addiction, and neuroticism.

STUDY ADDICTION AS A PREDICTOR OF ACADEMIC PERFORMANCE

The regression analysis for GPA from the last semester of studies (see Table 4) showed that the independent variables explained a total of 17.5% of the variance, $F(10, 179) = 3.79$, $p < .001$. The significant independent variables in Step 4 were learning engagement, gender, and intellect.

MEDIATION ANALYSES

The mediation analyses showed that the relationships between extraversion and study addiction, as well as between neuroticism and study addiction, are fully mediated by MPA (Table 5).

MODERATION ANALYSES

In regression analysis for GPA as the dependent variable, independent variables explained a total of 7.2% of the variance, $F(3, 190) = 4.91$, $p = .003$, and the interaction term explained 2.8% of the variance, $\Delta F(1, 190) = 5.69$, $p = .018$. Figure 1 shows the moderating effect of study addiction on the relationship between MPA and GPA from the last semester of studies. The conditional effects of the focal predictor (MPA) at benchmark values of the moderator variable (study addiction) showed that for low study

Table 3

Results of hierarchical multiple regression analyses in which study addiction, learning engagement, gender, age, Big Five personality traits, and MPA were regressed upon the scores for stress, general health, sleep quality and quality of life

Predictor	Stress		General health		Sleep quality		Quality of life	
	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2
Step 1		.08**		.04*		.05*		.15**
Study addiction	.30**		−.23**		−.24**		−.38**	
Learning engagement	−.15*		.13†		.12		.33**	
Step 2		.03		.04*		.02		.00
Study addiction	.28**		−.23**		−.25**		−.39**	
Learning engagement	−.15*		.14†		.13†		.34**	
Gender[a]	−.13†		.18*		.09		.00	
Age	−.06		−.15*		−.13†		−.05	
Step 3		.23**		.06*		.06*		.10**
Study addiction	.19**		−.19*		−.23**		−.32**	
Learning engagement	−.09		−.11		.11		.34**	
Gender[a]	.02		.11		.02		−.09	
Age	−.03		−.16*		−.14*		−.09	
Extraversion	.02		−.07		−.11		.02	
Agreeableness	.03		.05		−.04		−.04	
Conscientiousness	−.16*		.07		.07		−.05	
Neuroticism	.49**		−.25**		−.22**		−.33**	
Intellect	−.11†		−.01		.02		.15*	
Step 4		.01		.01		.00		.01
Study addiction	.17*		−.15†		−.21**		−.29**	
Learning engagement	−.09		.09		.09		.31**	
Gender[a]	.02		.10		.01		−.10	
Age	−.03		−.16*		−.14*		−.09	
Extraversion	.04		−.10		−.12		−.00	
Agreeableness	.01		.07		−.03		−.02	
Conscientiousness	−.14*		.05		.06		−.07	
Neuroticism	.45**		.19*		−.18*		−.27**	
Intellect	−.09		−.54		.01		.12†	
MPA	.11		−.16		−.08		−.12	
Total R^2		.33**		.16**		.13**		.26**

Note. MPA – music performance anxiety; [a] 0 – female, 1 – male. †$p < .10$, *$p < .05$, **$p < .01$.

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addiction, there was no significant relationship between MPA and GPA from the last semester of studies ($b = 0.001$, 95% CI [−0.010; 0.012]), there was no relationship between these variables for mean study addiction ($b = −0.007$, 95% CI [−0.014; 0.001]), and there was a negative relationship between these variables for high study addiction ($b = −0.016$, 95% CI [−0.026; −0.006]).

Table 4

Results of hierarchical multiple regression analyses in which learning engagement, study addiction, age, gender, Big Five personality traits, and MPA were regressed upon the last semester's GPA

Predictor	β	ΔR^2	Tolerance	VIF
Step 1		.10**		
Learning engagement	.29**		.82	1.22
Study addiction	−.04		.82	1.22
Step 2		.02		
Learning engagement	.29**		.81	1.24
Study addiction	.03		.82	1.23
Gender[a]	−.13		.93	1.08
Age	.05		.92	1.08
Step 3		.06*		
Learning engagement	.28**		.75	1.33
Study addiction	.03		.77	1.29
Gender[a]	−.16*		.80	1.24
Age	.06		.90	1.11
Extraversion	.14†		.83	1.20
Agreeableness	−.13†		.85	1.18
Conscientiousness	.13		.91	1.10
Neuroticism	−.01		.80	1.25
Intellect	.15*		.91	1.10
Step 4		.00		
Learning engagement	.27**		.71	1.42
Study addiction	.04		.74	1.35
Gender[a]	−.16*		.80	1.25
Age	.06		.90	1.11
Extraversion	.12		.79	1.26
Agreeableness	−.12†		.83	1.21
Conscientiousness	.12		.87	1.16
Neuroticism	.01		.63	1.58
Intellect	.14*		.85	1.18
MPA	−.06		.59	1.70
Total R^2		.18**		

Note. GPA – grade point average; MPA – music performance anxiety; [a] 0 – female, 1 – male. †$p < .10$, *$p < .05$, **$p < .01$.

DISCUSSION

Extraversion and study addiction showed a negative zero-order correlation (H1 partially substantiated). However, in the hierarchical regression model, extraversion was not significantly associated with study addiction, neuroticism was positively associated with it before MPA was introduced, and conscientiousness was positively associated with it after MPA was introduced. Nevertheless, these results align with other studies on the general populations of students showing positive associations of study addiction with neuroticism and conscientiousness (Atroszko, 2015; Atroszko et al., 2015). The surprising results of La-

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Table 5

Direct, indirect, and total effects as well as 95% confidence intervals in particular mediation models

Independent variable	Mediator	Dependent variable	Direct effect [95% CI]	Indirect effect [95% CI]	Total effect [95% CI]
Extraversion	MPA	Study addiction	−.144 [−.338; .051]	−.078 [−.155; −.019]	−.222 [−.417; −.026]
Neuroticism	MPA	Study addiction	.161 [−.068; .391]	.161 [.036; .301]	.322 [.119; .525]

Note. MPA – music performance anxiety.

wendowski et al. (2020) may be somewhat associated with the Big Five personality measure used (TIPI), which is less precise than the currently used Mini-IPIP. Together with a smaller sample size, the measure may have led to a lower variance of scores (or biased estimates) in the previous study, which resulted in generally low and mostly non-significant associations between personality and study addiction. Also, sample effects could account for these findings. This is novel finding that shows that music academies' students may be more similar to the general population of students in terms of personality characteristics than previous findings suggested.
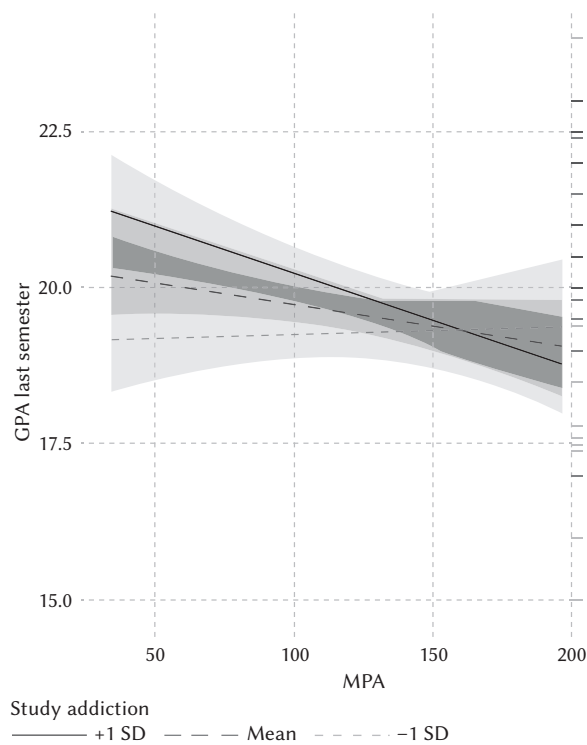
There was a positive relationship between MPA and study addiction (H2 substantiated). The results confirmed the previous findings that study addiction was positively related to perceived stress and negatively associated with general quality of life, general health, and sleep quality (H3 substantiated). After controlling for Big Five personality factors, study addiction was still significantly related to these variables.

The results showed that study addiction was not associated with academic performance after controlling for personality traits and learning engagement (H4 not substantiated). This result is inconsistent with previous studies (Atroszko, 2015; Atroszko et al., 2015). However, a similar lack of association between these variables was found in a sample of high school students (Wróbel, 2020). Generally, samples that are more heterogeneous in terms of universities/high schools, faculties, and courses of study tend to find lower associations between study addiction and GPA, most likely due to numerous factors affecting grading, including different grading systems. The previous study was conducted in only two music academies with the same grading system (Lawendowski et al., 2020).

Both study addiction and learning engagement were positively related to time spent studying but showed opposite associations with well-being indicators (H5 substantiated). It is highly consistent with previous studies and supports the notion that these are related but different phenomena (Atroszko, 2022b).

Figure 1

The effect of study addiction on the relationship between MPA and GPA from the last semester of studies with 95% confidence intervals based on standard errors

Study addiction
——— +1 SD   — — — Mean   - - - - −1 SD

MPA was shown to be a full mediator between neuroticism and study addiction and between extraversion and study addiction (H6 substantiated). Also, study addiction moderated the relationship between MPA and GPA (H7 substantiated). These results fully replicate intricate associations among personality, study addiction, anxiety associated with performance and social exposure, and academic performance found in the previous study (Lawendowski et al., 2020). It provides more robust substantiation for the hypothesised mechanisms regulating study addiction by showing that dispositional tendency to experience negative emotions and social withdrawal increases anxiety in performance or social exposure

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situations, and thereby affects higher study addiction as a potential ineffective compensatory mechanism. At the same time, MPA affects academic performance negatively only among students high on study addiction, confirming the pathological and counterproductive nature of this behavioural pattern. The current study suggests that factors common to social anxiety and MPA may be responsible for these effects.

To our knowledge, this is the first study to investigate the role of MPA in study addiction. MPA is one of the most commonly investigated problems among musicians and music students, responsible for considerable negative consequences for mental and physical health among those experiencing it, including ruining promising musical careers. The results showing that MPA regulates study addiction similarly to social anxiety is a novel finding suggesting that more general evaluation fear underlying both MPA and social anxiety may be the underlying problem.

A few factors need to be taken into account when considering the practical implications of the current findings. First, study addiction was recently found to be a universal phenomenon in different cultures across the world (Atroszko et al., 2023b). More and more data support the hypothesis that it is an addictive disorder (Atroszko et al., 2023a), and it is more prevalent than most other addictive behaviours, such as video gaming, pornography consumption, food intake, social networking or shopping (Charzyńska et al., 2021; for a detailed analysis of prevalence rates, see Atroszko et al., 2021). It is highly stable in time when unaddressed with any prevention or intervention solutions (Atroszko et al., 2016b), and it may develop into work addiction (Atroszko et al., 2016a), which is likely associated with considerable individual, social, and economic harms and costs (Atroszko et al., 2020; Atroszko & Atroszko, 2020). Recent studies using network analysis suggest that healthy engagement in work may turn into work addiction when the absorption (a component of engagement reflecting a full sustained focus on the tasks and feeling of elation akin to the "high" obtained with drugs) starts to be used to modify mood (a symptom of addiction) and escape from negative feelings and stress (Bereznowski et al., 2023a, b).

The current study's findings shed light on the potential associated mechanisms that may facilitate the transition from healthy engagement and passion for music to harmful study addiction. They show that MPA, if unaddressed, may increase the risk of study addiction among students who show a proclivity towards negative emotions and are socially withdrawn. Moreover, students experiencing MPA will have poorer performance in their studies (as measured by GPA) if they are addicted to studying. This may create a vicious cycle in which worse achievements increase stress and frustration, pushing young musicians into additional effort (cf. Czerwiński et al., 2023), more pressure on improvement (Atroszko

& Atroszko, 2020), and consequently, growing social isolation (cf., Atroszko, 2015; Godzwon et al., 2022), and more fear of evaluation.

The prevention and intervention solutions among young musicians should focus on managing MPA by developing effective and practical stress-coping skills, particularly focused on obtaining social support, and creating a supportive environment (Huang & Yu, 2022). Mindfulness practice may be routinely trained among young musicians to improve emotional and behavioural self-regulation, including skills useful in managing MPA, and focus. Widespread psychoeducation initiatives may raise awareness about study addiction and its consequences and decrease risks at the whole student population level.

STRENGTHS, LIMITATIONS, AND FUTURE DIRECTIONS

In terms of limitations, the results of the present study cannot be generalized to other populations without some reservations because a convenience sample was used. The relatively low sample size restricted the power of the analyses, which might account for the results that were approaching statistical significance in some cases. Also, when interpreting the results, the limitations of self-report data (such as social desirability bias, recall biases, etc.) must be considered.

Regarding the strengths of the present study, to the authors' knowledge, it is the first study to investigate the role of MPA in study addiction. Several variables comprising the possible antecedents and consequences of study addiction were used, including valid and reliable measures of personality, psychological well-being, health, stress, and academic performance. Moreover, mediation and moderation effects were fully replicated, providing more robust support for the potential mechanisms of study addiction development among musicians. It is particularly significant since mediation and especially moderation effects are often not replicated in the psychological literature.

Future studies should aim to understand better the role of anxiety in study addiction, including the relative significance of MPA, social anxiety, and general anxiety (Wiedemann et al., 2021), especially because the majority of individuals at risk of study addiction or experiencing its symptoms show high risk or presence of clinically significant levels of general anxiety (Woropay-Hordziejewicz et al., 2022). Longitudinal studies may shed light on the bidirectional relationships between anxiety and study addiction, particularly the role of social anxiety as a risk factor. These studies should determine whether general anxiety or rather specific facets of social and performance anxiety account for the observed effects and explain the regulatory mechanisms of study addiction. Also, the role of other personality traits previously found

to be associated with study addiction among general populations of students, such as competitiveness (Atroszko & Atroszko, 2019), could be investigated among young musicians to determine whether these constitute universal risk factors similarly to conscientiousness or neuroticism, and to what extent such traits as narcissism (Atroszko et al., 2019; Charzyńska et al., 2021; Kircaburun et al., 2021) are gender-specific risk factors in this group.

Supplementary materials are available on the journal's website.

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Problematic
overstudying
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musicians