Type-A personality competitiveness component linked to increased cardiovascular risk is positively related to study addiction but not to study engagement

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This research constitutes an initial effort to examine the relationship between study addiction, which is a newly conceptualized behavioural addiction, study engagement and type-A personality (TAP) linked to increased cardiovascular risk. Bergen Study Addiction Scale, Utrecht Work Engagement Scale-Student, and The Framingham Type-A Scale were used for this purpose. A total of 127 Polish students participated in the study. Study addiction was positively related to all components of study engagement and type-A personality traits. However, study engagement was not positively related to TAP traits when study addiction was controlled. The results provide further evidence that study addiction is a different construct than study engagement, and suggest that it is crucial to control study addiction whenever study engagement is being analysed.

Keywords: Cardiovascular risk, study addiction, study engagement, type-A personality, workaholism.

STUDY addiction has been recently conceptualized within the framework of theory and research on work addiction as an excessive pathological involvement in studying to the exclusion of other spheres of life and/or generating health problems[1,2]. It is hypothesized to be a potential precursor or an early form of work addiction which may manifest itself in adolescence in relation to studying[3]. While some researchers expressed doubts about the conceptualization of work addiction[4], lately it was pointed out that work addiction has been studied for several decades and fulfils the criteria suggested by Kardefelt-Winther *et al.*[4] for conceptualizing behavioural addiction[5,6]. Studies show comorbidity of work addiction with other disorders such as attention-deficit hyperactivity disorder (ADHD) or obsessive–compulsive disorder (OCD)[7,8]. Nevertheless, work addiction is characterized by specific phenomenology and aetiology. These co-occurrences with other psychopathologies and particular symptomatology are consistent with studies on other addictions[8]. Consequently, while the consensus among researchers regarding different aspects of conceptualizing work addiction is an ongoing process, majority of researchers in the field currently define it within the addiction framework[9]. It has been suggested that excessive studying may be an OCD-related disorder[10,11]. However, recently it has been extensively argued that the data seem more consistent with a model in which obsessive compulsiveness may underlie some types of work/study addiction (but not all), and perhaps some forms of obsessive–compulsive personality disorder (OCPD) could be re-classified as work/study addiction[12–14]. More studies are however needed to unearth the nature, different forms and underlying risk factors of this problematic behaviour. Work addiction is estimated to affect 8–10% of the population[6], and may be the cause of many health problems (anxiety, depression, sleep problems, cardiovascular disease (CVD)) and social functioning problems (work–family conflict, marital disaffection, work–life imbalance)[6,9]. Study addiction was shown to be temporarily stable and related to work addiction in cross-cultural longitudinal studies[15,16]. Analogously to work addiction, it shows negative relationship to well-being and performance[1,2] and similar prevalence rates[17].

Study addiction has been shown to be a different construct from study engagement[1,2], which parallels the well-established differentiation between work addiction and work engagement/passion for work[6,9,12,17,18]. It has been emphasized in the conceptualization of study addiction that while study engagement and study addiction are to some extent related due to time and energy devoted to learning, they have different antecedents and consequences. Therefore, as a result of this partial overlap, study addiction should be taken into account when analysing the relationship between learning engagement, and psychosocial and academic functioning of students. For example, the positive relationship between learning engagement and exam stress or the negative relationship of study engagement with sleeping time, found in a recent study[19,20], might be due to study addiction factor. Consequently, it is important to control study addiction, whenever study engagement is analysed.

Previous research has linked work addiction to type-A personality (TAP) traits[21]. Competitiveness component of TAP is a recognized risk factor for mortality related to CVD[22]. This is the primary cause of death and disability all over the world[23]. Up to one-third of the adult population around the world is estimated to suffer from hypertension[24]. Currently, it is well evidenced that long working hours and work stress are risk factors for CVD[25]. Work addiction has been connected to CVD as early as in the 1970s in the medical literature[26], and there are some preliminary empirical studies confirming this link[27]. Exceptionally high engagement in work is related to karoshi – a phenomenon of sudden death due to cardiac arrest[28], which is among several indicators of deterioration in the well-being due to high workload currently

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plaguing Asian countries[29]. Similarly, recent research has found association of study addiction to TAP[1].

On the basis of previous findings it can be hypothesized that TAP is related to study addiction but not to study engagement per se (hypothesis 1). TAP is related to competitiveness, hurry and the need for achievement and recognition, which are distinctive for work/study addiction rather than healthy engagement itself[1]. To provide more data on the differences between study addiction and study engagement, the relationship of these constructs with TAP was examined. Highly driven individuals are gratified on many different levels by the society, e.g. in terms of grades in education system or salaries at work. However, excessive competitiveness may lead to deteriorated health. Therefore, it is crucial to distinguish between those driven by passion for learning from individuals mainly driven by the need to compete with others for accomplishments. While previous studies confirmed positive relationship between study addiction and learning engagement measured by a single-item measure[1,2], the present one study uses a multi-item three-component scale of study engagement[30,31] based on the conceptualization of work engagement[32]. Therefore, it provides data on the relationship between study addiction and different facets of study engagement. Previous research showed that the absorption component of work engagement was the strongest correlate of work addiction/compulsive working[33–35]. This is to be expected because absorption is related to the state in which a person is highly focused and immersed in work so that time passes rapidly and it is difficult to disengage from work, which is congruent with the 'high' and feeling of being carried away produced by addictive behaviour.

On the other hand, the other two dimensions are more unequivocally positive: vigour is characterized by high energy and psychological resilience while working, and dedication is related to the person's sense of meaning, passion, inspiration, self-importance and challenge related to work. On this basis, it is assumed that the absorption component of study engagement will show the strongest positive relationship to study addiction (hypothesis 2), and both TAP and study engagement will have unique variance in study addiction (hypothesis 3). While study addiction shares time and energy involvement in learning with study engagement, it also includes competitive drive and hurry which are typical for TAP. From this perspective, study addiction could be perceived as a combination of involvement and rivalry.

One hundred twenty-seven students took part in the present study. It included 105 women (82.68%) and 21 men (16.54%) and one person (0.79%) did not report gender, with the mean age of 21.68 years (SD = 3.27; range 18–40), and one person (0.79%) did not report age. Students were from the Faculty of Social Sciences and the Faculty of Law and Administration at the University of Gdańsk, Poland. Seventy-six individuals (59.84%) studied criminology, 49 (38.58%) studied psychology and two (1.57%) did not report their field of study. Participants were from different years of their degree (the first and the second year), and from different modes of study (full time and part-time).

The respondents filled the following three self-report questionnaires. Study addiction was measured by the seven-item Polish version of Bergen Study Addiction Scale (BStAS)[1,2], based on Bergen Work Addiction Scale (BWAS)[36]. TAP was measured by the ten-item Polish version of The Framingham Type-A Scale (FTAS)[37], which measures two components: hurry and competitiveness. Learning engagement was measured by the nine-item Polish version of Utrecht Work Engagement Scale-Student (UWES-S), which is a research tool adapted by the present author, and based on the original UWES-S[38,39] and the Polish version of the nine-item Utrecht Work Engagement Scale (UWES)[40]. All measures showed adequate psychometric properties.

Convenience sampling was used and students participated in the study during their classes/lectures. All participants filled in the 'paper and pencil' anonymous questionnaires. The study took place in the spring of 2015.

Pearson's product–moment and point–biserial correlation coefficients were calculated, and z statistics was used to compare correlation coefficients taking into account the correlation of unshared variables. All variables met the requirements for using Pearson's or point bi-serial correlation coefficients[41]. Furthermore, the analyses included four hierarchical regression models. All tests were two-tailed, and the significance level was set to $\alpha = 0.05$. For all linear regression analyses, preliminary analyses were performed to ensure no violation of the assumptions of normality, homoscedasticity, multicollinearity and linearity. Statistical analysis was done using IBM SPSS Statistics 24.0.

Study addiction was positively related to three components of study engagement: vigour ($r = 0.19$; $P < 0.05$), dedicaton ($r = 0.23$; $P < 0.01$) and absorption ($r = 0.49$; $P < 0.01$), and two components of TAP: hurry ($r = 0.26$; $P < 0.01$) and competitiveness ($r = 0.37$; $P < 0.01$). Absorption was positively related to competiveness ($r = 0.21$; $P < 0.05$) (Table 1). The scatter plots of significant correlations are provided in the Supplementary Material. The correlation between study addiction and absorption was significantly stronger than with vigour ($z = 4.91$; $P < 0.001$) or dedication ($z = 4.13$; $P < 0.001$).

The hierarchical regression analysis in which the variable explained was vigour showed that the independent variables included in step 1 explained 0.6% of the variance ($F_{2,123} = 0.378$, $P > 0.05$). The independent variables included in step 2 explained additional 0.8% of the variance ($F_{2,121} = 0.463$, $P > 0.05$). The independent variables included in step 3 explained additional 5.3% of the variance ($F_{1,120} = 6.801$, $P < 0.05$). The independent

Table 1. Mean, standard deviations, percentage and Pearson's correlation coefficients of gender, age, study addiction, three components of study engagement (vigour, dedication and absorption) and two components of type-A personality (TAP; hurry and competitiveness)

Variable	*M* (SD)	Age	SA	SE-V	SE-D	SE-A	TAP-H	TAP-C
Gender[ab]	83.3% female	0.12	–0.27**	0.03	–0.12	–0.10	–0.21*	0.004
Age	21.68 (3.27)		–0.002	0.07	–0.06	0.02	0.11	0.02
SA	16.56 (5.61)			0.19*	0.23**	0.49**	0.26**	0.37**
SE-V	5.71 (4.26)				0.62**	0.72**	–0.08	–0.02
SE-D	9.92 (4.47)					0.70**	–0.09	0.05
SE-A	6.69 (4.25)						0.04	0.21*
TAP-H	0.61 (0.23)							0.52**
TAP-C	0.51 (0.23)							

SA, Study addiction, SE-V, Study engagement (vigour), SE-D, Study engagement (dedication), SE-A, Study engagement (absorption), TAP-H, Type-A personality (hurry), TAP-C, Type-A personality (competitiveness).
[a]0, Woman; 1, Man.
[b]Point-biserial correlation coefficients.
*$P < 0.05$; **$P < 0.01$.

Table 2. Results of hierarchical regression analysis with the variables explained being three components of study engagement and explanatory variables were gender, age, TAP and study addiction

		SE-V		SE-D		SE-A	
Step	Predictor	β	ΔR^2	β	ΔR^2	β	ΔR^2
1	Gender[a]	0.02	0.006	–0.11	0.016	–0.10	0.011
	Age	0.07		–0.04		0.03	
2	Gender[a]	0.00	0.008	–0.16	0.029	–0.14	0.062*
	Age	0.09		–0.02		0.05	
	TAP-H	–0.10		–0.20		–0.16	
	TAP-C	0.03		0.16		0.30**	
3	Gender[a]	0.07	0.053*	–0.10	0.042*	–0.01	0.188**
	Age	0.08		–0.02		0.04	
	TAP-H	–0.11		–0.20		–0.16	
	TAP-C	–0.06		0.07		0.12	
	SA	0.26*		0.23*		0.49**	
	Total R^2		0.067		0.087		0.261**

TAP-H, Type-A personality (hurry); TAP-C, Type-A personality (competitiveness).
[a]0, Woman; 1, Man.
*$P < 0.05$; **$P < 0.01$.

variables explained a total of 6.7% of the variance ($F_{5,120} = 1.711$, $P > 0.05$). The significant independent variable in step 3 was study addiction ($\beta = 0.26$) (Table 2).

The regression analysis in which the variable explained was dedication showed that the independent variables included in step 1 explained 1.6% of the variance ($F_{2,123} = 0.978$, $P > 0.05$). The independent variables included in step 2 explained additional 2.9% of the variance ($F_{2,121} = 1.853$, $P > 0.05$). The independent variables included in step 3 explained additional 4.2% of the variance ($F_{1,120} = 5.501$, $P < 0.05$). The independent variables explained a total of 8.7% of the variance ($F_{5,120} = 2.280$, $P > 0.05$). The significant independent variable in step 3 was study addiction ($\beta = 0.23$) (Table 2).

The regression analysis in which the variable explained was absorption showed that the independent variables included in step 1 explained 1.1% of the variance ($F_{2,123} = 0.680$, $P > 0.05$). The independent variables included in step 2 explained additional 6.2% of the variance ($F_{2,121} = 4.025$, $P < 0.05$). The independent variables included in step 3 explained additional 18.8% of the variance ($F_{1,120} = 30.604$, $P < 0.01$). The independent variables explained a total of 26.1% of the variance ($F_{5,120} = 8.480$, $P < 0.01$). The significant independent variable in step 3 was study addiction ($\beta = 0.49$) (Table 2).

The regression analysis in which the variable explained was study addiction showed that the independent variables included in step 1 explained 7.2% of the variance ($F_{2,123} = 4.801$, $P < 0.05$). The independent variables included in step 2 explained additional 13.8% of the variance ($F_{2,121} = 10.604$, $P < 0.01$). The independent variables included in step 3 explained additional 19.3% of the variance ($F_{3,118} = 12.738$, $P < 0.01$). The independent variables explained a total of 40.4% of the variance ($F_{7,118} = 11.418$, $P < 0.01$). Significant independent variables in step 3 were gender, competitiveness (TAP) and absorption (study engagement) (Table 3).

To the best of our knowledge, there are no previous studies on the relationship between study addiction, learning engagement and TAP. Study addiction was positively related to all components of study engagement (absorption, vigour and dedication) and TAP traits (hurry and competitiveness). Moreover, study engagement was not positively related to TAP traits when study addiction was controlled (hypothesis 1 substantiated). The correlation between study addiction and absorption was significantly stronger than with vigour or dedication (hypothesis 2 substantiated). This is congruent with the notion that absorption may represent the 'high' quality of addictive behaviour. Regression model showed that female gender, competitiveness and absorption are significant

independent predictors of study addiction (hypothesis 3 substantiated). This indicates that study addiction has elements of both study engagement and TAP-related behaviour.

Summarizing, the results provide further evidence that study addiction is a different construct than study engagement. This is especially relevant in the context of health-related behaviour. TAP trait competitiveness is a well-recognized risk factor for CVD[22], which is the leading cause of mortality and morbidity in the world[23,24]. Our results show that it is study addiction and not study engagement per se that is related to TAP, and it has significant implications both for public health and educational interventions.

Thus, it is crucial to control study addiction whenever study engagement is being analysed. Otherwise, the results of research showing no relationship or negative relationship of study engagement with psychosocial and academic functioning may be misinterpreted, misleading or simply confusing[19,20]. The problem is that current research on study engagement does not differentiate healthy engagement from excessive and compulsive over-involvement (study addiction). This must be taken into account.

Study addiction is a newly conceptualized behavioural addiction still awaiting more recognition[1,2,12,17]. It is a subject of an emerging debate concerning its conceptualization[10–13] within a more general debate on work addiction[6,9]. In contrast, learning engagement, school engagement, academic engagement, student engagement or study engagement are well-established concepts both in psychological and educational literature[39,40]. The results of the present study have significant importance to the process of clear conceptual delineation between study engagement and study addiction, the former being a positive phenomenon related to health and productivity, and the latter being a negative process impacting both well-being and performance.

The strength of this study is the use of valid, reliable and popular research tools, and proper statistical analyses unravelling the complex intertwining of positive engagement and negative addiction in relation to studying. The weakness of this study is a small, predominantly female research sample (127 persons) imposing some reservations on the generalizability of the results.

Subsequent studies should examine more aspects related to differentiation of study engagement and study addiction, including the process through which high involvement into learning may turn into study compulsion. Clear distinction between healthy engagement and pathological compulsion may help in designing proper screening tools, identify early those at risk, and develop effective prevention and intervention programmes. Several approaches to manage study addiction have been suggested, including mindfulness practice, motivational interviewing and interventions based on cognitive behavioural approach[41].

Ethics/conflict of interest: The project was approved by the Research Ethics Committee at the Department of Psychology, University of Gdańsk, Poland. Obtaining formal and written informed consent was not required as voluntary completion of the questionnaires was regarded as providing consent. All participants in the study took part voluntarily and did not receive any reward. The authors declare no conflict of interest.

Table 3. Results of hierarchical regression analysis with the variable explained being study addiction and explanatory variables being gender, age, TAP and three components of study engagement

		SA	
Step	Predictor	β	ΔR^2
1	Gender[a]	–0.27**	0.072*
	Age	0.03	
2	Gender[a]	–0.27**	0.138**
	Age	0.02	
	TAP-H	0.01	
	TAP-C	0.37**	
3	Gender[a]	–0.20*	0.193**
	Age	0.00	
	TAP-H	0.06	
	TAP-C	0.20*	
	SE-V	–0.18	
	SE-D	–0.16	
	SE-A	0.67**	
	Total R^2		0.404**

[a]0, Woman; 1, Man. Standard regression coefficients are reported.
*$P < 0.05$; **$P < 0.01$.

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ACKNOWLEDGEMENTS. This study was funded by a grant of the Faculty of Social Sciences, University of Gdańsk, Poland for young scientists and doctoral students in 2015 (grant no. 538-7422-B910-15).

Received 10 April 2018; revised accepted 1 July 2019

doi: 10.18520/cs/v117/i7/1184-1188