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Asikainen, Henna

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Abstract

The purpose of this study was to examine university students' learning profiles and their relationship to study-related burnout as well as study progression and study achievement. The participants in the study were 339 first-year university students. Four clusters were found: Students applying a deep approach; Organised students; Students applying a surface approach; and Unorganised students applying a deep approach. The results show that students who apply a surface approach to learning in their studies are more likely suffer from study-related burnout, as students applying a deep approach experience less study-related burnout. In addition, unorganised students applying a deep approach also proceeded slower in their studies. The study suggests that students' study skills and their learning processes should be considered when considering study-related burnout in higher education.

1. Introduction

In the 21st century, universities are facing challenges in educating students to become versatile experts in their own fields who have the ability to search efficiently for the relevant and reliable information from a vast body of information and make use of digital technologies (Thompson, 2013). At the same time, in this demanding knowledge society, higher education students are suffering from stress more than before and growing mental problems are a serious concern (Hunt & Eisenberg, 2010; Zivin, Eisenberg, Gollust, & Golberstein, 2009). These problems may lead to study-related burnout, which has negative effects on students' wellbeing in the long run. Study-

related burnout has been found to predict depressive symptoms later (Salmela-Aro, Kiuru, Leskinen, & Nurmi, 2009) which can lead to stress and poorer achievement in their studies. Study-related burnout has also been found to have a negative effect on educational aspirations and educational attainment, and this effect can be long-lasting (Salmela-Aro & Upadaya, 2017).

Burnout in the work context has been defined as emotional exhaustion, cynicism and reduced professional efficacy (Maslach, Schaufeli, & Leiter, 2001). A similar definition of burnout has emerged in a school and university context, where study-related burnout has been defined through three components: study-related-exhaustion, cynicism and lack of study (Salmela-Aro et al., 2009; Salmela-Aro & Kunttu, 2010; Schaufeli, Bakker, Hoogduin, Schaap, & Kladier, 2001). Thus, it seems that the conceptualization of burnout is the same in both contexts, including the three components (Salmela-Aro, Rantanen, Hyvänen, Tilleman, & Feldt, 2011). Study-related exhaustion refers to feelings of being burdened or exhausted resulting from overtaxing work; cynicism refers to lack of interest and a cynical or indifferent attitude towards studying generally and in relation to others; and lack of professional efficacy refers to feelings of incompetence and poor achievement in studying (Salmela-Aro et al., 2009). All these aspects of study-related burnout have been found to affect students' engagement, including their dedication to university studies (Salmela-Aro & Upadaya, 2017). Studies concerning the relationship between study-related burnout and engagement have focused more on integration in studies such as dedication, vigour and absorption in studies (Salmela-Aro, 2017; Salmela-Aro & Read, 2017) but research concerning the relationship between students' learning processes comprising cognitive engagement and study-related burnout is missing.

Student engagement has been examined widely through study processes and the strategies students use when studying (Kong, Wong, & Lam, 2003; Miller, Greene, Montalvo, Ravindran, & Nichols, 1996; Nolen, 1988). These strategies also reflect students' approaches to learning (Ainley, 1993) which reflect qualitatively different ways of going about learning and studying (Asikainen & Gijbels, 2017; Lonka, Olkinuora, & Mäkinen, 2004). A deep approach to learning, that is aimed at understanding and applying critical thinking and related ideas in learning have been found to be associated with better learning outcomes than the qualitatively different surface approach to learning which emphasises memorising and struggling with the fragmented knowledgebase (Asikainen, Parpala, Virtanen, & Lindblom-Ylänne, 2013; Entwistle & Ramsden, 1983). It has been shown that students who apply the surface approach to learning have a repetitive strategy in learning with a fragmented knowledge base, experience heavy workloads in their studying and have negative perceptions of the teaching-learning environment (Kyndt, Dochy, Struyven, & Cascallar, 2011). In addition, the way students experience workload obstacles in their studying is related to their processes of understanding (Hailikari, Tuononen, & Parpala, 2018). There is evidence that perceived workload is related to burnout and especially to the exhaustion which is one dimension of burnout (Maslach et al., 2001). Thus, it could be expected that study-related burnout would also be positively related to the surface approach to learning.

A third approach to learning, namely Organised studying, has also been distinguished which emphasises time management, organised studying and effort in their studies (Entwistle & McCune, 2004). The need for good time and effort management skills has been emphasized in earlier research regarding student exhaustion, and it has been

shown that students who have trouble managing their studying, experience high levels of stress, exhaustion and lack of interest in studying (Heikkilä, Lonka, Nieminen, & Niemivirta, 2012). Organised studying has also been found to be important in study success and progression in study at university (Asikainen, 2014; Hailikari & Parpala, 2014; Hailikari et al., 2018; Rytönen, Parpala, Lindblom-Ylänne, Virtanen, & Postareff, 2012). These findings indicate that organised studying is a critical factor in supporting students' wellbeing and study success, more precisely how they proceed in their studies (Asikainen, Parpala, Lindblom-Ylänne, Vanthournout, & Coertjens, 2014; Postareff, Mattsson, Lindblom-Ylänne, & Hailikari, 2017; Rytönen et al., 2012). Thus, it can be expected that organized studying is one factor which affects study-related burnout among university students.

Studies have shown that students also apply different combinations of approaches to learning (Entwistle & Entwistle, 2003; Meyer, 2000; Parpala, Lindblom-Ylänne, Komulainen, Litmanen, & Hirsto, 2010). Parpala et al. (2010) explored university students in several disciplines and found four combinations in students' approaches to learning using latent profile analysis: 1) Organised students, 2) Students applying a deep approach, 3) Students applying a surface approach, and 4) Unorganised students applying a deep approach. In the latter profile, students' scores in the deep approach were high but their scores for Organised studying, that is their time management and effort in studying were quite low (Parpala et al., 2010). This combination of a deep approach to learning and unorganised studying has been shown to cause to problems in study progression (Asikainen et al., 2013; Ruohoniemi, Parpala, Lindblom-Ylänne, & Katajavuori, 2010). Thus, it could be expected that unorganised students could experience more study-related burnout. The way students representing these different

learning profiles experience their well-being including study-related burnout have not been explored previously, although these differences could be expected.

Although it is a relatively new research topic, study-related burnout has rapidly gained international attention, a fact that speaks to its perceived relevance in Finland (Salmela-Aro & Kunttu, 2010; Salmela-Aro & Upadhyaya, 2017; Salmela-Aro & Read, 2017) and in many other countries (Fiorilli, De Stasio, Di Chiacchio, Pepe, & Salmela-Aro, 2017; Herrmann, J., Koeppen, & Kessels, 2019; Seibert, May, Fitzgerald, & Fincham, 2016; Yang & Chen, 2016). Although research into study-related burnout has been undertaken, the relationship between study-related burnout and students' learning processes has not yet been studied. Thus, it is important to examine how different students with different learning profiles experience study-related burnout to understand the connection better and support students in their study at university, and especially in the early stage of the studies because study-related burnout has been shown to increase over time at university (Salmela-Aro & Read, 2017; Väisänen, Pietarinen, Pyhältö, & Soini, 2018). Recent research has pointed out that the exhaustion seems to be the core of the study-related burnout and that the emotional and cognitive impairments are the outcomes of burnout (Shaufeli, 2019). Thus, we need more studies to examine the paths between burnout and learning, but it might be that burnout impairs cognitive functions which then are evident in terms of learning strategies.

2. The present study

The aim of this study was to examine different learning profiles and to examine the extent to which they would differ in study-related burnout. The aim is also to examine the relationship between learning profiles, study-related burnout, study progression and

study success. The specific research questions were: 1) What learning profiles can be identified? 2) How are the learning profiles related to the components of study-related burnout, study progression and study achievement?

3. Hypotheses

We expect to identify four student learning profiles found earlier with university students (Parpala et al., 2010): Students applying a deep approach, Organised students, Students applying a surface approach and Unorganised students applying a deep approach. Next, we hypothesised that students who are organised in their studying and apply a deep approach to learning experience less study-related burnout than students who apply a surface approach to learning and unorganised students applying a deep approach. Studies have shown that a deep approach to learning combined with organised studying is related to more successful studying (Asikainen et al., 2013; Entwistle & Ramsden, 1983) and experiences of less workload in their studies (Kyndt et al., 2011). In addition, it has been shown that students applying a surface approach to learning are also more likely to experience study-related burnout, since previous studies have shown the relationship between surface approach to learning and heavy workload (Kyndt et al., 2011). We also hypothesised that a lack of organised studying (even if students apply a deep approach to learning) could result in study-related burnout since it has been shown to result in problems in proceeding in studies (Asikainen et al., 2013; Haarala-Muhonen, Ruohoniemi, & Lindblom-Ylänne, 2011; Ruohoniemi et al., 2010).

4. Methods

4.1. Participants

The data were collected in the Faculty of Pharmacy, the Faculty of Theology and the Faculty of Biological and Environmental sciences at the University of X. These disciplines were chosen because students in these disciplines have been shown to have more problems with their time management (Parpala et al., 2010), processes of understanding (Nieminen, Lindblom-Ylänne, & Lonka, 2004) and workload (Ruohoniemi et al., 2010) which have been shown to cause problems with study and student progress (Asikainen et al., 2013). The participants in this study were 339 first-year students voluntarily participating in our study from the faculties mentioned above, and the students were majoring in theology (102), pharmacy (134), biosciences (70) and environmental sciences (33). The response rate in theology was 59%, bioscience 48%, pharmacy 75%, and environmental sciences 92%. Of the respondents, 84 were male and 225 were female students.

4.2. Measures and procedures

The data for this study were gathered in spring 2016 at the end of the first academic year using a HowULearn questionnaire (Parpala & Lindblom-Ylänne, 2012). Analysis was carried out on two sections of the HowULearn questionnaire. We used the section concerning students' approaches to learning which consisted of three Likert-type scales (1=totally disagree, 5=totally agree): the Deep approach to learning (4 items, e.g. 'I look at evidence carefully to reach my own conclusions about what I'm studying'), the surface approach to learning (4 items e.g. 'Even though I study things repeatedly to remember them, they do not make sense to me'), and Organised study (4 items e.g. 'I am generally systematic and organised in my studies') (Parpala & Lindblom-Ylänne, 2012). The section measuring approaches to learning in the HowULearn

questionnaire has been shown to be a robust instrument in a range of contexts (e.g. (Herrmann, K. J., Bager-Elsborg, & Parpala, 2017)).

The other section from the HowULearn questionnaire used in the present study is the Student Burnout Inventory (SBI-9) developed for measuring study-related burnout in the university context (Salmela-Aro et al., 2009). The instrument consists of nine Likert-type scales (1=totally disagree, 5=totally agree) items measuring the three dimensions' aspects of study-related burnout namely 1. Exhaustion (4 items e.g. 'I feel overwhelmed by my study work'), 2. Cynicism (3 items e.g. 'I feel that I am losing interest in my studying'), and 3. Inadequacy (2 items e.g. 'I often have feelings of inadequacy in my schoolwork'). The accumulation of study credits (ECTS) and study success (GPA) from the first academic year was gathered from the study register. The number of credits (ECTS) studied from the first academic year varied from 7 to 100 credits, and the mean number of credits studied being 45.7 (SD=12.95).

4.3 Analysis

Nine items measuring approaches to learning and study-related burnout had one missing value. These were replaced with means. Confirmatory factor analysis was conducted on the items measuring students' approaches to learning and study-related burnout using SPSS Amos 22.0. The analyses were conducted on the whole data set, because despite the differences in students' approaches to learning in different disciplines, similar profiles have been found (Parpala et al., 2010). Confirmatory factor analysis is a good method for testing a theoretical model (Brown, 2006). The student learning profiles were conducted with K-means analysis. The K-means cluster analysis was based on a previous study (Parpala et al., 2010). Because the cluster solution in this

clustering method depends on the order of cases in the file, the analyses were run several times. Although the means differed slightly each time, the solution stayed stable. A random number variable was also created to sort the data in the final stage of the analysis. The means of the different solutions varied slightly, but the four profiles could be found in every solution. To examine the validity of this solution further, a brief interviews were conducted with a few students to establish the authenticity of the profiles. The differences in study-related burnout and achievement between learning profiles was analysed with One-way Anova and Bonferroni's test. Bonferroni correction is a way to correct multiple comparisons in Anova when several tests are being done, to avoid false significant results (Cabin & Mitchell, 2000).

5.Results

The confirmatory factor analysis conducted with the items measuring approaches to learning (see Table 1) showed that the three-factor model (APP1) did not fit the data very well ($\chi^2=169,8$, $df=51$, $p<0.001$, $CFI=0.881$, $RMSEA=0.083$). It has been shown that CFI values over 0.9 and RMSEA values under .08 can be estimated as a good fit (Hooper, Coughlan, & Mullen, 2008). One item measuring surface approach *Often I have to repeat things in order to learn them* loaded the weakest in the surface latent variable and the standardised regression weight showed that there is a connection between this item and organised studying. In addition, reliability analysis showed that deleting this item improved the reliability from 0.6 to 0.71 and, thus, it was deleted from the analysis. The fit indexes showed that this model (APP2) fit the data quite well ($\chi^2=120.3$, $df=41$, $p<0.001$, $CFI=0.912$, $RMSEA=0.076$). The Crohnbach's alfa for Deep approach was 0.761, surface approach 0.701 and organised studying 0.669, which can all be seen as being adequate. Adding more items to measure the same dimension, would have most probably increased the alpha on Organised studying (Taber, 2018).

However, as the scale has been detected in many previous studies with good reliability (Herrmann, K. J. et al., 2017; Parpala et al., 2010; Ruohoniemi, Forni, Mikkonen, & Parpala, 2017) its use can be considered to be acceptable.

The confirmatory factor analysis concerning study-related burnout was conducted with both one latent variable measuring study-related burnout and with three dimensions measuring different aspects of burnout, namely 1) Exhaustion, 2) Cynicism and 3) Inadequacy (see Table 1) which have previously been found to be appropriate (Salmela-Aro et al., 2009). The confirmatory analysis done with only one latent variable (BURN1) was not as successful and the model did not fit the data well ($\chi^2=369.8$, $df=27$, $p<0.001$, $CFI=0.746$, $RMSEA=0.194$). The model with three different aspects, namely 1) Exhaustion, 2) Cynicism and 3) Inadequacy (BURN2) fitted the data very well ($\chi^2=53.4$, $df=24$, $p<0.001$, $CFI=0.978$, $RMSEA=0.061$). Thus, three sum scales were conducted from the items measuring study-related burnout: 1) Exhaustion ($\alpha=0.81$), 2) Cynicism ($\alpha=0.84$) and 3) Inadequacy ($\alpha=0.72$).

Please insert Table 1 near here

5.1 Approaches to learning, study-related burnout and academic achievement

First, correlations between scales measuring the approaches to learning, study-related burnout and academic achievement were explored (see Table 2). All the correlations between scales measuring approaches to learning and study-related burnout and organised studying ($M=3.25$, $sd=0.70$) correlated positively with each other and negatively with the surface approach ($M=2.37$, $sd=0.73$). In addition, exhaustion ($M=2.74$, $sd=0.91$), cynicism ($M=1.98$, $sd=0.98$) and inadequacy ($M=2.99$, $sd=1.10$) were positively and statistically significantly related to the surface approach and negatively to the deep approach and organised studying. In addition, study success was positively and

statistically significantly related to the deep approach and organised studying, and negatively related to the surface approach, inadequacy and exhaustion. Study progression was positively and statistically significantly related to organised studying, and negatively and statistically significantly related to the surface approach, cynicism, inadequacy and exhaustion. No statistically significant relationships between the deep approach and study progression were found. Furthermore, the correlations between the latent study-related burnout scale ($M=2.53$, $sd=0.81$) and the exhaustion, cynicism and inadequacy subscales were strong, with exhaustion having the strongest correlation.

Please insert Table 2 near here

5.2 Learning profiles

The cluster analysis produced four clusters: 1) *Students applying a deep approach*, 2) *Unorganised students applying a deep approach*, 3) *Students applying a surface approach* and 4) *Organised students* (see Table 3). These clusters also matched well the profiles found in the earlier study (Parpala et al., 2010). In the first cluster *Students applying a deep approach* ($N=111$, male=36), students' scores on the deep approach and organised studying were very high and their score on the surface approach was low. In the second cluster *Unorganised students applying a deep approach* ($N=82$, male=27), students scored high on the deep approach but their scores on organised studying and surface approach were low. In the third cluster *Students applying a surface approach* ($N=60$, male=8), students' scores on the surface approach were the highest and they scored relatively low on organised studying and average on the deep approach. In the fourth cluster *Organised students* ($N=86$, male=13), students' scores on organised studying were quite high and the scores on the deep and surface approaches were average.

Please insert Table 3 near here

5.3 Relationship between learning profiles, study-related burnout and academic achievement

Next, differences in study-related burnout, study progression and study success were examined relative to different learning profiles. The One-way Anova analysis showed that there were statistically significant differences in exhaustion, cynicism, inadequacy, study success and study progression between different learning profiles (see Table 4). Bonferroni's post hoc tests revealed that students representing the *Students applying a surface approach* cluster experienced more exhaustion than students representing the other clusters ($p \leq 0.001$). In addition, the students representing the *Students applying a deep approach* cluster experienced less exhaustion than students representing the other clusters ($p \leq 0.031$). In addition, according to Bonferroni's test, all the clusters statistically significantly differed from each other according to experiences of inadequacy ($p < 0.001$), except for the difference between the *Unorganised students applying a deep approach* cluster and the *Organised students* cluster ($p = 0.99$). Surface learners experienced more and deep learners less inadequacy than students representing the other clusters. Furthermore, *Surface learners* experienced more cynicism than students representing the other cluster ($p \leq 0.006$). In addition, students representing the *Students applying a deep approach* cluster experienced less cynicism than *Unorganised students applying a deep approach* cluster ($p = 0.007$).

Please insert Table 4 near here

Bonferroni's test showed that students representing the *Students applying a deep approach* cluster succeeded in their studies statistically significantly better than the students representing the other clusters ($p < 0.001$). In addition, the students representing the *Surface learners* cluster did not succeed as well as students representing the

Students applying a deep approach cluster ($p < 0.001$). Concerning study progression, *Students applying a deep approach* and *Organised students* proceeded statistically significantly faster than *Students applying a surface approach* and *Unorganised students applying a deep approach* ($p = 0.003$).

6. Discussion

The purpose of this study was to examine students' learning profiles and the relationship between their experiences of study-related burnout related to study success and progression. Our study showed that students representing different learning profiles experience study-related burnout differently. The results showed that *Students applying a surface approach* scored statistically significantly higher than the other profiles in all aspects of study-related burnout. Students who have trouble mastering and understanding the central knowledge as well as having fragmented knowledge about the subject matter feel more exhausted, less adequate and are more cynical in their studying. This result supports the results of earlier studies which suggested that surface level understanding is related to experiencing high workload in studies (Entwistle & Ramsden, 1983; Kyndt et al., 2011). Moreover, students representing the *Students applying a surface approach* learning profile also scored rather low on organised studying compared to students representing the *Students applying a deep approach* and *Organised students* profiles. The mixed method study by Lindblom and colleagues (2018) showed that a lack of organised studying was the most frequently detected factor related to using the surface approach. Moreover, in this research, the authors (Lindblom-Ylänne et al., 2018) found that unreflective studying and experience of a fragmented knowledge base seem to be at the core of the surface approach and suggest that the name "Unreflective studying" better describes the surface approach to learning

in the light of the recent empirical evidence. These findings suggest that this unreflective studying and fragmented knowledge base is more related to study-related burnout than the lack of organised studying.

It seems that students who apply deep level processes of learning experience less study-related burnout than students representing other profiles. This is in line with earlier research which suggests that experiences of appropriate workload is positively related to a deep approach to learning (Diseth, 2007; Lizzio, Wilson, & Simons, 2002). Interestingly however, *Organised students* experienced statistically significantly more exhaustion in their studies than *Students applying a deep approach*. This is a surprising result, as organised studying which emphasises time and effort management skills have been found to be positively related to study progression and have been shown to be a more important factor than having a deep approach to learning in study progression (Asikainen et al., 2013; Hailikari & Parpala, 2014; Rytönen et al., 2012). This finding may indicate that applying a deep approach to learning is a more important component in preventing study-related exhaustion. Students who aim at deep understanding and engage in meaningful learning which emphasises critical and evaluative processing experience less exhaustion, inadequacy and cynicism in their studies. One reason for the negative relationship between the deep approach to learning and study-related burnout could be that the deep approach to learning is closely related to intrinsic motivation (Kyndt et al., 2011). Earlier studies have found that there is a negative relationship between study-related burnout and intrinsic motivation (Lyndon et al., 2017).

We expected that students who are organised in their studies would experience less study-related burnout. However, this hypothesis was not supported by this study. On

the contrary, the experiences of organised students and unorganised students applying a deep approach did not differ in relation to the components of study-related burnout even though they differed according to their study success and study progression. Organised students proceeded faster and received higher grades than unorganised students applying a deep approach. Organised studying seems to be an important element in achievement in studies, as found in earlier studies (Haarala-Muhonen et al., 2011; Hailikari & Parpala, 2014). However, it seems that good time and effort management during study at university does not necessarily prevent feelings of exhaustion even though it has a positive effect on study success and study progression. Salmela-aro et al. (2017) found that many students in higher education are engaged in their studying but are still exhausted. This suggests that engagement in studies does not necessarily mean that the students are not experiencing study-related exhaustion or burnout. These engaged-exhausted students may well relate to the organised students who put effort into their studies and manage well but can still experience exhaustion in their studies.

6.1 Limitations

There are some limitations in our study. There was only one period of measurement, and most of the participants were women. It has been shown that the relationship between students' engagement and experiences of study-related burnout change during their studies (Salmela-Aro & Read, 2017). Thus, in the subsequent research, it would be important to follow-up students with different learning profiles and the development of their experiences of study-related burnout throughout their studies. Furthermore, previous studies have shown that students in some disciplines experience the learning environment and studying differently from those in others (Parpala et al., 2010),

meaning that students in some disciplines vary in their approaches to learning compared with students in others. For these reasons, we could expect that this relationship between study processes and study-related burnout could also vary between disciplines. In our data, some disciplines were represented with a small sample and disciplinary differences were not explored. Thus, in forthcoming studies it would be interesting to study the study-related burnout and study processes in different disciplines.

6.2 Practical implications

Salmela-Aro & Read (2017) suggest that more attention should be paid to supporting students' welfare and preventing study-related burnout from the beginning of studying at university, because burnout symptoms are likely to increase during the studies. The present study was conducted amongst first-year students and the results showed that study-related burnout was clearly related to surface-level processing and troubles in understanding and fragmented knowledge. Thus, students' study skills and learning processes should receive attention from the beginning of their studies and students should get support on how to develop these skills. In addition, students' well-being should also be the focus at university studies. For example, interventions promoting students psychological flexibility which are based on acceptance and commitment therapy (ACT) have been shown to be effective in treating mental disorders like depression and anxiety (Hacker, Stone, & MacBeth, 2016; Twohig & Levin, 2017) and also in decreasing burnout (Lloyd, Bond, & Flaxman, 2013). Some ACT-interventions have been developed for the university context and these have been shown to increase students' well-being, and to decrease depression, stress and anxiety (Levin, Haeger, Pierce, & Twohig, 2017; Räsänen, Lappalainen, Muotka, Tolvanen, & Lappalainen, 2016; Viskovich & Pakenham, 2018). Thus, it could be possible to develop ACT-based

intervention to increase students' well-being and prevent study-related burnout. It would also be important to integrate study skills into this kind of intervention in order to help students to develop their study processes as study-related burnout was strongly related to surface approach to learning. Furthermore, teachers should become more aware of the harmful effects of surface-level processing and acquire knowledge and tools to improve their teaching to promote students' active learning and knowledge processing. This, in turn, could be fostered with university pedagogy courses for teachers in order to enhance teachers' competency in teaching.

6.3 Conclusions

This study suggests that students' learning profiles should be taken into account when considering study-related burnout among students. Based on our results, it can be suggested that time and effort management, and deep level understanding, are important factors in reducing study-related burnout and thus promoting students' wellbeing. The results also emphasised the importance of time and effort management skills as an important predictor of study progression as students with low scores on these skills, undirected students, and unorganised deep learners proceeded slower in their studies than students with high scores on time and effort management skills, organised students and deep learners. Thus, the focus should be on the needs of different students. For example, attention should be paid to help students to develop their study skills and time management. In addition, students' wellbeing should be considered when enhancing their study skills. Furthermore, the results in this study showed that inadequacy and exhaustion were negatively related to study success and thus, study skills and study-related burnout have to be considered in achievement and study success.

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Table 1. Fit indexes concerning the confirmatory factor analyses

	χ^2	df	p	CFI	RMSEA
APP1	169,8	51	<.001	0.881	0.083
APP2	120.3	41	<0.001	0.912	0.076
BURN1	369.8	27	<0.001	0.746	0.194
BURN2	53.4	24	<0.001	0.978	0.061

Table 2. Correlations between approaches to learning, dimensions measuring exhaustion, study success and study progression.

Scale									
	DE	SU	ORG	EX	CY	INA	SB	SS	SP
Deep approach (DE)	1								
Surface approach (SU)	-,37***	1							
Organised studying (ORG)	.22***	-.22***	1						
Exhaustion (EX)	-.17**	.46***	-.14**	1					
Cynicism (CY)	-.18**	.39***	-.31***	.42***	1				
Inadequacy (INA)	-.23***	.51***	-.29***	.65***	.54***	1			
Study-related burnout (SB)	-.22***	-.28***	.54***	.87***	.84***	.78***	1		
Study success (SS)	.29***	-.37***	.32***	-.11*	-.10	-.30***	-.19**	1	
Study progression (SP)	.07	-.20***	.28***	-.11*	-.26**	-.24***	-.23***	.41***	1

* = $p < .05$; ** = $p < .01$; *** = $p < .001$.

Table 3. Final cluster centers

Cluster	Students applying a deep approach	Unorganised students applying a deep approach	Students applying a surface approach	Organised students
Surface	1.80	2.21	3.51	2.47
Deep	4.23	3.69	3.39	3.22
Organised	3.72	2.45	3.00	3.60

Table 4. The differences in study-related exhaustion and academic achievement between the different learning profiles.

	Exhaustion	Cynicism	Inadequacy	Study success	Study progression
Students applying a deep approach	2.34	1.61	2.41	3.66	50
Unorganised students applying a deep approach	2.68	2.06	3.05	2.99	41
Students applying a surface approach	3.40	2.58	3.88	2.87	41
Organised students	2.84	1.95	3.07	3.13	48
F	21.36	14.28	29.74	28.59	12.82
p	<0.001	<0.001	<0.001	<0.001	<0.001