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Study addiction – A new area of psychological study: Conceptualization, assessment, and preliminary empirical findings

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Aims: Recent research has suggested that for some individuals, educational studying may become compulsive and excessive and lead to 'study addiction'. The present study conceptualized and assessed study addiction within the framework of workaholism, defining it as compulsive over-involvement in studying that interferes with functioning in other domains and that is detrimental for individuals and/or their environment. *Methods:* The Bergen Study Addiction Scale (BStAS) was tested – reflecting seven core addiction symptoms (salience, mood modification, tolerance, withdrawal, conflict, relapse, and problems) – related to studying. The scale was administered via a cross-sectional survey distributed to Norwegian (n = 218) and Polish (n = 993) students with additional questions concerning demographic variables, study-related variables, health, and personality. *Results:* A one-factor solution had acceptable fit with the data in both samples and the scale demonstrated good reliability. Scores on BStAS converged with scores on learning engagement. Study addiction (BStAS) was significantly related to specific aspects of studying (longer learning time, lower academic performance), personality traits (higher neuroticism and conscientiousness, lower extroversion), and negative health-related factors (impaired general health, decreased quality of life and sleep quality, higher perceived stress). *Conclusions:* It is concluded that BStAS has good psychometric properties, making it a promising tool in the assessment of study addiction. Study addiction is related in predictable ways to personality and health variables, as predicted from contemporary workaholism theory and research.

Keywords: academic performance, learning engagement, assessment, scale, study addiction, workaholism

INTRODUCTION

In modern society, students face multiple academic pressures. The best colleges and universities require the best grades for entry and parents push and expect their children to succeed educationally. At school, pupils learn early on that success comes through dedication, discipline, and hard work. For some individuals, the act of educational study may become excessive and/or compulsive and lead to 'study addiction' (Andreassen, Griffiths et al., 2013). Although there is little research and no generally accepted definition of study addiction to date, such behavior (as a way of dealing with academic stress and pressure) may be understood and conceptualized within contemporary research into workaholism. Consequently, from a 'work addiction' (i.e., workaholism) perspective, study addiction may be defined likewise as "being overly concerned with studying, to be driven by an uncontrollable studying motivation, and to put so much energy and effort into studying that it impairs private relationships, spare-time activities, and/or health" (Andreassen, Hetland & Pallesen, 2014, p. 8). The many similarities between studying and working lead to the notion that study addiction may be a precursor for or an early form of workaholism that might manifest itself in childhood or adolescence. The present study attempts to embed, conceptualize, and assess the concept of study addiction within the theoretical framework and empirical research of work addiction (i.e., workaholism).

To date, pathological gambling ('Gambling Disorder') and problematic online video gaming ('Internet Gaming Disorder') are the only behavioral addictions that have received any kind of formal recognition in current diagnostic systems (American Psychiatric Association, 2013). However, other different types of behavioral addictions (e.g., exercise addiction, sex addiction, shopping addiction, etc.) have been described in the literature and await formal recognition based on epidemiological, experimental, and neurobiological research. Another behavioral addiction is workaholism (i.e., work addiction). Work appears to share many similarities to that of learning and studying, as both involve sustained effort in order to achieve success, often related to skills and knowledge, and both fulfill important social roles (Fischer, 2000). In previous studies, workaholism has been shown to be a relatively stable entity over time (Andreassen, Hetland et al., 2014). This suggests that the behavioral tendency to work excessively may be manifesting itself early in the development of an individual in relation to learning and associated academic behaviors. Given the similarities between excessive work and excessive study, there is no theoretical reason to believe that 'study addiction' (like work addiction) does not exist. A further argument for the existence of study addiction is the fact that both substance and behavioral addic-

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tions tend to develop in youth (Chambers & Potenza, 2003). Furthermore, some studies on workaholism have included student samples (e.g., Atroszko, 2010; Flowers & Robinson, 2002; Robinson, 1996; Spence & Robbins, 1992).

Given that most scales to assess workaholism have been developed without adequate consideration of all facets of addiction, the Bergen Work Addiction Scale (BWAS) was recently developed to overcome the theoretical and conceptual weaknesses of previous instrumentation (Andreassen, Griffiths, Hetland & Pallesen, 2012). This short scale assesses seven core elements of addiction (salience, mood modification, tolerance, withdrawal, conflict, relapse, problems) (Brown, 1993; Griffiths, 2005; Leshner, 1997), and has demonstrated adequate validity and reliability. As no current measure of study addiction exists, the BWAS was adapted by replacing the words 'work' and 'working' with 'study' and 'studying'. The present authors believe this adapted scale could prove fruitful as an assessment of study addiction.

Unlike most other behavioral addictions (e.g., pathological gambling, video gaming addiction, shopping addiction, etc.), workaholism – like exercise addiction (Berczik et al., 2014) – has often been regarded as a positive and productive kind of addiction (Andreassen, Griffiths et al., 2013). Notably, workaholics typically score higher on personality traits such as conscientiousness and perfectionism compared to other addicts (Andreassen, 2014; Andreassen, Griffiths et al., 2013). As with the workaholic, the "perfect student" is hard working and involved, and it is likely that study addiction is also associated with conscientiousness. Along with the academic pressure derived from many differing sources (such as the fear of failure), it is also conceivable that such individuals – like workaholics – will score higher on neuroticism. Previous research has indicated that neuroticism and conscientiousness were positively associated with study addiction (Andreassen, Griffiths et al., 2013).

Although the societal notion of workaholism as a positive behavior has received some support, most current scholars conceive it as a negative condition due to its association with impaired health (Andreassen, Hetland, Molde & Pallesen, 2011; Atroszko, 2012; Shimazu, Demerouti, Bakker, Shimada & Kawakami, 2011), low perceived quality of life (Shimazu & Schaufeli, 2009), diminished sleep quality (Kubota, Shimazu, Kawakami & Takahashi, 2012), work-family conflicts (Andreassen, Hetland & Pallesen 2013; Atroszko, 2011) and lowered job performance (Shimazu, Schaufeli & Taris, 2010). Given these well-established associations, it is hypothesized that extreme studying behavior (i.e., study addiction) is negatively related to psychological wellbeing, health, and academic performance, and positively related to stress.

Scholars usually differentiate workaholism from the concept of work engagement (Andreassen, 2014; Andreassen & Pallesen, in press; Karanika-Murray, Duncan, Pontes & Griffiths, in press). Previous studies indicate that work addiction and work engagement are either marginally positively (Shimazu & Schaufeli, 2009) or not at all related (van Beek, Taris & Schaufeli, 2011). Engaged workers and workaholics both put much time and effort into work. However, engaged workers typically remain in control, and lead non-problematic multidimensional lives. Work engagement is related to several positive outcomes, while workaholism often shows reverse relationships (Falco et al., 2013; Schaufeli, Martinez, Pinto, Salanova & Bakker, 2002; Shimazu & Schaufeli, 2009; Shimazu, Schaufeli, Kubota & Kawakami, 2012; Shimazu et al., 2010; van Beek et al., 2011). In line with these findings, study addiction needs to be differentiated from learning engagement. Both study addiction and learning engagement are expected to be positively related to learning time because they assume more time, as well as increased emotional and cognitive investment in learning. However, it is hypothesized that study addiction will show a negative relationship with psychological wellbeing, health, and academic performance, and a positive relationship with stress while the opposite is expected for learning engagement.

On the basis of previous theoretical frameworks and empirical research into work addiction, it is hypothesized that the Bergen Study Addiction Scale (BStAS; adaptation of BWAS, Andreassen et al., 2012) will show good reliability and validity as well as an unidimensional factor structure (H1); study addiction will be positively and significantly associated with conscientiousness and neuroticism (H2); study addiction will be positively and significantly associated with stress, and lower quality of life, health, and sleep (H3); study addiction will be negatively and significantly related to academic performance (H4); and study addiction and learning engagement are different entities, showing opposite relationships with several of the study variables (academic performance, stress, quality of life, health and sleep) (H5).

METHODS

Samples

Sample 1. The first sample comprised 218 first-year psychology undergraduate students at the University of Bergen in Norway (171 females and 45 males; two did not report their gender) with a mean age of 20.7 years (SD = 3.0 years).

Sample 2. The second sample comprised 1,045 undergraduate students. Due to missing data, 52 participants were eliminated from the analyses. The sample therefore comprised of 993 participants. These individuals were studying at Polish universities: the University of Gdańsk, Technical University of Koszalin, Humanistic University of Gdańsk, and the Gdynia Maritime School (733 females and 255 males; five students did not report their gender) with a mean age of 21.57 years (SD = 2.74 years) (see Table 1).

Table 1. Descriptive data on Sample 2

		Number (percent)
Course of study	Administration	61 (6.1)
	Education studies	503 (50.7)
	Psychology	227 (22.9)
	Neurobiopsychology	40 (4.0)
	Informatics	134 (13.5)
	Management	28 (2.8)
Mode of study	Full time	748 (75.3)
	Part time	245 (24.7)
Year of study	First	502 (50.6)
	Second	312 (31.4)
	Third	128 (12.9)
	Fourth	38 (3.8)
	Fifth	13 (1.3)

Procedure

Both data collections used opportunistic sampling. Students were invited to participate anonymously in the study during lectures. More than 90% of all present students agreed to do so. In Sample 1 'paper and pencil' questionnaires were administered (September 2011). In Sample 2, 'paper and pencil' questionnaires were administered to 870 students, and 123 students completed online versions of the questionnaires (May, June, and October 2013). The BStAS for measuring study addiction was used in both samples. Different measures of personality and academic performance were used in Sample 1 and Sample 2. Questions about time devoted to studying and measures of learning engagement, quality of life, general health, quality of sleep and perceived stress were used only in Sample 2. No monetary or other material rewards were given for participation.

Instruments

Demographics. Both samples were asked about their age and gender. Respondents in Sample 2 were asked to provide estimates of the total number of hours they devote every week for studying at the university both in and outside of classes (e.g., at home or library). Using this information, a total number of study hours was computed.

Grade Point Average (GPA). In Sample 1, objective data on academic performance were obtained from the student registry at the Faculty of Psychology at the University of Bergen. GPA was based on the results of four exams that all first-year psychology students are required to sit. The grading scale was from A (best mark) to F (fail). The results of each exam were coded using numerals from 5 (for A grades) to 0 (for F grades). To ensure relatively high stability of results, the GPA was computed as arithmetic mean for individuals who sat at least three out of four exams. There were 105 such individuals.

In Sample 2 students were asked to provide the most accurate information about their GPA from the semester prior to the study and from their whole course of studies. When interval estimates were provided, the middle of interval was calculated. All participants studied at universities that used the same grading scale with 5 as a best result and 2 as a fail. This grading system also used half-points, and thus comprised a six-point grade system (without a 2.5 grade).

Study addiction. The Bergen Study Addiction Scale (BStAS) is an adaptation of the Bergen Work Addiction Scale (BWAS; Andreassen et al., 2012) and includes seven items that are based on the core elements of addiction (Brown, 1993; Griffiths, 2005; Leshner, 1997). The questions pertain to experiences during the past 12 months (see Appendix). The response alternatives ranged from never (1) to always (5). The overall score range is between 7 and 35. The Cronbach's alphas for the BStAS in Sample 1 and Sample 2 were .74 and .75, respectively.

Learning engagement. A one-item measure of learning engagement was used in Sample 2. Students were asked how engaged they were in studying. The response alternatives ranged from not at all (1) to totally engaged (7). This measure showed good test–retest reliability with a one-month interval between measurements (Atroszko, 2014). The intra-class correlation coefficient (ICC) was .77. In previous studies the measure has shown positive associations with learning time, learning self-efficacy, and learning enjoyment, suggesting that the measure possesses adequate criterion validity (Atroszko, 2013).

Personality. In Sample 1 the *NEO Five-Factor Inventory-Revised (NEO-FFI-R)* was administered (McCrae & Costa, 2004). The questionnaire assesses the Big Five traits of Neuroticism, Extroversion, Openness to Experience, Agreeableness, and Conscientiousness. The NEO-FFI-R comprises 60 items, 12 belonging to each of the five subscales. Items are rated on a 5-point Likert scale ranging from strongly disagree (0) to strongly agree (4). In the present study, all subscales showed good internal consistency. The Cronbach's alphas for the subscales were .85, .77, .77, .77, and .84, respectively. The gender adjusted T-scores were used in the analyses.

In Sample 2, the *Ten Item Personality Inventory (TIPI)* was used. The dimension of the five-factor model of personality was assessed by the TIPI (Gosling, Rentfrow & Swann Jr, 2003). The TIPI comprises 10 items, each consisting of a pair of descriptions that are scored from strongly disagree (1) to strongly agree (7). Each dimension of the Big Five (E – Extroversion, A – Agreeableness, C – Conscientiousness, N – Neuroticism and O – Openness) is represented by two items, one stated in a way that represents the positive pole of the dimension and the other stated in a way that represents the negative pole. In the present study the Spearman-Brown coefficients for the subscales were .65, .32, .55, .65, and .45, respectively, suggesting adequate reliability.

Quality of life, general health and quality of sleep. In Sample 2, three questions regarding quality of life were used. They were based on the WHOQOL Bref (Skevington, Lotfy & O'Connell, 2004). The response format was modified from a 5-point Likert scale to a 9-point Likert scale, as it is recommended to use at least a 7-point Likert response format data for testing based on an *a priori* basis at the item level. In a sub-sample of 73 Polish students (68 females and 5 males), the quality of life and quality of sleep measures showed good test–retest reliability and the general health measure had acceptable test–retest reliability. Two measurements were performed during a 3-week interval. The ICCs were .89 (95% CI = .82–.93), .82 (95% CI = .71–.89), and .65 (95% CI = .43 –.79), respectively.

Perceived stress. In Sample 2, the Perceived Stress Scale-4 was used (Cohen, Kamarck & Mermelstein, 1983). This scale has four items designed to assess the degree to which situations in one's life are considered stressful. Items are rated on a 5-point Likert format scale ranging from never (1) to very often (5). For the present sample the Cronbach's alpha reliability coefficient was .76.

Statistics

Factor analyses. A confirmatory factor analysis (CFA) using AMOS, version 21.0 was used to investigate the goodness of fit of the model with one-factor solution of the Bergen Study Addiction Scale (BStAS). Lack of correlation between error terms of the indicators was assumed. Maximum likelihood estimation method was used.

Correlational analysis. To examine the associations between the study variables, Pearson's product-moment correlation coefficients were calculated.

Table 2. Mean scores and standard deviations, percentages, and correlations between the study variables

	Variable	Mean (SD)/ Percentages	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
1.	Gender[a,b]	74.2% females/ 79.2% females		.09**	–.10**	.20**	–.14**	–.09**	–.07*	–.02	–.13**	–.26**	–.09**	–.06	–.10**	.01	–.11**	–.11**	.05	.04
2.	Age	21.57 (2.74)	–.02		.02	.12**	.01	.01	.03	.09**	.18**	.05	.05	–.03	–.07*	.02	–.08**	–.06	.02	.03
3.	BStAS	15.69 (4.73)	.08	–.11		.10**	–.10**	.01	.02	.16**	.02	.12*	.48**	.28**	.15**	.30**	.16**	–.07*	–.14**	–.15**
4.	Neuroticism	8.03 (2.72)	–.11	–.05	.33**		–.12**	.02	–.38**	–.24**	–.04	.12*	–.11**	.001	–.01	.02	.39**	–.21**	–.26**	–.21**
5.	Extroversion	9.5 (2.65)	.14*	–.14	–.06	–.47**		.42**	.11**	.20**	–.02	.01	.01	.003	.001	–.01	–.23**	.22**	.14**	.12**
6.	Openness	10.41 (2.14)	–.31**	.05	–.01	–.01	.03		.03	.20**	.06	.12*	.09**	.07*	.03	.09**	–.08*	.17**	.03	.01
7.	Agreeableness	9.73 (2.24)	.13	–.02	–.02	–.25**	.27**	.03		.13**	.05	.09	.10**	.03	.03	.01	–.12**	.14**	.14**	.11**
8.	Conscientioussness	9.39 (2.47)	.10	.04	.14*	–.25**	.28**	–.09	.37**		.21**	.21**	.35**	.15**	.11**	.13**	–.30**	.22**	.21**	.11**
9.	GPA last semester[c] Academic performance[d]	4.07 (.42) / 3.19 (.99)	.05	.11	.01	.12	–.01	.15	.12	.25*		.79**	.21**	.04	.08*	.001	–.09**	.08*	.06	.06
10.	GPA whole studies[e]	4.08 (.38)											.25**	.07	.07	.05	.01	.12*	.001	.03
11.	Learning engagement	4.44 (1.26)												.38**	.25**	.37**	–.15**	.13**	.05	.04
12.	Total time learning	25.69 (15.54)													.83**	.79**	–.03	.10**	–.02	–.04
13.	Time learning at the university classes	16.68 (9.82) 9.11 (8.89)														.32**	–.04	.09**	.01	–.04
14.	Time learning at home	10.63 (3.11)															–.01	.06	–.04	–.02
15.	General stress (PSS4)	6.74 (1.36)																–.41**	–.34**	–.33**
16.	General quality of life	5.73 (2.12)																	.38**	.34**
17.	General health	5.56 (2.12)																		.44**
18.	Quality of sleep																			

*$p < .05$; **$p < .01$

[a] 0 = women, 1 = men; [b] The correlation coefficients are point-biserial correlation coefficients; [c] $n = 868$ (87.4% of whole sample); [d] $n = 105$; [e] $n = 418$ of 491 students (85.1%) of second and higher years.

Note: Above diagonal are results for Sample 2, below diagonal are results for Sample 1 (including correlation coefficients with Big Five personality traits measured by NEO–FFI–R reported in Andreassen, Griffiths et al. (2013)).

Regression analyses. Several hierarchical multiple regression analyses were conducted. Dependent and independent variables for particular models are shown in Tables 2, 4 and 5. In Sample 2 for GPA's as dependent variables, learning engagement was added in Step 4 as an independent variable to test the effect of study addiction while controlling for learning engagement. All tests were two-tailed, and the significance level was set to $\alpha = 0.05$. For all linear regression analyses, preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity. Analyses were conducted using IBM SPSS.21.

Ethics

Since major health outcomes were not assessed in the present study the Regional Committee for Medical and Health Research Ethics deemed the project to fall outside their jurisdiction. However, the project was approved by both the Norwegian Data Protection Official for Research and the Research Ethics Committee at the Psychology Department of the University of Gdańsk. Attaining formal and written informed consent was not regarded as necessary by either of these committees as voluntary completion of the questionnaires was regarded as providing consent.

RESULTS

Descriptive statistics

Table 2 presents mean scores and standard deviations for all the study variables as well as their interrelationships.

Factor analyses and reliability

The 7-item BStAS model had a good fit in Sample 1 (minimum value of the discrepancy function divided by degrees of freedom (CMIN/DF) = 1.19, RMSEA = .030 (90% confidence interval (CI) = .000–.076), CFI = .99, TLI = .98). The standardized regression weights ranged from .43 to .62. The 7-item BStAS model had an acceptable fit in Sample 2 (CMIN/DF = 6.57, RMSEA = .075 (90% CI = .061– .090), CFI =.94, TLI = .91) (Hu & Bentler, 1999). The standardized regression weights ranged from .43 to .75. Figure 1 shows the model and the standardized regression weights for each of the seven items in Sample 1 and Sample 2.

Study addiction predictors

The regression analysis for study addiction showed that the independent variables explained a total of 6.6% of the variance ($F_{7,967} = 9.83$, $p < .001$). Significant independent variables in Step 2 were gender (β = –.08), showing that women scored higher on BStAS, Neuroticism (β = .14), Extroversion (β = –.14), and Conscientiousness (β =.20) (see Table 3).

Perceived stress, general quality of life, general health and sleep quality

The regression analysis for perceived stress showed that the independent variables explained a total of 24.4% of the variance ($F_{9,965} = 34.55$, $p < .001$). Significant independent variables in Step 3 were gender (β = –.06), Neuroticism (β = .30), Extroversion (β = –.15), Conscientiousness (β = –.23), and study addiction (β = .15) (see Table 4). The regression analysis for general quality of life showed that the independent variables explained a total of 13.1% of the variance ($F_{9,951} = 16.35$, $p < .001$). Significant independent variables in Step 3 were gender (β = –.11), age (β = –.09), Neuroticism (β = –.18), Extroversion (β = .10), Openness (β = .09), Conscientiousness (β =.15), and study addiction (β = –.07) (see Table 4). The regression analysis for general health showed that the independent variables explained a total of 11.8% of the variance ($F_{9,949} = 14.42$, $p < .001$). Significant independent variables in Step 3 were Neuroticism (β = –.18), Extroversion (β = .08), Conscientiousness (β = .17), and study addiction (β = –.14) (see Table 4). The regression analysis for sleep quality showed that the independent variables explained a total of 7.8% of the

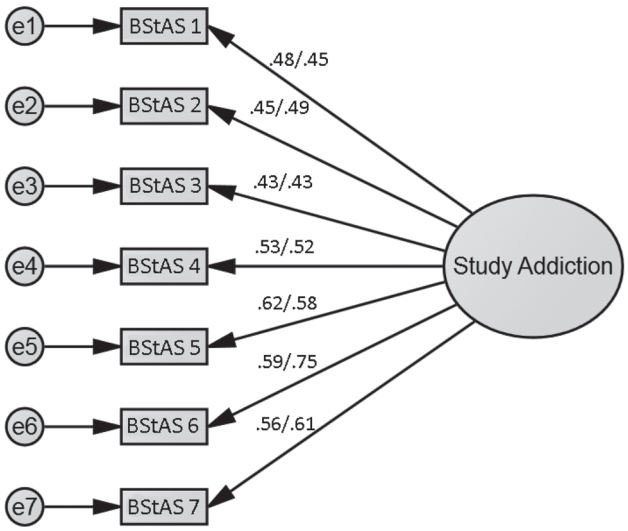

Figure 1. The factor structure and the standardized loadings of the items on the Bergen Study Addiction Scale (Sample 1/Sample 2)

Table 3. Results of hierarchical multiple regression analyses in which age, gender, and the five-factor model dimensions measured by TIPI (Neuroticism, Extroversion, Openness to experience, Agreeableness and Conscientiousness) were regressed upon the scores on BStAS

Step	Predictor[a]	*β*	ΔR^2
1	Gender[b]	–.098**	.010**
	Age	.031	
2	Gender[b]	–.080*	.056**
	Agee	.028	
	Neuroticism	.136**	
	Extroversion	–.136**	
	Openness to Experience	.021	
	Agreeableness	.062	
	Conscientiousness	.200**	
	Total R^2		.066**

*$p < .05$; ** $p < .01$
[a] Sample 2; [b] 0 = women, 1 = men

Table 4. Results of hierarchical multiple regression analyses in which age, gender, the five-factor model dimensions (Neuroticism, Extroversion, Openness to experience, Agreeableness and Conscientiousness), and study addiction were regressed upon the general perceived stress, exam/test stress, general quality of life, general health, and sleep quality

		Perceived stress[a]		General quality of life[a]		General health[a]		Sleep quality[a]	
Step	Predictor	β	ΔR^2	β	ΔR^2	β	ΔR^2	β	ΔR^2
1	Gender[b]	–.107**	.018**	–.101**	.014	.049 .019	.003	.031	.002
	Age	–.073*		–.053				.028	
2	Gender[b]	–.073*	.205**	–.104**	.113	.032	.096**	.014	.058**
	Age	–.019		–.089**		–.017		.001	
	Neuroticism	.317**		–.184**		–.197**		–.178**	
	Extroversion	–.172**		.113**		.101**		.106**	
	Openness to Experience	.023		.086*		–.035		–.044	
	Agreeableness	.040		.026		.037		.025	
	Conscientiousness	–.196**		.141**		.138**		.053	
3	Gender[b]	–.062*	.021**	–.109**	.004*	.021	.019**	.004	.017**
	Age	–.023		–.087**		–.013		.004	
	Neuroticism	.296**		–.175**		–.178**		–.160**	
	Extroversion	–.152**		.104**		.081*		.086*	
	Openness to Experience	.020		.087**		–.032		–.041	
	Agreeableness	.031		.030		.046		.034	
	Conscientiousness	–.226**		.154**		.166**		.080*	
	Study addiction	.149**		–.066*		–.142**		–.136**	
	Total R^2		.244**		.131**		.118**		.078**

*$p < .05$; ** $p < .01$

[a] Sample 2; [b] 0 = women, 1 = men

($F_{9,945} = 9.71$, $p < .001$). Significant independent variables in Step 3 were Neuroticism (β = –.16), Extroversion (β = .09), Conscientiousness (β =.08), and study addiction (β = –.14) (see Table 4).

Academic performance

The regression analysis for academic performance (in Norwegian students) showed that the independent variables explained a total of 16.9% of the variance ($F_{8,96} = 2.44$, $p = .019$). Significant independent variables in Step 3 were Neuroticism (β = .23), Openness to Experience (β = .22), and Conscientiousness (β = .32) (see Table 5). The regression analysis for GPA last semester (in Polish students) showed that the independent variables explained a total of 11.8% of the variance ($F_{9,851} = 13.74$, $p < .001$). Significant independent variables in Step 4 were gender (β = –.14), age (β = .18), Extroversion (β = –.10), Conscientiousness (β =.15), study addiction (β = –.13), and learning engagement (β = .20) (see Table 5). The regression analysis for GPA whole studies (in Polish students) showed that the independent variables explained a total of 17.0% of the variance ($F_{9,406} = 9.26$, $p < .001$). Significant independent variables in Step 4 were gender (β = –.22), Neuroticism (β = .13), Extroversion (β = –.12), Conscientiousness (β = .18), and learning engagement (β = .20) (see Table 5).

DISCUSSION

For the purposes of the present investigation, study addiction was conceptualized within the theoretical framework of work addiction (i.e., workaholism), and we hypothesized that it is an early developmental aspect/path of workaholism manifested within the education system before individuals enter their occupational career. The tool for assessing study addiction (BStAS) was adapted from the Bergen Work Addiction Scale (Andreassen et al., 2012) and its validity and reliability was tested in cross-cultural student samples. Content validity was established (part of H1) by comparing the scale content with the universe of content defining the construct (Cozby, 2009). As expected, factor-analytical results confirmed a one-factor solution of BStAS (part of H1). All factor loadings were significant, with standardized values above .40. The fit indices were slightly better in Sample 1 than in Sample 2.

Study addiction and personality

The study comprising Polish students using a different instrument for assessing Big Five personality traits (TIPI) replicated the findings from the Norwegian study as far as positive association between study addiction and Neuroticism and Conscientiousness, and the lack of relationship with Agreeableness (Andreassen, Griffiths et al., 2013) (H2 substantiated). These results are in large part in line with previous research on personality correlates of workaholism (e.g., Andreassen, Griffiths et al., 2014; Andreassen, Hetland & Pallesen, 2010; Aziz & Tronzo, 2011; Burke, Matthiesen & Pallesen, 2006; Clark, Lelchook & Taylor, 2010). In Sample 2, Extroversion was negatively related to study addiction, unlike previously cited studies on workaholism (e.g., Andreassen, Griffiths et al., 2014; Andreassen et al., 2010; Aziz & Tronzo, 2011; Burke et al., 2006; Clark et al., 2010).

Table 5. Results of hierarchical multiple regression analyses in which age, gender, the five-factor model dimensions (Neuroticism, Extroversion, Openness to experience, Agreeableness and Conscientiousness), study addiction and learning engagement were regressed upon the academic performance and GPA

		Academic performence (Norway)[a]		GPA last semester (Poland)[b]		GPA whole studies (Poland)[b]	
Step	Predictor	β	ΔR^2	β	ΔR^2	β	ΔR^2
1	Gender[c]	–.066	.017	–.142**	.054**	–.262**	.072**
	Age	.121		.196**		.066	
2	Gender[c]	–.137	.136*	–.146**	.045**	–.227**	.071**
	Age	.151		.176**		.046	
	Neuroticism	.173		–.008		.125*	
	Extroversion	–.036		–.107**		–.125*	
	Openness to Experience	.199*		.059		.087	
	Agreeableness	.041		.016		.106*	
	Conscientiousness	.295**		.196**		.227**	
3	Gender[c]	–.151	.015	–.149**	.002	–.224**	.001
	Age	.163		.178**		.045	
	Neuroticism	.234*		–.001		.120*	
	Extroversion	–.021		–.113**		–.121*	
	Openness to Experience	.224*		.061		.084	
	Agreeableness	.017		.019		.105*	
	Conscientiousness	.319**		.205**		.221**	
	Study addiction	–.140		–.045		–.037	
4	Gender[c]			–.141**	.027**	–.222**	.027**
	Age			.179**		.039	
	Neuroticism			.019		.131*	
	Extroversion			–.103**		–.115*	
	Openness to Experience			.051		.069	
	Agreeableness			.011		.087	
	Conscientiousness			.154**		.177**	
	Study addiction			–.134**		–.064	
	Learning engagement			.199**		.204**	
	Total R^2		.169*		.118**		.170**

* $p <$ .05; ** $p <$ .01

[a] Sample 1; [b] Sample 2; [c] 0 = women, 1 = men

Study addiction and psychological wellbeing, stress, and health

Results showed that study addiction was positively related to perceived stress and negatively associated with general quality of life, general health, and sleep quality above and beyond personality factors (H3 substantiated). The results parallel current knowledge about negative correlates of work addiction (Andreassen et al., 2011; Atroszko, 2012; Kubota et al., 2012; Shimazu et al., 2011; Shimazu & Schaufeli, 2009).

Study addiction and academic performance

When controlling for personality traits, and in Sample 2 also for learning engagement, study addiction was negatively associated with immediate academic performance (H4 substantiated). However, in Sample 1, results were statistically non-significant, probably due to the relatively small sample size in terms of exam results. Non-significant results when predicting the GPA for the studies as a whole may be related to the changes in study addiction over time, as symptoms of pathological over-involvement may develop throughout the study period, while high learning commitment may be more stable. This interpretation finds support in the fact that learning engagement was a significant predictor of GPA across the whole study period.

Study addiction versus learning engagement

The correlation between BStAS and learning engagement was moderately high. However, about three-quarters of the variance in BStAS was not accounted for by learning engagement, implying that other factors than commitment to studying largely contribute to study addiction. Both study addiction and learning engagement showed a positive relationship with learning hours at the university classes and at home. As previously discussed, study addiction showed a negative association with academic performance and psychological wellbeing, and a positive association with perceived stress. Learning engagement showed the reversed relationship with these constructs and no relationship with general health and sleep quality. The results suggest that study addiction has negative consequences whereas learning engagement has positive ones (H5 substantiated). This is similar to the distinction between workaholism and work

engagement (Andreassen & Pallesen, in press). These results also confirm the criterion validity of the BStAS, as well as its construct validity (part of H1 substantiated).

Strengths and limitations

In terms of limitations, both Sample 1 and Sample 2 were convenience samples, predominantly female, and they mainly comprised psychology and education students. Therefore, the results of the present study cannot be generalized to other populations without some reservation. The restricted amount of data on exam grades in Sample 1 also limited statistical power of relevant analyses. Furthermore, all data – apart from academic performance in Sample 1 – were self-reported and are therefore open to the usual weaknesses of such data (such as social desirability bias, recall biases, common method bias, etc.).

Regarding the strengths of the present study, it is the first ever study (as far as the authors are aware) to conceptualize study addiction and to test psychometric properties of a corresponding measurement tool, although a previous study did examine study addiction as part of a larger study on personality and behavioral addiction (i.e., Andreassen, Griffiths et al., 2013). Samples also included students from two countries and allowed some level of cross-cultural comparison to be carried out. Several variables comprising possible antecedents and consequences of study addiction were used, including valid and reliable measures of personality, psychological wellbeing, health, stress, and academic performance. Consequently, this study significantly adds to the existing literature on workaholism and behavioral addictions, and lays both the foundation and benchmark for future research into study addiction (in and of itself).

Conclusions and future research directions

In general, the new Bergen Study Addiction Scale (BStAS) demonstrated good reliability and validity. The initial findings appear to support the concept of study addiction and provide an empirical base for its further investigation. As expected, study addiction appears to be related to several negative consequences and problems. The findings also demonstrate a clear distinction between study addiction and learning engagement, with the latter being linked to several positive consequences. Future research should attempt to collect and analyze further data on the psychometric properties of BStAS and develop cut-off values. Furthermore, replication studies using representative samples of students would aid the examination of the incidence and prevalence of the study addiction in countries both in- and outside of those in the present investigation. Longitudinal studies and data collection in younger samples (e.g., high school) are also warranted as such data may provide useful information in terms of possible developmental risk factors, determinants, and correlates of study addiction. The relationship between study addiction and later work addiction could also be investigated longitudinally in order to investigate if these aspects are part of the same phenomenon and/or pathological process. The temporal stability of study addiction should also be examined. Finally, additional studies on the relationship between study addiction and academic performance are needed to identify which aspects underlying study addiction most impair performance.

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APPENDIX

The Bergen Study Addiction Scale (BStAS)

Instructions: Below you find seven questions related to studying. Answer each of the seven questions by selecting the one response alternative (ranging from "never" to "always") for each question that best describes you.

How often during the last year have you…

Item	Wording	Addiction components
BStAS1	Thought of how you could free up more time to study?	Salience
BStAS2	Spent much more time studying than initially intended?	Tolerance
BStAS3	Studied in order to reduce feelings of guilt, anxiety, helplessness and depression?	Mood modification
BStAS4	Been told by others to cut down on studying without listening to them?	Relapse
BStAS5	Become stressed if you have been prohibited from studying?	Withdrawal
BStAS6	Deprioritized hobbies, leisure activities, and exercise because of your studying?	Conflict
BStAS7	Studied so much that it has negatively influenced your health?	Problems

Note: All items are scored along the following scale: "never" = 1, "rarely" = 2, "sometimes" = 3, "often" = 4, "always" = 5. The Bergen Study Addiction Scale may be freely used for research purposes only. Non-scientific or commercial use requires granted permission by authors.