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Platform for Advancement of Self

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Deliverable Form IO4

Analysis of the results; exploration of the relations among variables and conclusions. A person-centered approach that will be used in the analysis will be innovative in this particular group of variables. The use of most updated statistical analyses will shed light on aspects of educational and psychological "states" that have never before been examined in relation. Transferability will be ensured by comparisons of results among countries.

Output Description

The impact of the identification of the (a) constructs with the most influence on students learning and pace of study (b) strong and weak relations among individual factors, psychological and learning constructs on freshmen academic success and retainment in studies, will “open” particular paths for optimal prevention for students. The contribution of particular trait characteristics and learning/motivation constructs on learning depicted in students’ psycho/educational profiles will enable the prediction of students at risk and the development of early prevention policy; the particular ways of influence identified in the context of this output will inform the way teachers and counselors will work with students to retain attendance and engagement with learning. The publication of a paper in an international open-access journal is a way to monitor the advancement of the project so far and lends validity to the suggested patterns of relations, students psycho/educational profiles and predictions of retainment in studies/pace of studies. The contribution to the relevant literature ensured by the international publication strongly supports innovation.





**Output
Identification**

- Statistical analysis of the datasets (separately for each country)
- Test hypotheses about the latent structure of the questionnaires
- Explore the existence of differences among the three different datasets - the three samples may eventually be treated as one
- Conclusions
- Submission for publication of a paper, in a peer-reviewed international journal



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IO4: Analysis of the Results

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Consortium:

- University of Ioannina
- University of Turin
- University of Antwerp

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1. Data analysis

1.1 University of Ioannina

The psychometric properties of ILS (Vermunt 1994, 1998), MSLQ (Pintrich et al. 1991), RS (Wagnild and Young 1987), DERS-18 (Gratz and Roemer, 2004), DASS-21 (Lovibond & Lovibond, 1995), and PASS (Solomon and Rothblum 1994) have already been studied in the literature, giving evidence that these instruments are beneficial to the assessment of the respective learning process aspects. Results from the Confirmatory Factor Analysis (CFA; the parameter estimation was based on the weighted least squares method) can be found in Table 1; note that the fit of the models on our data is assessed by the next indices (see, e.g., Raykov and Marcoulides 2006; Kline 2011): Comparative Fit Index (CFI), Normed Fit Index (NFI), Goodness-of-Fit Index (GFI), Adjusted Goodness-of-Fit Index (AGFI), Tucker-Lewis Index (TLI), Root Mean Square Error Approximation (RMSEA) (providing the p-value for testing the hypothesis: $H_0: RMSEA \leq 0.05$ vs $H_1: RMSEA > 0.05$) and Standardized Root Mean square Residual (SRMR). It is necessary to mention that some covariances between residual/error terms associated with indicators only from the same subscales, have been set not equal to zero.

Therefore, it can be seen (Table 1) that most of the indices are found in acceptable range of values because most of AGFI, TLI, NFI, GFI, and CFI are larger than 0.90, while RMSEA and SRMR are quite small (for seven out of eight cases, $H_0: RMSEA \leq 0.05$ is not rejected at 0.05 significance level). An extra caution must be paid to Motivation, Regulation Strategies and RS because of some unacceptable indices values. Note also that the last row of Table 1 includes the mean values of R-squares from all items included in the respective scales; RS and PASS (recall that only one factor is assumed for each of the two scales) have the smallest values, whereas DERS and DASS the largest ones.

Table 2 includes Cronbach's alpha, Average Extracted Variance (AVE) and mean values for the 20 subscales; Cronbach's alpha ranges from .547 (Awareness) to .849 (Goals) and two out of twenty subscales do not meet Fornell-Larcker criterion (i.e. square root of AVE for each of the latent factors is greater than the correlations with any other latent variable; Fornell and Larcker 1981).

Pearson correlations can be found in Table 3; the largest positive correlations are between Strategies-Impulse ($r=.79$), Deep-Concrete ($r=.782$), Strategies- Goals ($r=.773$), Strategies- Non Acceptance ($r=.725$), whereas the smallest negative correlations between Ambivalent- Personal Interest ($r=-.712$), Ambivalent-Vocational Oriented ($r=-.533$) and Resilience- Strategies ($r=-.49$).

The procedure for classifying the participants into homogeneous groups, according to their responses to the 20 subscales, has already been described (in section Data Analysis); according to this method, the best solution consists of four clusters, provided by "manhattan" distance and "ward.D" clustering method. Hence, Table 4 provides us with the means of subscales for each cluster and the results of the multiple pair-wise comparisons among clusters (using the Kruskal-Wallis test and function "kruskalmc", at 0.05 significance level). Note that all the mean values of the 20 subscales used in cluster formulation, are statistically different through the four clusters; furthermore, in eight out of twenty subscales (Deep, Personal Interest, Vocation Oriented, Ambivalent, Clarity, Non-acceptance, Resilience, and Anxiety) the differentiation is quite strong, since five out of six pair-wise comparisons were statistically significant, whereas in two subscales (External and Test Oriented) only one out of six pairs had significant difference. The last two lines of Table 4 refer to the effect of the cluster solution on GPA and success rate; clusters 1 and 3 have the statistically significant highest GPA. Cluster 1 also seems to have the highest success rate whereas the success rate of cluster 3, is not statistically different than this of cluster 4.

1.1.1 Confirmatory Factor Analysis

Table 1

The CFA on the instruments used for the Greek sample

	<i>Cognitive Learning Strategies (ILS)</i>	<i>Regulation Strategies (ILS)</i>	<i>Motivation (ILS)</i>	<i>MSLQ</i>	<i>DERS</i>	<i>DASS</i>	<i>PASS</i>	<i>Resilience</i>
<i>CFI</i>	0.958	0.941	0.881	0.983	1.000	1.000	0.968	0.926
<i>NFI</i>	0.913	0.870	0.813	0.957	0.974	0.986	0.947	0.848
<i>TLI</i>	0.947	0.927	0.860	0.976	1.014	1.011	0.949	0.920
<i>GFI</i>	0.978	0.967	0.925	0.979	0.986	0.994	0.981	0.931
<i>AGFI</i>	0.967	0.953	0.903	0.963	0.981	0.987	0.964	0.918
<i>RMSEA</i>	0.051	0.047	0.066	0.045	0.000	0.000	0.065	0.050
<i>p-value*</i>	(0.442)	(0.632)	(0.001)	(0.590)	(1.000)	(0.990)	(0.068)	(0.486)
<i>SRMR</i>	0.065	0.061	0.083	0.065	0.047	0.044	0.067	0.077
<i>R-square**</i>	0.366	0.353	0.323	0.363	0.546	0.451	0.264	0.187

*The *p*-value for testing the hypothesis: $H_0: RMSEA \leq 0.05$ vs $H_1: RMSEA > 0.05$.

**The mean value of *R-square* from all subscales included in the respective scale.

1.1.2 Descriptive Statistics, Cronbach's alpha and Average Extracted Variance

Table 2

Cronbach's alpha, average extracted variance (AVE) and descriptive statistics for the Greek sample

	<i>Subscales (number of items)</i>	<i>Alpha</i>	<i>AVE</i>	<i>Mean (std)</i>
<i>Cognitive Learning Strategies (ILS)</i>	<i>Deep (4)</i>	0.672	0.331*	10.67 (3.28)
	<i>Stepwise (6)</i>	0.749	0.340	19.84 (5.12)
	<i>Concrete (3)</i>	0.708	0.466	9.35 (2.63)
<i>Regulation Strategies (ILS)</i>	<i>Self (5)</i>	0.705	0.324	13.09 (3.9)
	<i>External (5)</i>	0.635	0.342	17.71 (3.11)
	<i>Lack (4)</i>	0.733	0.364	8.79 (3.4)
<i>Motivation (ILS)</i>	<i>Personal Interest (5)</i>	0.658	0.314*	19.32 (2.96)
	<i>Test Oriented (5)</i>	0.689	0.310	18.70 (3.38)
	<i>Vocation Oriented (5)</i>	0.676	0.420	19.68 (3.19)
	<i>Ambivalent (5)</i>	0.755	0.397	10.95 (3.82)
<i>MSLQ</i>	<i>Self Efficacy (8)</i>	0.678	0.205	27.92 (4.9)
<i>DERS</i>	<i>Awareness (3)</i>	0.547	0.350	6.18 (2.16)
	<i>Clarity (3)</i>	0.841	0.645	6.33 (2.64)
	<i>Goals (3)</i>	0.849	0.655	8.97 (3.14)
	<i>Impulse (3)</i>	0.845	0.645	6.28 (2.98)
	<i>Non acceptance (3)</i>	0.703	0.426	5.63 (2.43)
	<i>Strategies (3)</i>	0.770	0.530	5.75 (2.86)
<i>DASS</i>	<i>Anxiety (7)</i>	0.843	0.453	12.55 (5.63)
<i>PASS</i>	<i>Procrastination (12)</i>	0.779	0.331	29.35 (8.15)
<i>RS</i>	<i>Resilience (25)</i>	0.816	0.183	91.76 (9.69)

**The Fornell-Larcker Criterion is not met.*

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1.1.3 Pearson correlation coefficient among subscales

Table 3 Pearson correlation coefficient among subscales (factor scores) for the Greek sample

	Deep	Step-wise	Concrete	Self	External	Lack	Self Efficacy	Aware-ness	Clarity	Goals	Impulse	Non acceptance	Strate-gies	Anxiety	Personal Interest	Test Oriented	Vocation Oriented	Ambi-valent	Procrasti-nation
Deep	1	.285**	.782**	.483**	-.047	-.088	.369**	-.179**	-.210**	.040	-.006	-.008	-.042	.003	.355**	-.021	.112*	-.216**	-.069
Stepwise	.285**	1	.058	.089	.294**	-.125*	.149**	-.138*	-.087	-.028	.007	-.011	-.019	.012	.246**	.203**	.298**	-.183**	.088
Concrete	.782**	.058	1	.480**	-.171**	.018	.314**	-.101	-.119*	.049	.042	-.026	-.009	.031	.271**	-.052	.049	-.164**	-.042
Self	.483**	.089	.480**	1	-.125*	-.203**	.329**	-.178**	-.172**	-.156**	-.107	-.053	-.150**	.070	.351**	-.035	.050	-.287**	-.053
External	-.047	.294**	-.171**	-.125*	1	.022	-.049	-.019	-.076	.041	.005	-.040	-.024	.012	.043	.158**	.108	-.040	.147**
Lack	-.088	-.125*	.018	-.203**	.022	1	-.293**	.129*	.329**	.339**	.345**	.217**	.373**	.116*	-.214**	.118*	-.188**	.316**	.157**
Self Efficacy	.369**	.149**	.314**	.329**	-.049	-.293**	1	-.173**	-.269**	-.157**	-.213**	-.134*	-.236**	-.046	.356**	.054	.190**	-.339**	-.146**
Awareness	-.179**	-.138*	-.101	-.178**	-.019	.129*	-.173**	1	.302**	.028	.033	.144*	.039	.070	-.116*	.032	-.036	.153**	-.021
Clarity	-.210**	-.087	-.119*	-.172**	-.076	.329**	-.269**	.302**	1	.302**	.506**	.440**	.604**	.331**	-.277**	.022	-.139*	.268**	-.019
Goals	.040	-.028	.049	-.156**	.041	.339**	-.157**	.028	.302**	1	.800**	.445**	.773**	.356**	-.101	.140*	-.038	.147**	.158**
Impulse	-.006	.007	.042	-.107	.005	.345**	-.213**	.033	.506**	.800**	1	.477**	.790**	.410**	-.115*	.108	-.060	.162**	.156**
Non acceptance	-.008	-.011	-.026	-.053	-.040	.217**	-.134*	.144*	.440**	.445**	.477**	1	.725**	.370**	-.177**	.030	-.145**	.230**	.075
Strategies	-.042	-.019	-.009	-.150**	-.024	.373**	-.236**	.039	.604**	.773**	.790**	.725**	1	.491**	-.192**	.061	-.118*	.240**	.138*
Anxiety	.003	.012	.031	.070	.012	.116*	-.046	.070	.331**	.356**	.410**	.370**	.491**	1	-.074	.028	-.027	.073	.070
Personal Interest	.355**	.246**	.271**	.351**	.043	-.214**	.356**	-.116*	-.277**	-.101	-.115*	-.177**	-.192**	-.074	1	.190**	.586**	-.712**	.091
Test Oriented	-.021	.203**	-.052	-.035	.158**	.118*	.054	.032	.022	.140*	.108	.030	.061	.028	.190**	1	.232**	.017	.212**
Vocation Oriented	.112*	.298**	.049	.050	.108	-.188**	.190**	-.036	-.139*	-.038	-.060	-.145**	-.118*	-.027	.586**	.232**	1	-.533**	.120*
Ambivalent	-.216**	-.183**	-.164**	-.287**	-.040	.316**	-.339**	.153**	.268**	.147**	.162**	.230**	.240**	.073	-.712**	.017	-.533**	1	.035
Procrastination	-.069	.088	-.042	-.053	.147**	.157**	-.146**	-.021	-.019	.158**	.156**	.075	.138*	.070	.091	.212**	.120*	.035	1
Resilience	.287**	.165**	.237**	.320**	.064	-.160**	.452**	-.243**	-.387**	-.373**	-.360**	-.351**	-.490**	-.227**	.306**	.026	.157**	-.329**	-.049

*Significant at 0.05 level. **Significant at 0.01 level.

1.1.4 Person-centered approach (Cluster analysis)

Table 4
Cluster solution and multiple pair-wise comparisons for the Greek sample

	Means				Pair-wise Comparisons (1: difference is statistically significant at 0.05 level, 0: otherwise)					
	1 (n=131)	2 (n=39)	3 (n=63)	4 (n=83)	1-2	1-3	1-4	2-3	2-4	3-4
<i>Deep</i>	.570	-.505	.166	-.788	1	1	1	1	0	1
<i>Stepwise</i>	.069	-.568	.553	-.261	1	1	0	1	0	1
<i>Concrete</i>	.492	-.384	.190	-.740	1	0	1	0	0	1
<i>Self</i>	.538	-.461	-.113	-.547	1	1	1	0	0	1
<i>External</i>	-.087	-.315	.002	.284	0	0	0	0	1	0
<i>Lack</i>	-.320	.805	.317	-.113	1	1	0	0	1	0
<i>Personal Interest</i>	.319	-1.119	.362	-.253	1	0	1	1	1	1
<i>Test Oriented</i>	-.169	-.084	.338	.051	0	1	0	0	0	0
<i>Vocation Oriented</i>	.054	-.868	.575	-.114	1	1	0	1	1	1
<i>Ambivalent</i>	-.380	1.078	-.303	.323	1	0	1	1	1	1
<i>Self Efficacy</i>	.404	-.776	-.048	-.236	1	1	1	1	0	0
<i>Awareness</i>	-.234	.507	-.191	.276	1	0	1	1	0	1
<i>Clarity</i>	-.368	1.251	.343	-.267	1	1	0	1	1	1
<i>Goals</i>	-.476	.879	.991	-.414	1	1	0	0	1	1
<i>Impulse</i>	-.462	1.113	.958	-.521	1	1	0	0	1	1
<i>Non acceptance</i>	-.317	1.478	.265	-.395	1	1	0	1	1	1
<i>Strategies</i>	-.504	1.488	.822	-.527	1	1	0	0	1	1
<i>Resilience</i>	.503	-1.084	-.263	-.084	1	1	1	1	1	0
<i>Anxiety</i>	-.348	1.085	.406	-.269	1	1	0	1	1	1
<i>Procrastination</i>	-.321	-.025	.563	.092	0	1	1	1	0	1
<i>GPA</i>	7.248	6.071	7.170	6.680	1	0	1	1	0	1
<i>Success Rate</i>	.756	.579	.663	.660	1	0	1	0	0	0

1.2 University of Turin

The psychometric properties of ILS (Vermunt 1994, 1998), MSLQ (Pintrich et al. 1991), RS (Wagnild and Young 1987), DERS-18 (Gratz and Roemer, 2004), DASS-21 (Lovibond & Lovibond, 1995), and PASS (Solomon and Rothblum 1994) have already been studied in the literature, giving evidence that these instruments are beneficial to the assessment of the respective learning process aspects. Results from the Confirmatory Factor Analysis (CFA; the parameter estimation was based on the weighted least squares method) can be found in Table 5; note that the fit of the models on our data is assessed by the next indices (see, e.g., Raykov and Marcoulides 2006; Kline 2011): Comparative Fit Index (CFI), Normed Fit Index (NFI), Goodness-of-Fit Index (GFI), Adjusted Goodness-of-Fit Index (AGFI), Tucker-Lewis Index (TLI), Root Mean Square Error Approximation (RMSEA) (providing the p-value for testing the hypothesis: $H_0: RMSEA \leq 0.05$ vs $H_1: RMSEA > 0.05$) and Standardized Root Mean square Residual (SRMR). It is necessary to mention that some covariances between residual/error terms associated with indicators only from the same subscales, have been set not equal to zero.

Therefore, it can be seen (Table 5) that most of the indices are found in acceptable range of values because most of AGFI, TLI, NFI, GFI, and CFI are larger than 0.90, while RMSEA and SRMR are quite small (most of them; $H_0: RMSEA \leq 0.05$ is not rejected at 0.05 significance level). An extra caution must be paid to Cognitive Learning Strategies, Motivation and PASS because of some unacceptable indices values. Note also that the last row of Table 5 includes the mean values of R-squares from all items included in the respective scales; RS and PASS (recall that only one factor is assumed for each of the two scales) have the smallest values, whereas MSLQ and DASS the largest ones.

Table 6 includes Cronbach's alpha, Average Extracted Variance (AVE) and mean values for the 20 subscales; Cronbach's alpha ranges from .579 (Personal Interest) to .877 (Impulse) and one out of twenty subscales do not meet Fornell-Larcker criterion (i.e. square root of AVE for each of the latent factors is greater than the correlations with any other latent variable; Fornell and Larcker 1981).

Pearson correlations can be found in Table 7 the largest positive correlations are between Strategies-Goals ($r=.783$), Deep-Concrete ($r=.747$), Strategies- Impulse ($r=.72$), Strategies- Non Acceptance ($r=.702$), whereas the smallest negative correlations between Ambivalent- Personal Interest ($r=-.458$), Self-efficacy - Lack ($r=-.375$) and Resilience-Strategies ($r=-.443$).

The procedure for classifying the participants into homogeneous groups, according to their responses to the 20 subscales, has already been described (in section Data Analysis); according to this method, the best solution consists of four clusters, provided by "manhattan" distance and "ward.D" clustering method. Hence, Table 8 provides us with the means of subscales for each cluster and the results of the multiple pair-wise comparisons among clusters (using the Kruskal-Wallis test and function "kruskalmc", at 0.05 significance level). Note that all the mean values of the 20 subscales used in cluster formulation, are statistically different through the three clusters; furthermore, in eight out of twenty subscales (Deep, Concrete, Self, Oriented, Ambivalent, Strategies, Non-acceptance, Resilience, and Anxiety) the differentiation is quite strong, since three out of three pair-wise comparisons were statistically significant, whereas in two subscales (Stepwise, External, and Procrastination) only one out of three pairs had significant difference. Cluster 1 seems to be the most adaptive one; although students in this cluster do not score very high on learning strategies, they have the lowest scores on emotion dysregulation strategies, anxiety and procrastination compared to the other clusters 1 and 2, while their score on resilience is the highest one. Cluster 2 seems the most difficult to interpret; it has the highest scores on learning strategies (Deep, Stepwise and Concrete), while on subscales lack of regulation and ambivalent also score high enough; furthermore, students on this cluster score quite high on emotion dysregulation strategies, anxiety and procrastination while their resilience is the second one lowest among the three clusters. Finally, students in cluster 3 have the lowest score on learning strategies and self-regulation; their score on resilience is the lowest among the three groups, while they show the highest negative score on personal interest.

1.2.1 Confirmatory Factor Analysis

Table 5
The CFA on the instruments used for the Italian sample

	<i>Cognitive Learning Strategies</i>	<i>Regulation Strategies</i>	<i>Motivation</i>	<i>MSLQ</i>	<i>DERS</i>	<i>DASS</i>	<i>PASS</i>	<i>Resilience</i>
<i>CFI</i>	0.890	0.941	0.899	1.000	1.000	1.000	0.851	0.946
<i>NFI</i>	0.854	0.898	0.848	0.989	0.982	0.996	0.825	0.896
<i>TLI</i>	0.862	0.926	0.882	1.000	1.000	1.000	0.761	0.941
<i>GFI</i>	0.962	0.968	0.942	0.993	0.991	0.998	0.958	0.949
<i>AGFI</i>	0.944	0.954	0.924	0.988	0.987	0.996	0.920	0.940
<i>RMSEA</i>	0.077	0.054	0.062	0.006	0.000	0.000	0.097	0.048
<i>p-value*</i>	0.000	0.274	0.004	0.985	1.000	1.000	0.000	0.701
<i>SRMR</i>	0.078	0.062	0.083	0.049	0.041	0.027	0.087	0.073
<i>R-square**</i>	0.344	0.343	0.378	0.511	0.578	0.508	0.183	0.227

**The p-value for testing the hypothesis: $H_0: RMSEA \leq 0.05$ vs $H_1: RMSEA > 0.05$.*
***The mean value of R-square from all subscales included in the respective scale.*

1.2.2 Descriptive Statistics, Cronbach's alpha and Average Extracted Variance

Table 6
Cronbach's alpha, average extracted variance (AVE) and descriptive statistics for the Italian sample

	Subscales (number of items)	<i>Alpha</i>	<i>AVE</i>	<i>Fornell-Larcker Criterion</i>
Cognitive Learning Strategies (ILS)	Deep (4)	0.650895	0.337044	FALSE
	Stepwise (6)	0.622126	0.281937	TRUE
	Concrete (3)	0.759325	0.512972	TRUE
Regulation Strategies (ILS)	Self (5)	0.715171	0.357211	TRUE
	External (5)	0.71309	0.334492	TRUE
	Lack (4)	0.670141	0.30307	TRUE
Motivation (ILS)	Personal Interest (5)	0.579654	0.266733	TRUE
	Test Oriented (5)	0.8329	0.52013	TRUE
	Vocation Oriented (5)	0.738752	0.425572	TRUE
	Ambivalent (5)	0.707957	0.359708	TRUE
MSLQ	Self Efficacy (8)	0.838982	0.406569	
DERS	Awareness (3)	0.710469	0.474011	TRUE
	Clarity (3)	0.737712	0.496737	TRUE
	Goals (3)	0.826973	0.621926	TRUE
	Impulse (3)	0.877462	0.703007	TRUE
	Non acceptance (3)	0.78282	0.577657	TRUE
	Strategies (3)	0.810351	0.599984	TRUE
DASS	Anxiety (7)	0.872399	0.506188	
PASS	Procrastination (12)	0.715525	0.192452	
RS	Resilience (25)	0.711733	0.121554	



1.2.3 Pearson correlation coefficient among subscales

Table 7
Pearson correlation coefficient among subscales (factor scores) for the Italian sample

	Deep	Stepwise	Concrete	Self	External	Lack	Personal Interest	Test Oriented	Vocation Oriented	Ambivalent	Self Efficacy	Awareness	Clarity	Goals	Impulse	Non_acceptance	Strategies	Resilience
Deep	1	0.087	0.747	0.505	0.086	0.011	0.203	0.026	0.039	-0.157	0.268	-0.073	0.044	-0.025	-0.021	0.071	-0.005	0.24
Stepwise	0.087	1	0.022	0.019	0.237 *	0.067	0.052	0.195 *	0.036	0.021	0.084	-0.051	0.053	0.051	0.08	0.063	0.087	0.058
Concrete	0.747 *	0.022	1	0.488 *	0.059	0.094	0.223 *	0.092	0.029	-0.11 *	0.232 *	-0.063	0.075	-0.037	0.002	0.066	-0.02	0.239 *
Self	0.505 *	0.019	0.488 *	1	0.073	0.136 *	0.304 *	0.13 *	0.03	-0.117 *	0.245 *	-0.057	0.022	-0.049	0.013	0.085	0.004	0.216 *
External	0.086	0.237 *	0.059	0.073	1	0.006	0.057	0.089	0.154 *	-0.09	0.105 *	-0.096 *	-0.031	0.064	0.014	-0.075	0.015	0.13 *
Lack	0.011	0.067	0.094	0.136 *	0.006	1	-0.033	0.217 *	-0.121 *	0.382 *	-0.375 *	0.146 *	0.321 *	0.303 *	0.32 *	0.369 *	0.373 *	-0.342 *
Personal Interest	0.203 *	0.052	0.223 *	0.304 *	0.057	-0.033	1	0.335 *	-0.074	-0.458 *	0.233 *	0.058	0.089	-0.101 *	-0.021	0.071	-0.034	0.201 *
Test Oriented	0.026	0.195 *	0.092	0.13 *	0.089	0.217 *	0.335 *	1	0.153 *	0.135 *	0.047	0.059	0.207 *	0.068	0.146 *	0.196 *	0.127 *	0.11 *
Vocation Oriented	0.039	0.036	0.029	0.03	0.154 *	-0.121 *	-0.074	0.153 *	1	-0.242 *	0.143 *	-0.057	-0.097 *	-0.063	0.008	-0.133 *	-0.096 *	0.202 *
Ambivalent	-0.157 *	0.021	-0.11 *	-0.117 *	-0.09	0.382 *	-0.458 *	0.135 *	-0.242 *	1	-0.398 *	0.034	0.172 *	0.249 *	0.148 *	0.211 *	0.252 *	-0.311 *
Self Efficacy	0.268 *	0.084	0.232 *	0.245 *	0.105 *	-0.375 *	0.233 *	0.047	0.143 *	-0.398 *	1	-0.171 *	-0.171 *	-0.133 *	-0.127 *	-0.159 *	-0.19 *	0.497 *
Awareness	-0.073	-0.051	-0.063	-0.057	-0.096 *	0.146 *	0.058	0.059	-0.057	0.034	-0.171 *	1	0.488 *	0.006	0.096 *	0.26 *	0.096 *	-0.248 *
Clarity	0.044	0.053	0.075	0.022	-0.031	0.321 *	0.089	0.207 *	-0.097 *	0.172 *	-0.171 *	0.488 *	1	0.452 *	0.446 *	0.638 *	0.644 *	-0.301 *
Goals	-0.025	0.051	-0.037	-0.049	0.064	0.303 *	-0.101 *	0.068	-0.063	0.249 *	-0.133 *	0.006	0.452 *	1	0.663 *	0.495 *	0.783 *	-0.313 *
Impulse	-0.021	0.08	0.002	0.013	0.014	0.32 *	-0.021	0.146 *	0.008	0.148 *	-0.127 *	0.096 *	0.446 *	0.663 *	1	0.524 *	0.72 *	-0.258 *
Non acceptance	0.071	0.063	0.066	0.085	-0.075	0.369 *	0.071	0.196 *	-0.133 *	0.211 *	-0.159 *	0.26 *	0.638 *	0.495 *	0.524 *	1	0.702 *	-0.296 *
Strategies	-0.005	0.087	-0.02	0.004	0.015	0.373 *	-0.034	0.127 *	-0.096 *	0.252 *	-0.19 *	0.096 *	0.644 *	0.783 *	0.72 *	0.702 *	1	-0.443 *
Resilience	0.24 *	0.058	0.239 *	0.216 *	0.13 *	-0.342 *	0.201 *	0.11 *	0.202 *	-0.311 *	0.497 *	-0.248 *	-0.301 *	-0.313 *	-0.258 *	-0.296 *	-0.443 *	1

**Significant at 0.05 level. **Significant at 0.01 level.*



1.2.4 Person-centered approach (Cluster analysis)

Table 8
Cluster solution and multiple pair-wise comparisons for the Italian sample

	Means			Pair-wise Comparisons (1: difference is statistically significant at 0.05 level, 0: otherwise)		
	1 (n=305)	2 (n=61)	3 (n=57)	1-2	1-3	2-3
<i>Deep</i>	0.077152	0.382213	-0.82187	0	1	1
<i>Stepwise</i>	0.04848	0.088716	-0.35435	0	1	0
<i>Concrete</i>	0.065237	0.424273	-0.80312	0	1	1
<i>Self</i>	0.03486	0.490978	-0.71197	1	1	1
<i>External</i>	0.093243	-0.08808	-0.40467	0	1	0
<i>Lack</i>	-0.2316	0.757902	0.428151	1	1	0
<i>Personal Interest</i>	0.086314	0.423633	-0.91522	1	1	1
<i>Test Oriented</i>	-0.01561	0.322829	-0.26196	1	0	1
<i>Vocation Oriented</i>	0.116325	-0.40994	-0.18373	1	0	0
<i>Ambivalent</i>	-0.23392	0.185728	1.052916	1	1	1
<i>Self Efficacy</i>	0.231845	-0.08993	-1.14433	0	1	1
<i>Awareness</i>	-0.19758	0.604004	0.410829	1	1	0
<i>Clarity</i>	-0.30811	1.32975	0.225609	1	1	1
<i>Goals</i>	-0.2606	0.924611	0.404941	1	1	1
<i>Impulse</i>	-0.2573	0.967529	0.341364	1	1	1
<i>Non acceptance</i>	-0.33814	1.425165	0.284185	1	1	1
<i>Strategies</i>	-0.35541	1.314153	0.495401	1	1	1
<i>Resilience</i>	0.297232	-0.47266	-1.08462	1	1	1
<i>Anxiety</i>	-0.34102	1.376027	0.352192	1	1	1
<i>Procrastination</i>	-0.09393	0.339133	0.139691	1	0	0

1.3 University of Antwerp

1.3.1 Descriptive statistics

Table 10 Descriptive statistics for the Belgian sample

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	
						Statistic	Std. Error
<i>Deep processing</i>	111	5.00	19.00	11.8378	3.22924	.274	.229
<i>Stepwise processing</i>	100	10.00	30.00	19.4400	4.90170	.149	.241
<i>Concrete processing</i>	111	3.00	15.00	9.4414	2.62396	-.402	.229
<i>Self-regulation</i>	100	6.00	21.00	12.1200	3.34326	.396	.241
<i>External regulation</i>	100	9.00	24.00	16.9000	3.46556	.110	.241
<i>Lack regulation</i>	100	4.00	18.00	9.5800	3.46463	.315	.241
<i>Certificate oriented</i>	80	8.00	25.00	18.5500	3.35985	-.559	.269
<i>Job oriented</i>	85	9.00	25.00	18.8353	3.42903	-.481	.261
<i>Test oriented</i>	80	5.00	25.00	15.4625	4.94257	-.176	.269
<i>Personal interest</i>	80	7.00	22.00	15.9500	2.89434	-.267	.269
<i>Ambivalent</i>	80	5.00	24.00	11.1375	4.37988	.591	.269
<i>Self-efficacy</i>	76	14.00	35.00	26.2500	4.79757	-.244	.276
<i>Peer learning</i>	76	3.00	15.00	8.6579	2.84981	-.244	.276
<i>Help seeking</i>	76	4.00	20.00	13.6316	3.54341	-.463	.276
<i>Depression</i>	74	7.00	33.00	13.4054	6.02942	1.380	.279
<i>Anxiety</i>	74	7.00	35.00	14.5676	6.55865	.828	.279
<i>Stress</i>	74	7.00	35.00	18.8514	7.00427	.299	.279
<i>Awareness</i>	73	3.00	14.00	8.7945	2.58714	-.079	.281
<i>Clarity</i>	73	3.00	15.00	6.9041	2.71398	.588	.281
<i>Goals</i>	72	3.00	15.00	9.9306	3.38317	.010	.283
<i>Impulse</i>	72	3.00	15.00	6.4583	3.03935	.786	.283
<i>Nonacceptance</i>	72	3.00	15.00	7.3750	3.61311	.555	.283
<i>Strategies</i>	72	3.00	15.00	5.9028	3.15853	1.176	.283
<i>Procrastination</i>	72	12.00	60.00	32.0278	11.62073	.591	.283
<i>Tendency to reduce procrastination</i>	72	6.00	30.00	17.7917	6.80914	.146	.283
<i>Resilience</i>	72	43.00	115.00	91.7500	13.88864	-1.174	.283



1.3.2 Correlations

Table 10. Correlations for the Belgian sample

	D P	S P	C P	S R	E R	L R	C O	J O	T O	P O	A m	S E	P L	H S	D	A	S	A w	C	G	I	N A	S t r	P r	T R P	R	
Deep processing	1																										
Stepwise processing	.131	1																									
Concrete processing	.381*	.026	1																								
Self regulation	.593*	.126	.329*	1																							
External regulation	.249*	.264*	.154	.107	1																						
Lack regulation	-.277*	-.012	-.176	-.196	-.232*	1																					
Certificate oriented	.050	.293*	-.048	-.075	.287*	.075	1																				
Job oriented	.206	.026	.244*	.243*	.082	-.026	.187	1																			
Test oriented	-.007	.168	-.080	-.040	.269*	.159	.506*	-.034	1																		
Personal interest	.397*	.069	.231*	.355*	.210	-.233*	.064	-.038	.237*	1																	
Ambivalent	-.307*	.121	-.311*	-.326*	-.023	.568*	.106	-.099	.188	-.355*	1																
Self-efficacy	.423*	.013	.355*	.373*	.115	-.597*	.032	.100	-.055	.341*	-.596*	1															
Peer learning	.270*	.174	.079	.266*	.267*	-.227*	.050	-.050	.163	.061	-.128	.236*	1														
Help seeking	.086	.380*	-.132	.129	.261*	-.187	.155	-.164	.131	.100	-.199	.116	.373*	1													
Depression	-.061	.135	-.112	-.241*	.103	.306*	.121	.054	.079	-.176	.552*	-.210	-.120	-.295*	1												
Anxiety	-.069	.285*	.024	-.130	.026	.416*	.179	.107	.150	-.171	.497*	-.326*	.026	-.106	.710*	1											
Stress	-.113	.266*	.007	-.163	.115	.375*	.289*	.198	.222	-.158	.348*	-.238*	.008	-.052	.628*	.715*	1										



1.3.3 Reliability indices

In table 11 Cronbach's alpha values can be found. The largest internal consistency can be found between the items measuring *Goals* ($r=.915$), *Non acceptance* ($r=.912$) and *Resilience* ($r=.895$). The smallest consistencies are found in the items measuring *Selfregulation* ($r=.569$), *Personal interest* ($r=.490$) and *Help seeking* ($r=.452$).

Table 11. Cronbach A's for the Belgian sample

<i>ILS</i>	<i>N</i>	<i>Items</i>	<i>Cronbach's Alpha</i>
Processing			
<i>Deep processing</i>	111	4	.705
<i>Stepwise processing</i>	100	6	.747
<i>Concrete processing</i>	111	3	.657
Regulation			
<i>Selfregulation</i>	100	5	.569
<i>External regulation</i>	100	5	.648
<i>Lack of regulation</i>	100	4	.706
Motivation			
<i>Certificate orientated</i>	80	5	.631
<i>Job oriented</i>	85	5	.624
<i>Test oriented</i>	80	5	.798
<i>Personal interest</i>	80	5	.490
<i>Ambivalent</i>	80	5	.784
MSLQ			
<i>Self-efficacy</i>	76	7	.893
<i>Peer learning</i>	76	3	.742
<i>Help seeking</i>	76	4	.452
DASS			
<i>Depression</i>	74	7	.893

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<i>Anxiety</i>	74	7	.881
<i>Stress</i>	74	7	.884
<hr/>			
<i>DEERS</i>	N	Items	Cronbach's Alpha
<hr/>			
<i>Awareness</i>	73	3	.714
<i>Clarity</i>	73	3	.836
<i>Goals</i>	72	3	.915
<i>Impulse</i>	72	3	.800
<i>Non acceptance</i>	72	3	.912
<i>Strategies</i>	72	3	.865
<hr/>			
<i>PASS</i>			
<hr/>			
<i>Procrastination</i>	72	12	.883
<i>Tendency to reduce procrastination</i>	72	6	.843
<hr/>			
<i>Resilience</i>	72	2	.895
<hr/>			

2 Conclusions

The aim of the current study was to identify student profiles that include cognitive, metacognitive and motivational aspects of learning, but also aspects of resilience, emotion dysregulation and anxiety. In the past, student learning profiles have been identified on cognitive, metacognitive and motivational aspects of learning, but aspects of mental health and wellbeing have largely been neglected so far (Fonteyne et al. 2017; Willems et al., 2018). However, it was already shown that these aspects of mental health and wellbeing play a crucial role in students' transition from secondary to higher education and may have an impact on students' achievement (Schneider & Preckel 2014; Schaeper 2019). Therefore, the current study focuses on determining (meta)cognitive-emotional learner profiles in first-year students in higher education and how these different profiles differ with regard to academic achievement.

The first research question focuses on identifying different (meta)cognitive-emotional learner profiles based on students' general disposition towards cognitive processing strategies, regulation strategies, motivation, emotion regulation, anxiety, procrastination and resilience. We identified four different (meta)-cognitive-emotional learner profiles. The first profile could be labeled the emotionally stable and highly adaptive learner (Cluster 1 in the result section). These students indicate applying different cognitive processing strategies, mainly self-regulating their learning process, being interested in learning and highly self-efficacious, being emotionally regulated, resilient, not anxious and they do not have a tendency to procrastinate their school work. This profile demonstrates the positive interaction between self-regulation, self-efficacy, a positive motivation and no tendency to procrastinate as described in the literature (Burnam et al. 2014; Katz, Eilot, and Nevo 2014; Steel 2007). This learning profile can be considered to be the wishful profile for students in the first-year of higher education.

The second profile can be labeled as the emotionally dysregulated and at risk learner (Cluster 2). These learners have a low use of cognitive processing strategies, experience lack of regulation, are highly ambivalent motivated, not self-efficacious, emotionally dysregulated, not resilient, anxious and do have a tendency towards procrastination. Students that have this learning profile are at risk, both on the emotional and (meta)cognitive aspects of learning. This

profile shows that self-regulated learning does not go hand in hand with anxiety (Pintrich 2004) and that anxiety leads to procrastination (Chang 2014). The third profile can be labeled as the emotionally dysregulated and highly adaptive learner (Cluster 3). These students apply different cognitive processing strategies, are mainly externally regulated or lack regulation, are motivated, self-efficacious, emotionally dysregulated, not very resilient, anxious and have a tendency towards procrastination. It seems that these students are quite good in academic adjustment, meaning that they are adapting their (meta)cognitive learning strategies to the new learning environment (Vermunt, 2005), but are less emotionally adjusted to the new learning environment. This demonstrates the importance to look at both (meta) cognitive and emotional aspects of students' learning when entering higher education (Schneider & Preckel 2007; Schaeper 2019).

The fourth profile can be labeled as the emotionally stable and at risk learner (Cluster 4). These students show a low use of cognitive processing strategies, external regulation, ambivalent motivation, emotional regulation, resilient, not anxious and a slight tendency towards procrastination. These learners are emotionally adjusted to the new learning environment but are not academically adjusted to the new learning environment. They lack self-regulation, motivation and self-efficacy (Katz, Eliot, and Nevo 2014). It also demonstrates that students who procrastinate lack the confidence needed to apply useful strategies in completing tasks. The second research question examines whether the different (meta)cognitive emotional learner profiles differ regarding success rate and GPA. The emotionally dysregulated and at risk learner has a lower GPA than the emotional stable and highly adaptive learner, the emotionally dysregulated and highly adaptive learner and the emotionally stable and at risk learner. As already described above, this learner profile is the least desirable profile and this profile thus also shows the lowest GPA. This demonstrates that low self-regulation and low self-efficacy are related to a lower academic achievement (Burnam et al. 2014; Komarraju and Nadler 2013; Vermunt 2005) in combination with high levels of emotional dysregulation and anxiety. The emotionally stable and highly adaptive learner has a higher GPA than the emotionally stable and at risk learner. This demonstrates that a higher self-regulation and self-efficacy (characteristics of the highly adaptive learner) lead to a higher academic achievement (Burnam et al. 2014). The emotionally stable and highly adaptive learners has no different GPA

than the emotionally dysregulated and highly adaptive learner. The emotionally stable and at risk learner has no different GPA than the emotionally dysregulated and at risk learner. This demonstrates that profiles with equal (meta) cognitive aspects, have no different GPA even though their emotional aspects differ.

To conclude, this study was able to distinguish between four different (meta)cognitive emotional learner profiles, which offers an added value to the already know (meta)cognitive learner profiles that were determined in previous work. However, this study also has some limitations. One of the limitations is related to the person-oriented perspective we took in this study. A learner profile combines students with a comparable score on the different scales, but this does not mean that students within a certain profile have the same scores on the different scales included in the profile analysis. It is possible that students find themselves at the ‘border’ of a learner profile and sometimes are more closely related to another learner profile. It is informative to look at profile membership for diagnostic reasons, however it could also be interesting to look at the difference between the individual scores of a student compared to the mean for the learner profile when diagnosing students. For future research, we would suggest to replicate the findings of this study with other datasets in order to control whether the same four profiles can be detected. In addition, it would be interesting to explore other outcome variables than GPA. More specifically, future research could look at well-being (Postareff et al. 2017; Trautwein and Bosse 2017) or drop-out of higher education.

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