1 **Student characteristics associated with dominant approaches to studying:**

2 **Comparing a national and an international sample**

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1   **Abstract**

2   **Background:** Productive approaches to studying are associated with a variety of favorable

3   academic outcomes. The aim of this study was to explore associations between student

4   background characteristics and their dominant approaches to studying based on two samples

5   of occupational therapy students: A national sample of Norwegian first-year students, and an

6   international sample of students in different year cohorts. **Methods:** A total of 845 students

7   responded on questionnaires measuring demographic and education-related factors, and

8   approaches to studying (national sample (Norway): $n = 180$; response rate $= 61.3$ %;

9   international sample (Norway, Australia, Hong Kong, Singapore): $n = 665$; response rate $=$

10   66.1 %), measured with the Approaches and Study Skills Inventory for Students (ASSIST).

11   Data were analyzed with descriptive statistics, chi-square tests, one-way analysis of variance

12   (ANOVA) and multinomial regression analyses. **Results:** In the adjusted analyses, age,

13   gender and prior higher education were not associated with dominant study approach. More

14   time spent on independent studying (international sample; OR $= 1.07/1.08$, $p < .01/< .001$)

15   and having current study program as the top priority line of education at enrolment (national

16   sample; OR $= 2.89$, $p < .05$) predicted productive study approaches. **Conclusions:** Factors

17   such as age, gender and prior higher education seem to be of limited importance for

18   understanding students' dominant approaches to studying, while factors relating to motivation

19   and learning environment may be more pivotal.

20

21   *Keywords*: Approaches to studying; higher education; multinomial logistic regression;

22   learning

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1   **Introduction**

2   Students differ in how they approach their studies. 'Approach to study' refers to how students

3   orient themselves towards learning in academic situations (1). A student's approach to study

4   is developed through an interaction between individual characteristics and factors related to

5   the learning environment. An approach to study is more complex than a specific type of

6   learning style, insofar that the latter primarily refers to individual dispositions that are stable

7   in nature (2). In their influential theoretical framework, Entwistle and Ramsden (3)

8   distinguished between three approaches to study : (i) a *surface approach* that is characterized

9   by investing the least possible effort in order to pass necessary exams, with an emphasis on

10   passive information processing and reproduction of memorized knowledge (2-4), (ii) a *deep*

11   *approach* that comprises processes of examining, connecting and integrating ideas and

12   knowledge in order to construct personal meaning from the study materials (2, 5), and (iii) a

13   *strategic approach* that encompasses elements of both deep and surface studying,

14   characterized by a flexible, organized and achievement-oriented adaptation of study efforts in

15   accordance with external academic demands (6).

16   A deep approach to studying has, quite consistently, been associated with higher academic

17   achievements, as demonstrated in heterogeneous student samples (7, 8), as well as in

18   discipline-specific samples, such as medical students (9, 10), chemistry students (11), and

19   occupational therapy students (12). A deep study approach has been associated with a variety

20   of other favorable outcomes, e.g., lower self-handicapping (7), higher student reflectivity (7),

21   and more time spent on independent study tasks (13). Similarly, higher academic

22   achievements have been associated with a strategic study approach (12, 14). Conversely, a

23   surface approach to studying has been linked to several detrimental outcomes, such as lower

24   academic achievement (12, 14-18), increased risk of dropping out of academic study

25   programs (19), lower academic expectations (7), increased test anxiety (20), and higher levels

1   of stress (21). Deep and strategic approaches to studying may thus be characterized as

2   productive approaches that ought to be encouraged and promoted by educational institutions.

3   In the following, we will therefore use this term to denote deep and strategic approaches to

4   studying.

5   Research has demonstrated that factors related to the learning environment may influence

6   students' approach to studying, such as workload (4, 22), teaching methods (4, 23, 24),

7   teacher approach (25, 26), and assessment and feedback procedures (4, 27, 28). Some studies

8   have suggested that students embrace more productive approaches to studying as their study

9   experience increases (15, 29, 30), while others have proposed the opposite, i.e., a gradual shift

10 from deeper to more surface orientations (31, 32).

11   Studies exploring individual motivational factors imply that a deep approach to studying is

12 predicted by a high degree of identification with one's field of study (33) and an intrinsic

13 study motivation (25, 34). Moreover, a deep orientation has been associated with high levels

14 of self-confidence, self-efficacy, organizational skills, time management abilities, dedication

15 and self-regulation (25, 34-36), as well as certain personality traits (25). A preference for

16 teaching where educators emphasize understanding, rather than information transfer, has been

17 linked to productive approaches to study and academic engagement (25, 37).

18   Several studies have explored the importance of students' demographic factors for

19 understanding study approaches, yet investigations have often yielded inconclusive and/or

20 conflicting results (25, 38). Some studies have found that males are more prone than females

21 to surface studying (39, 40), while others have found the opposite (26, 37, 41). Likewise,

22 studies have reported conflicting results regarding the association between gender and

23 productive approaches to study (17, 39, 41, 42). Interestingly several other studies have

24 documented significant differences between genders existed (16, 32, 43-46). Across countries

25 and study disciplines, research has generally found that higher student age is associated with

1   an inclination to adopt a deep or strategic study approach (35, 37, 43, 44, 46). However,

2   several studies have not been able to demonstrate a significant relationship between age and

3   approach to academic studies (32, 40, 45, 47).

4   Knowledge of factors that may influence occupational therapy students' approaches to

5   studying is important in order to enable educational institutions to encourage and facilitate

6   productive student study orientations. Student variables such as gender, age and higher

7   education experience are not amenable to intervention, but knowledge about such links may

8   enable educator providers to identify students that may particularly benefit from interventions

9   aimed at encouraging productive approaches to academic study. Current research evidence on

10   students' demographic factors and associations with study approaches stands out as

11   inconclusive and conflicting. Moreover, research on such relationships among occupational

12   therapy students is sparse. This study adds to existing literature by comparing a national

13   sample and an international sample within the same discipline.

14   **Study aim**

15   The aim of this study was to explore associations between occupational therapy students'

16   background characteristics and their dominant approaches to studying in (i) a sample of

17   Norwegian first-year undergraduate occupational therapy students, and (ii) a cross-cultural

18   sample of undergraduate occupational therapy students in different year level cohorts.

19

20   **Methods**

21   **Design and study context**

22   The research reported in this paper is part of the international Learning Environment and

23   Approaches to Studying among Occupational Therapy Students project, and is based on two

24   datasets from two different studies. Study 1 is a cross-sectional study of approaches to

25   studying and their associated factors among first-year undergraduate occupational therapy

1   students in Norway. The data for this study were collected about midway into their first year

2   of study, gathered in 2017/2018. Similarly, Study 2 is a cross-sectional study, but employs a

3   larger dataset with responses from undergraduate occupational therapy students in Australia,

4   Hong Kong, Singapore and Norway. These students were enrolled in four different year level

5   cohorts, and the data were collected in 2014.

6   **Recruitment and response rate**

7   In Study 1, students enrolled in the first year at each of the six occupational therapy

8   undergraduate education programs in Norway were invited to participate. Three-hundred-and-

9   eight students were eligible to take part, and 187 (response rate = 61.3 %) chose to participate.

10   Of these recruited students, 180 had valid scores on all variables employed in the analyses.

11   Faculty members at each education program distributed the questionnaires and consent forms

12   to the students.

13   In Study 2, the questionnaires were completed by 712 students, representing 66.1 % of the

14   total number of students at four sites. Response rates for Australia were $n = 376/410$ (91.7 %),

15   for Hong Kong $n = 109/355$ (30.7 %), for Norway $n = 160/245$ (65.3 %), and for Singapore n

16   $= 67/67$ (100 %). Participants from Australia were from all four study years (first year $n =$

17   170; second year $n = 77$; third year $n = 73$; and fourth year $n = 56$). The Norwegian

18   participants were from all three year levels (first year $n = 57$; second year $n = 50$; and third

19   year $n = 53$). Participants from Hong Kong were predominantly in the first and third study

20   years (first year $n = 37$; second year $n = 5$; and third year $n = 23$ from the 4-year program; and

21   third year $n = 44$ from the 3-year program). Lastly, only first year students were included in

22   Singapore ($n = 67$). Of the 712 recruited students, 665 had valid scores on the variables

23   employed in the analyses. Faculty members at each education program distributed the

24   questionnaires and consent forms to students.

25   **Measurements**

1   **Demographic and education-related characteristics.** Information about age, gender and

2   education (prior higher education versus no prior higher education, and hours spent of self-

3   studying during a typical week) was collected as part of the questionnaire. Age was

4   categorized as ≤19 years, 20-24 years, 25-29 years, 30-35 years, 36-39 years, and ≥ 40 years.

5   In Study 1, the participants also provided information on whether occupational therapy was

6   their priority line of study at the time of enrolment (yes/no).

7   **Approaches to studying.** Data related to the students' approaches to studying were obtained

8   from the 52-item Approaches and Study Skills Inventory for Students (ASSIST (6)). The

9   ASSIST may serve as a tool to identify students who experience problems with studying. For

10   the Norwegian students in Study 1 and 2, a previously validated Norwegian version of the

11   ASSIST was used (48). As established from prior psychometric studies, the ASSIST items are

12   organized into three main factors, namely the *deep*, *strategic*, and *surface* approaches (49-51).

13   The three approaches to study are compose of several subscales, each of which contain four

14   items. The deep approach consists of four subscales (seeking meaning, relating ideas, use of

15   evidence, and interest in ideas); the strategic approach consists of five subscales (organized

16   study, time management, alertness to assessment demands, achieving, and monitoring

17   effectiveness); and lastly, the surface approach consists of four subscales (lack of purpose,

18   unrelated memorizing, syllabus-bound, and fear of failure).

19   The original English language version of the ASSIST demonstrated satisfactory internal

20   consistency for the main scales (Cronbach's α ranging 0.61-0.88) when used with students in

21   different academic and professional areas (49, 51-54). The Norwegian language version of the

22   ASSIST was examined using factor analytic procedures (55) and structural equation

23   modelling (48), and yielded the same three latent factors (deep, strategic, and surface

24   approaches). In Study 1, internal consistency estimates (Cronbach's α) for the study approach

25   scales were 0.71 (deep approach), 0.84 (strategic approach), and 0.76 (surface approach). In

1   Study 2, internal consistency was 0.79 (deep approach), 0.84 (strategic approach), and 0.74

2   (surface approach).

3   **Data analysis**

4   All data were entered into IBM SPSS version 26 (56). Descriptive analyses were performed

5   on all variables using means (M), standard deviations (SD), frequencies and percentages as

6   appropriate. Scores on the deep-, strategic-, and surface scales were normalized; i.e., divided

7   by the number of items belonging to each scale. The resulting scale scores ranged from 1-5.

8   Based on their highest normalized scale score, all students were categorized as either deep,

9   strategic or surface learners, thus three groups of students were constituted. Overall

10   differences between the three groups were investigated with Chi-square tests for categorical

11   variables and with one-way analysis of variance (ANOVA) for continuous variables.

12   Subsequently, multinomial logistic regression analyses were used to examine the adjusted

13   associations between demographic and education-related characteristics (age group, gender,

14   prior higher education experience, and time spent engaging in self-study during a typical

15   week) and dominant study approach (deep versus strategic versus surface approach) as the

16   outcome variable. In Study 1, having or not having occupational therapy as the highest

17   priority line of study at enrolment was used as an additional independent variable. The surface

18   approach was used as the reference category. Statistical significance was set at $p < 0.05$.

19   **Ethics**

20   For Study 1, approval for collecting and storing the data was granted by the Norwegian

21   Center for Research Data (NSD). For Study 2, ethical approval and approval for collecting

22   and storing data was granted by the following ethics review boards/data protection agencies:

23   Monash University Human Research Ethics Committee (MUHREC; for Monash University);

24   the Norwegian Center for Research Data (NSD; for Oslo Metropolitan University); the

25   Human Subject Ethics Application Review System (HSEARS; for Hong Kong Polytechnic

1   University); and Nanyang Polytechnic, School of Health Sciences Projects Review

2   Committee (for Nanyang Polytechnic University). In both studies, the students were informed

3   that completion of the questionnaire was voluntary, that their responses would be treated in

4   confidence, and that there would be no negative consequences from opting not to participate

5   in the study. Written informed consent was provided from all participants.

6

7   **Results**

8   **Study 1**

9   **Participants.** The demographic and education-related characteristics of the participants in

10   Study 1, and their scores on the study approach scales, are reported in Table 1 according to

11   the dominant study approaches. The unadjusted analysis revealed unequal gender proportions

12   classified with the three dominant study approaches ($p < 0.01$). Among the male students, the

13   largest proportion was classified as deep learners (61.1 %), while the largest proportion of

14   female students were classified as strategic learners (55.6 %). Relatively small proportions

15   were classified as surface learners (8.3 % of male students and 14.6 % of female students

16   respectively). The normalized mean scores on the three study approach scales followed the

17   expected pattern: the mean deep approach score was highest among students classified as

18   deep learners, the mean strategic approach score was highest among students classified as

19   strategic learners, and the mean surface approach score was highest among students classified

20   as surface learners (all $p < 0.001$).

21

22   INSERT TABLE 1 ABOUT HERE

23

24   **Associations between student characteristics and dominant study approach.** In the

25   adjusted multinomial regression analyses (Table 2), none of the independent variables

1   significantly predicted the deep approach to study as the dominant approach, compared to the

2   surface approach to study. However, we noted a non-significant association between male

3   gender and higher odds of being classified as a deep learner, compared to a surface learner

4   (OR = 3.23, $p = 0.09$). Students who reported having had occupational therapy as their top

5   priority line of education at the time of enrolment had increased odds for having a dominant

6   strategic approach to studying, compared to a surface approach (OR = 2.89, $p < 0.05$).

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8   INSERT TABLE 2 ABOUT HERE

9

10   **Study 2**

11   **Participants.** The demographic and education-relation characteristics of the participants in

12   Study 2, and their scores on the study approach scales, are displayed in Table 3 according to

13   their dominant study approaches. The unadjusted analyses revealed unequal gender

14   proportions between the dominant study approaches ($p < 0.05$). Among the male students, the

15   proportions classified as deep learners (46.2 %) and strategic learners (43.0 %) were relatively

16   similar in size, while the largest proportion of female students were classified as strategic

17   learners (54.2 %). Surface learners were relatively few (10.8 % among male students and 13.3

18   % among female students respectively). The number of hours spent engaging in independent

19   study during a typical week was also different between the groups, with more hours spent

20   among deep learners ($M = 12.6$ hours, $SD = 7.7$ hours) and strategic learners ($M = 13.8$ hours,

21   $SD = 9.0$ hours), while fewer hours were spent among the surface learners ($M = 10.0$ hours,

22   $SD = 6.2$ hours, $p < 0.01$).

23   The normalized mean scores on the three study approach scales followed the expected

24   pattern: the mean deep approach score was highest among students classified as deep learners,

25   the mean strategic approach was highest among students classified as strategic learners, and

1 the mean surface approach score was highest among students classified as surface learners (all

2 $p < 0.001$).

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4 INSERT TABLE 3 ABOUT HERE

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6 **Associations between student characteristics and dominant study approach.** In the

7 adjusted multinomial regression analyses (Table 4), spending more hours on independent

8 studying during a typical week significantly predicted a dominant deep approach to study,

9 compared to the surface approach (OR = 1.07, $p < 0.01$). In addition, a borderline significant

10 association was noted between male gender and higher odds of being classified as a deep

11 learner, compared to a surface learner (OR = 2.11, $p = 0.05$). Students who reported spending

12 more time involved in independent study during a typical week also had increased odds for a

13 dominant strategic approach to studying, compared to a surface approach (OR = 1.08, $p <$

14 0.001).

15

16 INSERT TABLE 4 ABOUT HERE

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18 **Discussion**

19 This study explored associations between occupational therapy students' background

20 characteristics and their dominant approaches to studying, based on two samples: a national

21 sample of Norwegian first-year students, and an international sample of students in different

22 year cohorts. The following main findings will be discussed: (i) age, gender and prior higher

23 education experience were not associated with the dominant approach to study; (ii) more time

24 spent on independent studying predicted productive study approaches (deep and strategic) in

25 the international sample, but not in the national sample; and (iii) having the current study

1   program (occupational therapy) as the top priority line of education at the time of enrolment

2   predicted a strategic approach in the national sample. It should be noted that this was not

3   measured in the international sample.

4   The pattern of study approach distributions was similar across the two samples. Overall,

5   strategic learners were most prevalent, followed by deep and surface learners. Among males,

6   the deep approach was somewhat overrepresented, while the strategic approach was most

7   common among females. This pattern is consistent with what has been found in a

8   heterogeneous student sample in Turkey and Taiwan (males higher on deep learning) (39),

9   and among math students in Vietnam (females higher on strategic learning) (17). However,

10   we were not able to demonstrate significant associations between gender and students'

11   approach to study, in line with previously reported studies involving psychology students (43,

12   44), medical students (16, 45) or science students (46). Moreover, this study does not provide

13   support for previous research that have found that higher age tend to be associated with

14   application of more productive study approaches (35, 37, 43, 44, 46).

15   We did, in line with other inconclusive studies (32, 40, 45, 47), not find a significant

16   relationship between age and students' approach to study. Moreover, we did not find a

17   significant association between prior higher education experience and dominant study

18   approach. Few studies have explicitly explored the role of prior higher education experience.

19   A notable exception is a study among Norwegian occupational therapy students (35) that

20   revealed that students without prior higher education were more prone to adopt a surface

21   approach to studying. However, studies exploring temporal changes in preferred approaches

22   to study throughout the course of an education program have yielded inconclusive results (15,

23   29-32).

24   In the international sample, it was found that students who spent more time participating in

25   independent study were more inclined to adopt productive study approaches. This finding

1   among occupational therapy students is thus comparable to Entwistle and Tait's (13) study of

2   engineering students that concluded that more time spent on independent study was associated

3   with embracing a meaningful orientation to learning. Time spent engaging in independent

4   study may be interpreted as a reflection of students' interest in, dedication and motivation for

5   the course, and may thus reflect an intrinsic motivation towards study, which in previous

6   studies has been linked to productive study approaches (25, 33, 34). The findings from the

7   current study does not explain why significant associations between involvement in

8   independent study and approaches to study were not found in the Norwegian student sample.

9   It may be due to actual cross-cultural differences in higher education study programs and

10   learning environments, as a result of the Norwegian sample (composed of just first-year

11   students) having less experience with their line of study than the international sample (that

12   involved students across all year levels), or perhaps as a consequence of lower statistical

13   power (lower sample size) in the Norwegian sample.

14   In the Norwegian sample of students, having occupational therapy as the top priority rank

15   of educational choice of program at enrolment predicted the adoption of a strategic (compared

16   to a surface) approach to study. It is plausible to assume that students granted their top study

17   priority choice are more intrinsically motivated for studying than students who are refused

18   their top priority and instead granted occupational therapy studies as an alternate choice. This

19   may partially explain why students who were granted their top ranked study area of choice

20   were characterized by an increased strategic learning strategy. No doubt students who ranked

21   occupational therapy as their top choice for university student were highly motivated to do so.

22   Study choice ranking (i.e., priority) at initial enrollment into the occupational therapy course

23   was not measured in the international sample.

24   **Educational implications**

1   Taken together, the results from both the national and international samples of undergraduate

2   occupational therapy students suggests that student factors such as gender, age and prior

3   higher education experience are of less importance when attempting to understand students'

4   approaches to studying, while factors that may relate more to students' motivation (time spent

5   engaging in independent study in the international sample; having occupational therapy as the

6   top ranked choice of university academic course in the national sample) seem to be more

7   important. As such, this study does not provide support for educational institutions to target

8   specific student groups based on factors such as gender, age and prior education experience.

9   Taking results from previous research into consideration, institutions could benefit from

10   focusing on encouraging productive study approaches for all students, for instance by means

11   of emphasizing problem-based learning (4, 23), in-class activities (24), supportive teaching

12   (25, 26), formative rather than summative assessments (57), building students' self-efficacy

13   (25, 34, 35) and identification with their line of study (33).

14   **Methodological issues**

15   The present study has several strengths. The results are based on data from both a national and

16   an international sample (four countries) of students within the same study discipline across

17   study year cohorts. The response rates were quite high (national sample = 61.3 %;

18   international sample = 66.1 %), and the sample sizes were statistically satisfactory by well

19   exceeding a recommended ratio of 15 participants per independent variable (national sample:

20   $\frac{180\ participants}{5\ predictors} = 36$ participants per predictor; international sample: $\frac{665\ participants}{4\ predictors} = 166.25$

21   participants per predictor) (58), and by exceeding a required sample size in concordance with

22   the formula $N > 50 + (8 \times$ number of independent variables) (59). However, in the

23   international sample, the number of students was not evenly distributed between the four

24   countries. This was due to the eligible subsamples varying in size and response rates.

1   Consequently, subsamples from large institutions and institutions with high response rates

2   were ascribed undue weight, which may somewhat have biased the results.

3   Moreover, the outcome variables (study approaches) were measured with the Approaches

4   to Study Skills Inventory for Students (ASSIST (6)), an instrument that has demonstrated

5   satisfactory measurement properties across languages as well as across academic and

6   professional areas (48, 49, 51-55). The cross-sectional design of this study does, however,

7   pose certain limitations. By studying cross-sectional relationships between predictors and

8   outcomes, we were able to explore associations, yet unable to draw causal inferences. For

9   instance, we identified a significant association between time spent on independent studying

10   and study approaches. It may well be that considerable independent studying leads to a

11   productive study approach. However, the opposite may also be true, i.e., that a productive

12   study approach leads to more independent studying, or that some extraneous factor(s) (e.g.,

13   motivation) were the cause of both. Future research would benefit from exploring study

14   approaches by means of more robust research designs, such as controlled prospective cohort

15   studies or retrospective case-control studies.

16

17   **Conclusions**

18   Productive approaches to studying (deep and strategic learning) are associated with a variety

19   of favorable academic outcomes. Knowledge of factors that enhance productive approaches

20   may enable educational institutions to encourage deep and strategic study approaches among

21   students. Factors such as age, gender and prior higher education seem to be of limited

22   importance for understanding students' study approaches. Taking previous findings into

23   consideration, factors relating to the learning environment and students' motivation stand out

24   as more pivotal.

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1
2 **Declarations**

3 **Conflicts of interest**

4 The authors declare that they have no conflicts of interest.

5 **Data availability**

6 The data used to support the findings of this study are available from the corresponding author

7 upon reasonable request.

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Table 1

Study 1: Student characteristics and scores on the approach to study scales according to dominant study approach (n = 180)

Student characteristics	Dominant study approach			p^b
	Deep	Strategic	Surface	
	n (%)	n (%)	n (%)	
All students	65 (36.1)	91 (50.6)	24 (13.3)	
Age group (n [%])				0.58
≤ 19 years	2 (12.5)	12 (75.0)	2 (12.5)	
20-24 years	48 (37.2)	64 (49.6)	17 (13.2)	
25-29 years	11 (47.8)	8 (34.8)	4 (17.4)	
30-35 years	2 (33.3)	3 (50.0)	1 (16.7)	
36-39 years	0 (0.0)	1 (100.0)	0 (0.0)	
≥ 40 years	2 (40.0)	3 (60.0)	0 (0.0)	
Gender (n [%])				< 0.01
Male	22 (61.1)	11 (30.6)	3 (8.3)	
Female	43 (29.9)	80 (55.6)	21 (14.6)	
Prior higher education (n [%])				0.31
Yes	33 (42.3)	36 (46.2)	9 (11.5)	
No	32 (31.4)	55 (53.9)	15 (14.7)	
Educational priority (n [%])				0.06
OT was highest priority	40 (35.7)	62 (55.4)	10 (8.9)	
OT was not higher priority	25 (36.8)	29 (42.6)	14 (20.6)	
Weekly hrs. spent on indep. stud. (*M* [*SD*])	8.7 (6.6)	10.0 (7.2)	8.6 (7.6)	0.50
Study approach scale scores (*M* [*SD*])[a]				
Deep approach	3.9 (0.5)	3.4 (0.5)	3.1 (0.4)	< 0.001
Strategic approach	3.4 (0.4)	3.9 (0.4)	3.1 (0.9)	< 0.001
Surface approach	2.9 (0.4)	2.8 (0.6)	3.7 (0.4)	< 0.001

Note. M = mean; SD = standard deviation; OT = occupational therapy; [a]Study approach scale scores are normalized, each ranging 1-5; [b]Statistical tests are chi-square (categorical variables) and one-way ANOVA (continuous variables)

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Table 2

Study 1: Associations between student characteristics and dominant approach to study,
using surface approach as the reference category (n = 180)

Characteristics	OR	95 % CI for OR	p
Deep approach			
Age group (lower age is ref.)	1.06	0.60-1.87	0.86
Male	3.23	0.83-12.51	0.09
Female		reference category	
Prior higher education	1.35	0.49-3.72	0.57
No prior higher education		reference category	
OT was highest priority	2.17	0.81-5.79	0.12
OT was not highest priority		reference category	
Hrs. spent on indep. stud. (fewer is ref.)	0.99	0.92-1.08	0.86
Strategic approach			
Age group (lower age is ref.)	0.99	0.56-1.73	0.96
Male	0.91	0.22-3.71	0.89
Female		reference category	
Prior higher education	1.05	0.39-2.81	0.92
No prior higher education		reference category	
OT was highest priority	2.89*	1.13-7.39	< 0.05
OT was not highest priority		reference category	
Hrs. spent on indep. stud. (fewer is ref.)	1.02	0.94-1.10	0.66
Model χ^2	19.3		< 0.05
Pseudo R^2 (Cox and Snell [Nagelkerke])	0.10 (0.12)		

Note. Results from multinomial regression analyses; OR = odds ratio; CI = confidence interval; OT = occupational therapy; *p* <.05

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Table 3

Study 2: Student characteristics and scores on the approach to study scales according to dominant study approach (n = 665)

Student characteristics	Dominant study approach			p^{b}
	Deep	Strategic	Surface	
	n (%)	n (%)	n (%)	
All students	229 (34.4)	350 (52.6)	86 (12.9)	
Age group (n [%])				0.68
≤ 19 years	68 (35.4)	99 (51.6)	25 (13.0)	
20-24 years	126 (32.9)	201 (52.5)	56 (14.6)	
25-29 years	20 (38.5)	30 (57.7)	2 (3.8)	
30-35 years	8 (44.4)	9 (50.0)	1 (5.6)	
36-39 years	4 (30.8)	7 (53.8)	2 (15.4)	
≥ 40 years	3 (42.9)	4 (57.1)	0 (0.0)	
Gender (n [%])				< 0.05
Male	43 (46.2)	40 (43.0)	10 (10.8)	
Female	186 (32.5)	310 (54.2)	76 (13.3)	
Prior higher education (n [%])				0.22
Yes	91 (37.0)	130 (52.8)	25 (10.2)	
No	138 (32.9)	220 (52.5)	61 (14.6)	
Weekly hrs. spent on indep. stud. (*M* [*SD*])	12.6 (7.7)	13.8 (9.0)	10.0 (6.2)	< 0.01
Study approach scale scores (*M* [*SD*])[a]				
Deep approach	3.9 (0.3)	3.4 (0.4)	3.0 (0.5)	< 0.001
Strategic approach	3.4 (0.4)	3.9 (0.4)	3.1 (0.5)	< 0.001
Surface approach	3.0 (0.5)	3.0 (0.4)	3.7 (0.3)	< 0.001

Note. M = mean; *SD* = standard deviation; [a]Study approach scale scores are normalized, each ranging 1-5; [b]Statistical tests are chi-square (categorical variables) and one-way ANOVA (continuous variables)

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Table 4

Study 2: Associations between student characteristics and dominant approach to study,

using surface approach as the reference category (n = 665)

Characteristics	OR	95 % CI for OR	p
Deep approach			
Age group (lower age is ref.)	1.18	0.84-1.66	0.34
Male	2.11	0.99-4.49	0.05
Female		reference category	
Prior higher education	1.49	0.83-2.65	0.18
No prior higher education		reference category	
Hrs. spent on indep. stud. (fewer is ref.)	1.07**	1.03-1.11	< 0.01
Strategic approach			
Age group (lower age is ref.)	1.21	0.88-1.68	0.25
Male	1.20	0.57-2.56	0.63
Female		reference category	
Prior higher education	1.29	0.74-2.26	0.37
No prior higher education		reference category	
Hrs. spent on indep. stud. (fewer is ref.)	1.08***	1.04-1.13	< 0.001
Model χ^2	30.0		< 0.001
Pseudo R^2 (Cox and Snell [Nagelkerke])	0.04 (0.05)		

Note. Results from multinomial regression analyses; OR = odds ratio; CI = confidence interval; **p <.01;
***p <.001

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