Validation of the "Study-Anxiety" Questionnaire: a scale for the initial assessment of university students seeking psychological help

Nicole Casali[1] · Marta Ghisi[1,2] · Roberta Rizzato[2] · Chiara Meneghetti[1,2] · Rossana De Beni[1,2]

Abstract

Students can turn to university counseling services for several reasons, ranging from study-related to emotional issues; yet, few instruments assess both dimensions. This study examines the validity of the "Study-Anxiety" Questionnaire (SAQ), a measure evaluating study strategies, motivation and anxiety in students seeking psychological help. Two samples of students (Sample 1 and 2, n = 910, M_{age} = 22.78, SD = 2.6) completed the SAQ only, while a third sample (Sample 3, n = 100, M_{age} = 23.22, SD = 2.3) also filled measures of self-regulated learning and anxiety. Exploratory factor analysis on Sample 1 indicated a 4-factor structure (cognitive and behavioral study strategies, motivation, and anxiety), confirmed through confirmatory factor analysis on Sample 2. The four factors presented satisfactory internal consistency; sex invariance was supported, as well as convergent validity with measures of SRL and anxiety. Overall, SAQ emerged as a reliable measure to capture academic and emotional difficulties.

Keywords University students · Assessment · Self-regulated learning · Motivation · Anxiety

Introduction

Students can encounter several difficulties in their university academic career path, ranging from study-related issues (Richardson, Abraham, & Bond, 2012) to mental health difficulties (Cuijpers et al., 2019). Examples of these difficulties include: not being able to manage one's studies; feeling lost at the university, insecure and confused; having trouble managing emotions, or relating with others (from University of Padova's 2018/2019 Annual Report). These difficulties can in turn impair academic performance (Bruffaerts et al., 2018) and psychosocial functioning (Auerbach et al., 2016; Dörrenbächer & Perels, 2016). In this regard, universities have organized psychological assistance services to sustain students throughout their careers and to address their specific needs, be them related to study or mental health (Auerbach et al., 2018; Sneyers & De Witte, 2018), in order

to reduce the number of students behind schedule and prevent dropout, as well as to improve their wellbeing (Biasi et al., 2017; Østergård et al., 2017). In order to effectively devise a personalized treatment for students seeking help, university counselling services must first evaluate students' difficulties using specific assessment tools, able to capture different kinds of academic difficulties.

Academic difficulties: self-regulated learning, motivation, and anxiety issues

Integrative theoretical models of academic learning success (Ben-Eliyahu, 2019; Ben-Eliyahu & Bernacki, 2015; Panadero, 2017) comprehend both behavioral and cognitive learning-specific features, such as self-regulated learning or motivation to study, and emotions felt while studying, such as anxiety. Therefore, it is of importance to assess both components when dealing with students that may experience academic difficulties. Developing and using instruments that effectively grasp both emotional and study-related aspects can extend this theoretical framework to students seeking psychological help and also allow counselors have a clearer picture of the issues displayed early in the consultation, so

✉ Nicole Casali
  nicole.casali@phd.unipd.it

1 Department of General Psychology, University of Padova, Via Venezia, 8, 35131 Padova, Italy

2 Centro Ateneo dei Servizi Clinici Universitari Psicologici, University of Padova, Padova, Italy

to be more expedite and precise in their clinical work with the student.

What kinds of difficulties tend to emerge the most and should thus be addressed in the assessment process? Issues with the ability to self-regulated one's learning and stay motivated have been identified as very common (see Theobald 2021 for an overview). Self-regulated learning (SRL; Zimmerman 2008) is a broad construct concerning the active process through which students develop and manage their learning (Zimmerman, 2008). Similarly, learning success involves motivation to learn (Ben-Eliyahu, 2019), for instance in terms of interest and desire to know. The cognitive and behavioral strategies adopted while studying, as well as motivation to learn, have been associated to academic success (Burnette et al., 2013). Consequently, students with difficulties in SRL and motivation to learn can be at increased risk for suboptimal adaptation to university and struggle with both performing adequately and feeling satisfied (Liborius, Bellhäuser & Schmitz, 2019; Richardson, Abraham, & Bond, 2012).

Emotions experienced when studying, and in particular anxiety, also play a crucial role in the learning process, as it is increasingly being recognized by theoretical models on successful learning (Ben-Eliyahu, 2019; Pekrun & Linnebrink-Garcia, 2014). In Pekrun (2006) model, study-related anxiety is conceptualized as a negative activating emotion concerning prospective outcomes, meaning it has a negative valence and occurs in anticipation of an activity's outcome, such as a learning task (Pekrun & Linnebrink-Garcia, 2014). In the academic context, anxiety is, over a certain threshold (Yerkes & Dodson, 1908), generally maladptive (Ben-Eliyahu, 2019), because it generates task-irrelevant thoughts that reduce the cognitive resources available for the task in hand, making learning less effective (Zeidner, 2007). Negative academic emotions like anxiety also seem to impair motivation to learn (Pekrun & Linnenbrink-Garcia 2014) and, by prompting strategies to avoid failure, require resources that could be otherwise devoted to learning (Ben-Eliyahu, 2017), thereby negatively affecting achievement (Pekrun et al., 2006; Pekrun et al., 2009). Academic anxiety is a specific form of academic anxiety elicited by academic-related situations whose outcome students worry about or fear, resulting in a series of negative physiological, emotional, or behavioral responses (Zeidner, 1998). Several theories have conceptualized test anxiety and its relationship with performance (von der Embse et al., 2018), with substantial agreement that it is a complex, dynamic process (Spielberger & Vagg, 1995; Zeidner & Matthews, 2005) involving interference of emotionality on information recall (Alpert & Haber, 1960; Liebert & Morris, 1967; Wine, 1971), possible deficits in SRL strategies and motivation (Culler & Holahan, 1980; Tobias, 1985), attentional

control impairment (Eysenck et al., 2007), among others. Meta-analytical evidence (von der Embse et al., 2018) suggest that test anxiety is significantly negatively associated with test performance, SRL and motivation.

All in all, it appears that the main academic struggles experienced by students usually range from difficulties in self-regulated learning, motivation, and emotion management; all these factors have been shown to interrelate and should thus be equally important to address in assessment and counselling.

Assessing academic difficulties in university counselling services

According to Locke et al., (2011), assessment within university counselling services can be categorized into three groups: global assessments, content-specific/single domain assessments, and informal/unstandardized assessments. Global assessments focus on general mental health, using standardized multidimensional clinical measures, such as the Symptoms Check List 90-Revised (SCL-90-R; Derogatis 1994), the Clinical Outcomes in Routine Evaluation-Outcome Measure (CORE-OM; Evans et al., 2000), the Outcome Questionnaire-45 (OQ-45; Lambert et al., 1996). More rarely, services also adopt standardized single measures to assess specific symptoms, SRL, motivation, or anxiety. These instruments include the Beck Anxiety Inventory (BAI; Beck & Steer 1993), the Motivated Strategies for Learning Questionnaire (MSLQ; Pintrich et al., 1991), a multidimensional inventory assessing motivation and self-regulated learning strategies, or the Test Anxiety Inventory (TAI; Spielberger 1980), that evaluates worry and emotionality related to testing situations. Finally, counseling centers may also adopt an idiographic approach to student assessment, by means of informal or unstandardized assessment tools that are often internally developed and whose psychometric properties are unknown. Although being quick and inexpensive, this approach makes it difficult to compare students and generalize efficacy results to other student populations. Very few standardized instruments evaluate both emotional and academic distress; among them, there is the Counseling Center Assessment of Psychological Symptoms-62 (Locke et al., 2011). Overall, there is a lack of quick, standardized, and multidimensional instruments specifically designed for the university student population to be administered preliminary to a more thorough clinical assessment.

National university counseling services mainly rely on standardized clinical measures (e.g., Biasi et al., 2017a; Filippi et al., 2001; Monti et al., 2013, 2014; Vescovelli et al., 2017) and focus almost exclusively on mental health

disorders reported by students, with scarce attention paid to study-related issues, with few exceptions (Bani et al., 2020; Biasi et al., 2017b). To our knowledge, no standardized multidimensional measures of students' difficulties are available in the Italian context.

The present study

The aim of the present study is to assess the structural and convergent validity of a locally developed instrument assessing both study and emotional (anxiety) difficulties in university students seeking psychological help. This instrument has been created by the counseling center staff at the University of Padova Psychological Assistance Service to assess students' difficulties with studying and career path. It investigates several cognitive and behavioral self-regulated learning strategies, taking in consideration the main study strategies and behaviors identified by the self-regulated learning approach (Zimmerman, 2008), such as memorization or reviewing, together with the degree of motivation towards studying. At the same time, a part assessing symptoms of anxiety in relation to studying, exams, and everyday life was also included, drawing inspiration on models and theories on anxiety (von der Embse et al., 2018; Spielberger & Vagg, 1995). The items for the studying difficulties were conceived as a quick checklist of behaviors and cognitive strategies related to one's approach to studying, since the assessment process usually comprehended other, more extensive, instruments evaluating study strategies (e.g., the self-regulated learning questionnaire by De Beni et al., 2014). In other words, these items could be considered as preliminary to a deeper investigation of the study strategies deployed by students. The items assessing anxiety issues were instead developed as classical items referring to specific study situations, as this construct was not object to further investigation in the assessment process.

Convergent and divergent validity were assessed correlating the present instrument's scores with standardized measures of self-regulated learning strategies (De Beni et al., 2014) and anxiety (Bertolotti et al., 2015). Positive correlations were expected between items related to studying and a measure of self-regulated learning strategies (De Beni et al., 2014), and between items related to anxiety and a clinical measure of anxiety (Bertolotti et al., 2015). As for divergent validity, negative correlations were anticipated between the items related to studying and clinical anxiety and null ones were expected between items related to anxiety and the questionnaire on SRL strategies.

Table 1 Sample characteristics

Feature	Sample 1 + 2	Sample 1	Sample 2	Sample 3
Sex				
Female (%)	575 (63.19%)	287 (63.08%)	288 (63.3%)	56 (56%)
Male (%)	335 (36.81%)	168 (36.92%)	167 (36.7%)	44 (44%)
Age (SD)	22.78 (2.6)	22.83 (2.65)	22.73 (2.54)	23.22 (2.3)
Area of study				
Health and Life sciences	433 (48.49%)	209 (46.97%)	224 (50%)	47 (57.32%)
Hard Sciences	198 (22.17%)	98 (22.02%)	100 (22.32%)	20 (24.39%)
Social Sciences	91 (1.19%)	51 (11.46%)	40 (8.93%)	8 (9.76%)
Humanities	153 (17.13%)	79 (17.75%)	74 (16.52%)	7 (8.54%)
Other	18 (2.02%)	8 (1.8%)	10 (2.23%)	0 (0%)
Course year (SD)	3.37 (2.7)	3.27 (2.43)	3.46 (2.93)	2.64 (1.70)
ECTS earned (SD)	67.4 (5.71)	68.24 (52.24)	66.58 (49.25)	61.7 (5.24)

Note. ECTS = European Credit Transfer and Accumulation System. [a] In the Italian university system, the mean of grades ranges between 18 and 30

Method

Participants

Participants were 910 students aged 18–30 years old, who turned to the university psychological help service – Counseling and Psychotherapy. Students sought help due to study issues (41.52%), anxiety (34.03%), internalized problems (8.04%), relational issues (7.60%) and other issues (8.81%). The sample was divided in two sub-samples using R package minDiff, balancing for age and sex. Both Sample 1, on which exploratory factor analysis (EFA) was conducted, and Sample 2, on which confirmatory factor analysis (CFA) was conducted, consist of 455 students aged 18–30. The two subsamples do not differ with respect to sex ($\chi^2 = 0.01$, $p = 0.95$), age ($t_{(1,908)} = 0.57$, $p = 0.57$), origin ($\chi^2 = 2.47$, $p = 0.65$), area of study ($\chi^2 = 8.72$, $p = 0.46$), course year ($t_{(1,888)} = -1.08$, $p = 0.28$), number of credits acquired ($t_{(1,612)} = 0.40$, $p = 0.46$) and mean of grades ($t_{(1,724)} = 1.05$, $p = 0.29$). Moreover, to examine the convergent validity of the questionnaire, a third sample (Sample 3) was considered, composed by 100 students aged 20–28. This sample does not differ from entire sample (Samples 1 and 2) with regards to sex ($\chi^2 = 1.78$, $p = 0.18$), age ($t_{(1,1004)} = -1.6$, $p = 0.11$), origin ($\chi^2 = 0.11$, $p = 0.95$), area of study ($\chi^2 = 5.7$, $p = 0.22$), number of credits acquired ($t_{(1,686)} = 0.91$, $p = 0.36$) and mean of grades ($t_{(1,816)} = 0.48$, $p = 0.29$); the only significant difference

concerns course year, that is greater in the whole sample compared to Sample 3 ($t_{(1,975)} = 2.45$, $p = 0.01$). Table 1 shows the characteristics of the whole sample, the two sub-samples and Sample 3.

Materials

"Study-Anxiety" Questionnaire (SAQ).

This consists of 19 items investigating two main areas: the adequacy of one's study method, through a list of study skills and behaviors (11 item, e.g., reasoning, reviewing), assessed on a 5-point Likert scale (1 = "Not at all adequate" to 5 = "Totally adequate"); the frequency of anxiety symptoms, either referred to exams (e.g., "When I am studying, I tend to think that I could look bad") or to daily worries (e.g., "I worry that others may criticize and/or judge me"), assessed on a 5-point Likert scale from 1 "Never" to 5 "Always". The complete list of items is provided in Table 2.

Self-Regulated Strategy Questionnaire (SRSQ, De Beni et al., 2014).

This consists of 50 items assessing five aspects of self-regulated learning: organization (e.g., "In the early afternoon I plan all the things I have to do"), elaboration (e.g., "I make connections while the teacher is explaining"), preparing for exams (e.g., "While I am studying, I allocate some time to checking what I know"), self-evaluation (e.g., "I am aware when I have not studied enough"), and metacognition (e.g., "I like to think about how my mind works"). For each facet, there are 10 questions, 5 of them formulated in

a positive direction and the other 5 in a negative one. The original version of the questionnaire displayed satisfactory psychometric properties ($\alpha = 0.76$ for the overall score; De Beni et al., 2014).

Cognitive behavioral Assessment – Outcome evaluation – anxiety subscale (CBA-OE; Bertolotti et al., 2015)

This consists of 14 items assessing the intensity of the anxiety experienced over the past two weeks (e.g., "I have been upset about trivial things") on a 5-point Likert scale, from 1 "Not at all" to 5 "Very much". An overall score is computed reverting the answer of one negative item and summing all the items together. The original scale has good internal consistency ($\alpha = 0.89$; Bertolotti et al., 2015).

Procedure

Students who contacted the university psychological help service – Counseling and Psychotherapy filled a socio-demographic and academic-related information scale and the SAQ during the first access. Students from Sample 3 also filled in CBA-OE and SRSQ, respectively. All students signed the informed consent to access the service for the processing of their personal data. The present study was approved by the Ethical Committee of the University of Padova (n. 4427).

Table 2 Factorial structure: PCA results (Sample 1)

Item	Cognitive study aspects	Behavioral study aspects	Motivation to study	Anxiety
Comprehension [Understand study material]	0.83			
Reasoning [Reflect upon what is being studied]	0.82			
Elaboration [Expand on what is being studied]	0.71			
Memory [Remember the study material]	0.54			
Flexibility [Adapt one's way of studying]	0.68			
Schemes [Summarize the study material]		0.73		
Organization [Plan the study time]		0.82		
Reviewing [Revise the study material]		0.81		
Desire [Willingness to study]			0.89	
Interest [Interest towards the study material]			0.87	
Motivation [Drive to study]			0.69	
When I am studying, I tend to think that I could look bad				0.72
I am sure that as much as I can study, the exam will not go as good as I would like				0.63
I have the tendency to feel less prepared than my course mates				0.69
I worry that others may criticize and/or judge me				0.80
Not disappointing others is fundamental to me				0.70
The closer the exam gets, the more I feel tense and worried				0.69
While I am studying, I think about what is going to happen if the exam goes bad				0.66
During the days that precede the exam, I feel sad and melancholy				0.76
R^2 explained	14%	11%	12%	22%

Note. The explanations within brackets are offered to the reader to better understand the meaning of the items in their original formulation

Data analysis

Analysis were run using RStudio (RStudio Team, 2020). To examine the internal structure of the questionnaire, an exploratory factor analysis (EFA) was conducted on one half the sample (Sample 1) and confirmatory factor analysis (CFA) was run on the other half (Sample 2). Combining EFA and CFA is recommended because EFA, especially at the beginning of a scale development, can account for "unanticipated, but substantively meaningful, factors influencing subsets of items or unanticipated cross-loadings" (Flora & Flake, 2017, p. 12); in turn, CFA allows to strengthen EFA results by replicating them on a separate sample. To determine the number of factors to be extracted, three different statistical methods were used: Kaiser's rule (i.e., number of eigenvalues greater than 1, Kaiser 1960), scree test (Cattell, 1966) and parallel analysis (PA, Horn 1965). Then, factors were extracted by means of Principal Component Analysis (PCA) with promax oblique rotation, hypothesizing a certain degree of correlation between the factors, since they all relate to study. Importantly, the aim of EFA analysis is to determine whether the factor extracted are consistent with the theoretical aspects they should reflect: in our case,

factors were expected to mirror self-regulated learning, motivation, and emotions (anxiety). Factors' internal consistency was ascertained through Cronbach's α; item-total correlations were also computed.

Confirmatory factor analysis was run using the package lavaan (Rosseel, 2012); items were considered as ordinal and the diagonally weigthed least squares (DWLS) was used as estimator. The following cut-off were adopted to determine goodness of fit (Hu & Bentler, 1999): comparative fit index (CFI) > 0.95, non-normed fit index (NNFI) > 0.95, root mean square error of approximation (RMSEA) < 0.08 and standardized root mean square residual (SRMR) < 0.08.

Structural invariance was tested with respect to sex. More specifically, configural invariance (structural equivalence) was compared with metric invariance (equality of factor loadings) and scalar invariance (equality of intercepts). Two criteria were used to test for significant differences between these three models: the chi-squared difference test ($p > 0.05$ indicate that models do not significantly differ; Satorra & Bentler 2001) and ΔCFI criterion (|ΔCFI| < 0.01 indicates that models do not significantly differ; Cheung & Rensvold 2002).

Fig. 1 Factorial structure: Screeplot (Sample 1)
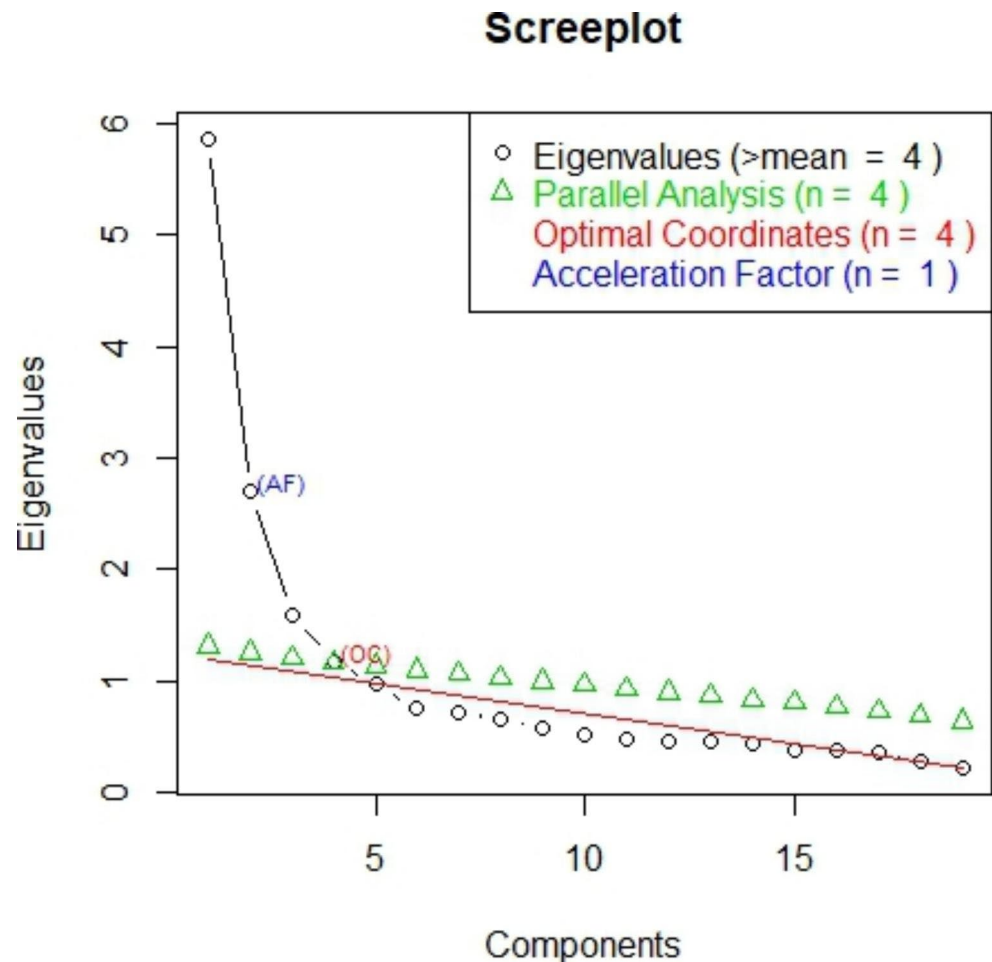
Then, socio-demographic differences in the questionnaire subscores were considered. More specifically, differences regarding sex, area of study and reason for seeking help were examined through t-test or univariate ANOVA.

Lastly, to investigate the convergent and divergent validity of the instrument, correlational analyses were conducted on Sample 3, testing the correlations between SAQ, SRSQ and CBA-OE – Anxiety subscale.

Results

Factorial structure: exploratory factor analysis

Kaiser's rule evidenced 4 eigenvalues to be greater than 1 (5.86, 2.69, 1.60, 1.18); similarly, screeplot suggested four factors to be extracted, and so did the parallel analysis. Figure 1 shows the screeplot.

A PCA with promax rotation was thus conducted to extract the four factors. Items were included in the factor in which they showed the highest loading, provided it was greater than 0.35. Results (Table 2) show that the four factors are easily interpretable as "cognitive study aspects", "behavioral study aspects", "motivation to study" and "anxiety". Together, the four factors contribute to explain 59% of the variance. Table 2 shows EFA results.

Internal consistency and item-total correlations

The four factors extracted show satisfactory reliability indexes, and so does the overall score ($\alpha = 0.87$): Cronbach's α was equal to 0.79 for the factor "cognitive study aspects", to 0.74 for the factor "behavioral study aspects", to 0.83 for the factor "motivation to study", and to 0.87 for the "anxiety" factor. Table 3 shows the item-total correlations for each item.

Factorial structure: confirmatory factor analysis

The 4-factor solution was then validated using Sample 2. Results of the CFA show good fit indexes (CFI = 0.98, NNFI = 0.97, RMSEA = 0.07, SRMR = 0.07). All items loading were significant for $p < 0.001$, with a mean loading of 0.67 for the cognitive factor, 0.74 for the behavioral factor, 0.85 for the motivation factor and 0.68 for the anxiety factor. Table 4 shows CFA results.

Table 3 Item-total correlations and α values if the item is dropped (Sample 1)

Item	Item-total correlations	α if the item is dropped
Comprehension	0.73	0.64
Reasoning	0.73	0.63
Elaboration	0.69	0.61
Memory	0.49	0.44
Flexibility	0.57	0.50
Schemes	0.59	0.51
Organization	0.69	0.58
Reviewing	0.69	0.60
Desire	0.80	0.70
Interest	0.85	0.75
Motivation	0.63	0.59
When I am studying, I tend to think that I could look bad	0.66	0.62
I am sure that as much as I can study, the exam will not go as good as I would like	0.67	0.62
I have the tendency to feel less prepared than my coursemates	0.73	0.68
I worry that others may criticize and/or judge me	0.69	0.63
Not disappointing others is fundamental to me	0.54	0.49
The closer the exam gets, the more I feel tense and worried	0.65	0.61
While I am studying, I think about what is going to happen if the exams goes bad	0.75	0.70
During the days that precede the exam, I feel sad and melancholy	0.69	0.65

Sex invariance

Sex invariance was then tested, assessing the differences between the least restrictive model (configural invariance) and the two models in which loadings (metric invariance) and intercepts (scalar invariance) were fixed to be equal across females and males. Results show that the three models do not differ significantly ($p > 0.05$), neither with respect to CFI values ($|\Delta CFI| < 0.01$). Table 5 shows CFI values across the models and the results of the model comparison.

Students' characteristics and SAQ subscales' scores

Sex differences

To examine possible sex differences in SAQ scores, t-tests were run (Sample 1 and 2). Results showed no significant differences between female and male students with respect to cognitive aspects ($t_{(1,908)} = -1.28$, $p = 0.20$), behavioral

aspects ($t_{(1,908)} = 0.27$, $p = 0.79$), motivation ($t_{(1,908)} = -0.004$, $p = 1.00$) and anxiety ($t_{(1,908)} = 0.93$, $p = 0.35$).

Area of study differences

To examine possible differences in SAQ scores with respect to the area of study, ANOVAs were run (Sample 1 and 2). Results showed no significant differences in terms of cognitive aspects ($F_{(4,888)} = 0.91$, $p = 0.46$), behavioral aspects ($F_{(4,888)} = 0.65$, $p = 0.63$), motivation ($F_{(4,888)} = 0.48$, $p = 0.75$) and anxiety ($F_{(4,888)} = 0.23$, $p = 0.92$).

Reason for seeking help differences

To examine possible differences in SAQ scores according to the reason for seeking help, ANOVAs were run (Samples 1 and 2). Results showed no significant differences in terms of cognitive aspects ($F_{(4,903)} = 0.90$, $p = 0.47$), behavioral aspects ($F_{(4,903)} = 1.55$, $p = 0.19$), motivation ($F_{(4,903)} = 2.29$, $p = 0.06$) and anxiety ($F_{(4,903)} = 1.68$, $p = 0.15$).

Correlations with age, course year and credits earned

Correlations between the questionnaire subscales' scores, age, course year, number of credits acquired were examined. Results indicated significant intercorrelations between the questionnaire's factors. Moreover, significant, albeit small, correlations emerged between the anxiety factor and the number of credits, as well as between the overall score and the number of credits. The other correlations were not significant ($p_s > 0.05$).

Convergent and divergent validity

In order to examine convergent validity of the SAQ, scores obtained by participants in Sample 3 in the subscales and the overall score were correlated to SRSQ and CBA-OE. Results (Table 7) show significant medium correlations between the three subscales related to study method of the SAQ and SRSQ overall score. Furthermore, a significant strong correlation ($r = 0.51$) emerged between the anxiety subscale of the SAQ and CBA-OE anxiety subscale. A negative medium correlation also emerged between SAQ overall score and CBA-OE anxiety, while SAQ cognitive subscale showed a negative weak correlation with it.

Table 4 CFA results (Sample 2)

Factor		Item	Loading
Cognitive aspects	→	Comprehension	0.76
	→	Reasoning	0.73
	→	Elaboration	0.74
	→	Memory	0.49
	→	Flexibility	0.62
Behavioral aspects	→	Schemes	0.73
	→	Organization	0.77
	→	Reviewing	0.73
Motivation	→	Desire	0.83
	→	Interest	0.92
	→	Motivation	0.81
Anxiety	→	When I am studying, I tend to think that I could look bad	0.70
	→	I am sure that as much as I can study, the exam will not go as good as I would like	0.69
	→	I have the tendency to feel less prepared than my course mates	0.75
	→	I worry that others may criticize and/or judge me	0.64
	→	Not disappointing others is fundamental to me	0.52
	→	The closer the exam gets, the more I feel tense and worried	0.70
	→	While I am studying, I think about what is going to happen if the exams goes bad	0.78
	→	During the days that precede the exam, I feel sad and melancholy	0.67

Discussion

Self-regulated learning, motivation, and emotions all concur to define learning success, as suggested by both theoretical models (Ben-Eliyahu, 2019) and empirical evidence (Richardson et al., 2012); difficulties in one or more of these areas can lead to students struggling with their studies and potentially requiring professional help to solve these issues. Nevertheless, university counseling services focus mostly on clinical symptoms, disregarding study-related difficulties possibly accounting for these complaints (Bani et al., 2020; Biasi et al., 2017b). Very few standardized instruments consider both study and general difficulties students may experience in their career (Locke et al., 2011). The present study introduces a new instrument, locally developed at the University of Padova Psychological Assistance Service, assessing SRL strategies, motivation, and anxiety in university students looking for psychological help. This measure is intended to extend the integrated SRL model to this specific student population, supporting the importance of considering both study-related and emotional difficulties in the assessment process. On the practical level, it is meant to

Table 5 Sex invariance results (Sample 2)

Model	CFI	ΔCFI	Chisq.difference	p
Configural invariance	0.980			
Metric invariance	0.982	0.002	− 171.56	1.00
Scalar invariance	0.982	0	12.13	0.67

integrate clinical interviews offering both practitioners and students a reliable, valid, and easy to administer quantitative measure of study-related difficulties.

First, the exploratory factor analysis (principal component analysis with promax rotation) conducted on Sample 1 identified four factors that we named "cognitive study aspects", "behavioral study aspects", "motivation to study" and "anxiety". The former two factors reflect cognitive and behavioral SRL strategies students self-report to use, the third factor concerns motivation towards studying, while the fourth factor describes anxiety experienced in relation to exams and everyday situations. The four factors displayed acceptable to good internal consistency, as well as the overall score, obtained by reversing the "anxiety" items. These results indicate that both the general and the subscales' scores are reliable. Most importantly, the four factors extracted through EFA are in line with our theoretical background, that sees self-regulated learning, motivation, and emotions as inextricable components of the intraindividual system of successful learning (Ben-Eliyahu, 2019). In other words, these facets seem to faithfully represent the areas in which students may have trouble, possibly leading them to seek psychological help.

Confirmatory factor analysis conducted on Sample 2 further supported the 4-factor structure of the instrument, as the model displayed good fit. Furthermore, model invariance across sex showed a similar structure of the questionnaire in both female and male students, meaning the 4-factor structure is reliable irrespective of sex and can be used to compare scores obtained by both female and male students.

No significant differences emerged in SAQ subscales' scores with respect to sex, area of study and reason for seeking help. This result further suggests that the instrument can be used for both male and female students of different faculties and presenting various problems.

Table 7 Correlations between SAQ subscales, SRSQ, and CBA-OE – Anxiety (Sample 3)

	SRSQ	CBA-OE –Anxiety
Cognitive aspects	0.26**	− 0.21*
Behavioral aspects	0.36***	− 0.01
Motivation	0.29**	− 0.13
Anxiety	− 0.04	0.51***

SRSQ = Self-regulated Strategies Questionnaire; CBA-OE = Cognitive Behavioral Assessment-Outcome Evaluation. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Correlational analyses finally provided information on the convergent and divergent validity of the instrument. As expected, significant, small-to-medium sized intercorrelations emerged between the questionnaire's factors. Convergent validity results suggested that the present instrument significantly correlates with already existing measures of SRL strategies and anxiety. More specifically, significant medium correlations emerged between the three subscales related to study method (i.e. cognitive and behavioral study aspects and motivation) of the "Study-Anxiety" Questionnaire and the measure of SRL strategies (SRSQ overall score). Moreover, the "anxiety" subscale of the "Study-Anxiety" Questionnaire showed a significant strong correlation with the anxiety measure (CBA-OE). The negative correlation between cognitive study aspects and the anxiety measure supports the divergent validity of the SAQ questionnaire.

Some shortcomings of the present study are worth mentioning. First of all, the specificity of the samples (students seeking psychological help) do not allow for generalizing the observed results to the entire university student population. Furthermore, data on convergent validity was available only for a subsample of students (Sample 3) due to internal changes in the assessment procedure; further studies with bigger samples are needed to ascertain the convergent validity of the instrument. Moreover, future studies should investigate the temporal stability of the instrument through test-retest correlational analyses, as well as its predictive validity (e.g., of grades).

All in all, validating this instrument allows to overcome the limitations of informal measures (Locke et al., 2011)

Table 6 Descriptive statistics for SAQ subscales and correlations with age, course year, and number of credits

Variable	M	SD	.1	.2	.3	.4	.5	.6
1. Cognitive aspects	15.53	3.4	-					
2. Behavioral aspects	8.09	2.75	0.48***	-				
3. Motivation	10.61	2.86	0.34***	0.38***	-			
4. Anxiety	26.61	6.86	− 0.36***	− 0.22***	− 0.12***	-		
5. Age	-	-	− 0.04	− 0.04	− 0.10**	− 0.05	-	
6. Course year	-	-	0	− 0.01	− 0.03	− 0.04	0.50***	-
7. Credits acquired	-	-	0.05	0.07	0.05	− 0.09*	0.24*	0.47***

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

and to be applied in other national and international contexts as a preliminary multidimensional assessment to get a first impression of the main difficulties and resources displayed by the student seeking help. In this sense, the SAQ instrument appears as a quick and reliable measure that may support university counseling services in the decision-making process leading to the allocation of each student to the most suitable clinician and type of treatment.

Administering this instrument together with other clinical measures would allow to complement the assessment process of the study-related, student-specific issues possibly displayed by the student, information that could otherwise get lost in the assessment process. Indeed, when students seek psychological help, the assessment phase should comprehend both quantitative and qualitative instruments, i.e., the self-report questionnaires and objective tasks should then follow a clinical interview to deepen what has emerged and raise the student's awareness of their strengths and weaknesses. Last, counseling/psychotherapy could be initiated based on the specific struggles evidenced by both questionnaires and interviews.

Overall, despite the aforementioned limitations, the presented instrument emerged as a structurally sound, reliable tool to assess both study-related and emotional difficulties students may encounter during their academic career path. As such, its use as initial assessment within university counseling services is welcomed and supported.

References

Alpert, R., & Haber, R. (1960). Anxiety in academic achievement situations. *Journal of Abnormal and Social Psychology*, *61*, 207–215. https://doi.org/10.1037/h0045464

Auerbach, R. P., Alonso, J., Axinn, W. G., Cuijpers, P., Ebert, D. D., Green, J. G. … Bruffaerts, R. (2016). Mental disorders among college students in the World Health Organization world mental health surveys. *Psychological medicine*, *46*, 2955–2970. https://doi.org/10.1017/S0033291716001665

Auerbach, R. P., Mortier, P., Bruffaerts, R., Alonso, J., Benjet, C., Cuijpers, P. … Kessler, R. C. (2018). Prevalence and distribution of mental disorders. *Journal of Abnormal Psychology*, *127*, 623–638. https://doi.org/10.1037/abn0000362. WHO World Mental Health Surveys International College Student Project:

Bani, M., Zorzi, F., Corrias, D., & Strepparava, M. (2020). Reducing psychological distress and improving students well-being and academic self-efficacy: the effectiveness of a cognitive university counselling service for clinical and non-clinical situations. *British Journal of Guidance and Counselling*, 1–11. https://doi.org/10.1080/03069885.2020.1840512

Beck, A. T., & Steer, R. A. (1993). *Beck Anxiety Inventory Manual*. San Antonio, TX: Psychological Corporation

Ben-Eliyahu, A. (2019). Academic emotional learning: A critical component of self-regulated learning in the emotional learning cycle. *Educational Psychologist*, *54*, 84–105. https://doi.org/10.1080/00461520.2019.1582345

Ben-Eliyahu, A., & Bernacki, M. L. (2015). Addressing complexities in self-regulated learning: A focus on contextual factors, contingencies, and dynamic relations. *Metacognition and Learning*, *10*, 1–13. https://doi.org/10.1007/s11409-015-9134-6

Bertolotti, G., Michielin, P., Vidotto, G., Sanavio, E., Bottesi, G., Bettinardi, O., & Zotti, A. M. (2015). Metric qualities of the cognitive behavioral assessment for outcome evaluation to estimate psychological treatment effects. *Neuropsychiatric disease and treatment*, *11*, 2449. https://doi.org/10.2147/NDT.S86855

Biasi, V., Patrizi, N., Mosca, M., & De Vincenzo, C. (2017a). The effectiveness of university counselling for improving academic outcomes and well-being. *British Journal of Guidance & Counselling*, *45*, 248–257. https://doi.org/10.1080/03069885.2016.1263826

Biasi, V., Patrizi, N., De Vincenzo, C., & Mosca, M. (2017b). I colloqui di orientamento per facilitare il successo accademico: Una indagine sperimentale. *Journal of Educational Cultural and Psychological Studies*, *2017*, 215–228. https://doi.org/10.7358/ecps-2017-015-bias

Bruffaerts, R., Mortier, P., Kiekens, G., Auerbach, R. P., Cuijpers, P., Demyttenaere, K. … Kessler, R. C. (2018). Mental health problems in college freshmen: Prevalence and academic functioning. *Journal of affective disorders*, *225*, 97–103. https://doi.org/10.1016/j.jad.2017.07.044

Burnette, J. L., O'Boyle, E. H., VanEpps, E. M., Pollack, J. M., & Finkel, E. J. (2013). Mind-sets matter: A meta-analytic review of

implicit theories and self-regulation. *Psychological Bulletin*, *139*, 655–701. https://doi.org/10.1037/a0029531

Cattell, R. B. (1966). The scree test for the number of factors. *Multivariate behavioral research*, *1*, 245–276. https://doi.org/10.1207/s15327906mbr0102_10

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural equation modeling*, *9*, 233–255. https://doi.org/10.1207/S15328007SEM0902_5

Cuijpers, P., Auerbach, R. P., Benjet, C., Bruffaerts, R., Ebert, D., Karyotaki, E., & Kessler, R. C. (2019). Student initiative: An overview. *International Journal of Methods in Psychiatric Research*, *28*, 1–6. https://doi.org/10.1002/mpr.1761. The World Health Organization World Mental Health International College

Culler, R. E., & Holahan, C. J. (1980). Test anxiety and academic performance: The effects of study-related behaviors. *Journal of Educational Psychology*, *72*, 16–20. https://doi.org/10.1037/0022-0663.72.1.16

De Beni, R., Zamperlin, C., Meneghetti, C., Cornoldi, C., Fabris, M., Tona, G. D. M., & Moè, A. (2014). *Test AMOS-Abilitá e Motivazione allo Studio: prove di Valutazione e Orientamento per la Scuola Secondaria di Secondo Grado e L'università: Nuova edizione*. Trento: Edizioni Centro Studi Erickson

Derogatis, L. R. (1994). *SCL-90-R: Administration scoring and procedures manual*. Minneapolis, MN: National Computer Systems

Dörrenbächer, & Perels, F. (2016). Self-regulated learning profiles in college students: Their relationship to achievement, personality, and the effectiveness of an intervention to foster self-regulated learning. *Learning and Individual Differences*, *51*, 229–241. https://doi.org/10.1016/j.lindif.2016.09.015

Evans, C., Mellor-Clark, J., Margison, F., Barkham, M., McGrath, G., Connell, J., & Audin, K. (2000). CORE: Clinical Outcomes in Routine Evaluation. *Journal of Mental Health*, *9*, 247–255. https://doi.org/10.1080/713680250

Eysenck, M. W., Derakshan, N., Santos, R., & Calvo, M. G. (2007). Anxiety and cognitive performance: Attentional control theory. *Emotion*, *7*, 336–353. https://doi.org/10.1037/1528-3542.7.2.336

Filippi, L. S., Valdarnini, D., & Burla, F. (2001). Una esperienza di sostegno psicologico per studenti universitari: Una modalità di obiettivazione dei risultati. *Rivista Di Psichiatria*, *36*, 146–155

Flora, & Flake, J. K. (2017). The Purpose and Practice of Exploratory and Confirmatory Factor Analysis in Psychological Research: Decisions for Scale Development and Validation. *Canadian Journal of Behavioural Science*, *49*(2), 78–88. https://doi.org/10.1037/cbs0000069

Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika*, *30*, 179–185. https://doi.org/10.1007/BF02289447

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1–55. https://doi.org/10.1080/10705519909540118

Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and psychological measurement*, *20*, 141–151. https://doi.org/10.1177/001316446002000116

Lambert, M. J., Burlingame, G. M., Umphress, V., Hansen, N. B., Vermeersch, D. A., Clouse, G. C., & Yanchar, S. C. (1996). The reliability and validity of the Outcome Questionnaire. *Clinical Psychology and Psychotherapy*, *3*, 249–258. https://doi.org/10.1002/(SICI)1099-0879(199612)3:4<249::AID-CPP106>3.0.CO;2-S

Liborius, Bellhäuser, H., & Schmitz, B. (2019). What makes a good study day? An intraindividual study on university students' time investment by means of time-series analyses. *Learning and Instruction*, *60*, 310–321. https://doi.org/10.1016/j.learninstruc.2017.10.006

Liebert, R., & Morris, L. (1967). Cognitive and emotional components of test anxiety: A distinction and some initial data. *Psychological Reports*, *20*, 975–978. https://doi.org/10.2466/pr0.1967.20.3.975

Locke, B. D., Buzolitz, J. S., Lei, P. W., Boswell, J. F., McAleavey, A. A., Sevig, T. D. … Hayes, J. A. (2011). Development of the Counseling Center Assessment of Psychological Symptoms-62 (CCAPS-62). *Journal of Counseling Psychology*, *58*, 97–109. https://doi.org/10.1037/a0021282

Monti, F., Tonetti, L., & Bitti, P. E. R. (2013). Effectiveness of psychological treatments delivered at a counseling service for students. *Psychological reports*, *113*, 955–968. https://doi.org/10.2466/21.02.PR0.113x28z4

Monti, F., Tonetti, L., & Ricci Bitti, P. E. (2014). Comparison of cognitive-behavioural therapy and psychodynamic therapy in the treatment of anxiety among university students: An effectiveness study. *British Journal of Guidance and Counselling*, *42*, 233–244. https://doi.org/10.1080/03069885.2013.878018

Østergård, O. K., Fenger, M., & Hougaard, E. (2017). Symptomatic distress and effectiveness of psychological treatments delivered at a nationwide student counseling service. *Counselling Psychology Quarterly*, *32*, 150–168. https://doi.org/10.1080/09515070.2017.1410696

Panadero, E. (2017). A review of self-regulated learning: Six models and four directions for research. *Frontiers in Psychology*, *8*, 422–422. https://doi.org/10.3389/fpsyg.2017.00422

Pekrun, R. (2006). The control-value theory of achievement emotions: Assumptions, corollaries, and implications for educational research and practice. *Educational Psychology Review*, *18*, 315–341. https://doi.org/10.1007/s10648-006-9029-9.

Linnenbrink-Garcia, L. (Ed.). (2014). *International Handbook of Emotions in Education*. Routledge.)

Pekrun, R., Elliot, A. J., & Maier, M. A. (2009). Achievement goals and achievement emotions: Testing a model of their joint relations with academic performance. *Journal of Educational Psychology*, *101*, 115–135. https://doi.org/10.1037/a0013383.

Pintrich, P. R., Smith, D., Garcia, T., & McKeachie, W. (1991). *A Manual for the Use of the Motivated Strategies for Learning Questionnaire (MSLQ)*. MI: National Center for Research to Improve Postsecondary Teaching and Learning (1991) (ERIC Document Reproduction Service No. ED 338122)

Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, *48*, 1–36. https://doi.org/10.18637/jss.v048.i02

RStudio Team. (2020). *RStudio: Integrated Development for R. RStudio*. Boston, MA: PBC. http://www.rstudio.com/

Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika*, *66*, 507–514. https://doi.org/10.2139/ssrn.199064

Sneyers, E., & De Witte, K. (2018). Interventions in higher education and their effect on student success: A meta-analysis. *Educational Review*, *70*, 208–228. https://doi.org/10.1080/00131911.2017.1300874

Spielberger, C. D., & Vagg, R. P. (1995). Test Anxiety: A Transactional Process Model. In by C. D. Speilberger and P. R. Vagg (Eds.) *Test Anxiety: Theory, Assessment and Treatment*, edited (pp. 3–14). Bristol, UK: Taylor & Francis

Spielberger, C. D. (1980). *Test anxiety inventory: Preliminary professional manual*. Palo Alto, CA: Consulting Psychologist Press

Theobald. (2021). Self-regulated learning training programs enhance university students' academic performance, self-regulated learning strategies, and motivation: A meta-analysis. *Contemporary Educational Psychology*, *66*, 101976. https://doi.org/10.1016/j.cedpsych.2021.101976

Tobias, S. (1985). Test anxiety: Interference, defective skills, and cognitive capacity. *Educational Psychologist*, *20*, 135–142. https://doi.org/10.1207/s15326985ep2003_3

University of Padova (2019). *Annual Report 2018/2019*. University of Padova https://www.unipd.it/sites/unipd.it/files/2020/UNIPD_RA_2018_19_NdV_0.pdf

Vescovelli, F., Melani, P., Ruini, C., Bitti, P. E. R., & Monti, F. (2017). University counseling service for improving students' mental health. *Psychological Services*, *14*, 470–480. https://doi.org/10.1037/ser0000166

von der Embse, N., Jester, D., Roy, D., & Post, J. (2018). Test anxiety effects, predictors, and correlates: A 30-year meta-analytic review. *Journal of affective disorders*, *227*, 483–493. https://doi.org/10.1016/j.jad.2017.11.048

Wine, J. (1971). Test anxiety and direction of attention. *Psychological Bulletin*, *76*, 92–104. https://doi.org/10.1037/h0031332

Yerkes, R. M., & Dodson, J. D. (1908). The relation of strength of stimulus to rapidity of habit formation. *Journal of Comparative Neurology and Psychology*, *18*, 459–482. https://doi.org/10.1002/cne.920180503

Zeidner, M. (1998). *Test Anxiety, The State of the Art*. New York: Plenum Press

Zeidner, M. (2007). Test anxiety in educational contexts. *Emotion in Education*, 165–184. https://doi.org/10.1016/B978-012372545-5/50011-3.

Zeidner, M., & Matthews, G. (2005). Evaluation anxiety. In A. J. Elliot, & C. S. Dweck (Eds.), *Handbook of competence and motivation* (pp. 141–163). London: Guilford Press

Zimmerman, B. J. (2008). Investigating self-regulation and motivation: Historical background, methodological developments, and future prospects. *American Educational Research Journal*, *45*, 166–183. https://doi.org/10.3102/0002831207312909