

## The Bergen Study Addiction Scale: psychometric properties of the Italian version. A pilot study

Skala Uzależnienia od Uczenia się Bergen: cechy psychometryczne wersji włoskojęzycznej.  
Badanie pilotażowe

Department of Health Sciences, School of Psychology, University of Florence, Florence, Italy

Correspondence: Yura Loscalzo, Department of Health Sciences, School of Psychology, University of Florence, Via di San Salvi 12 – Padiglione 26, 50135 Florence, Italy,

tel.: + 39 055 2755071, fax: + 39 055 2755390, e-mail: yura.loscalzo@gmail.com

### Abstract

**Aim:** A new potential clinical condition related to overstudying, namely study addiction (Atroszko et al., 2015) or studyholism (Loscalzo and Giannini, 2017), has been recently proposed in literature. This study has been aimed at analysing the psychometric properties of the Italian version of the Bergen Study Addiction Scale (BStAS) (Atroszko et al., 2015). **Material and methods:** We recruited a sample of 374 university students aged between 18 and 47 years old ( $M_{age} = 24.30 \pm 4.85$ ). The students' years of study and major subjects varied. By means of exploratory and confirmatory factor analyses (EFA and CFA), we analysed the instrument's factorial structure. Moreover, we evaluated its internal reliability and divergent validity. **Results:** The Italian version of BStAS does not have fully satisfying psychometric properties. Two items (i.e. salience and tolerance) in this scale are problematic, as shown by both EFA and CFA. **Conclusions:** This study provides support for the usefulness of BStAS for future studies aimed at a further analysis of the features of this new potential clinical condition. However, more extensive research is needed to improve its psychometric properties in Italian students.

**Keywords:** addictions, behavioural addictions, study addiction, study engagement, studyholism

### Streszczenie

**Cel:** W literaturze zaproponowano niedawno nową jednostkę kliniczną związaną z nadmiernym uczeniem się, czyli uzależnienie od uczenia się (Atroszko i wsp., 2015) lub naukoholizm (Loscalzo i Giannini, 2017). Niniejsze badanie miało na celu przeanalizowanie właściwości psychometrycznych włoskojęzycznej wersji Skali Uzależnienia od Uczenia się Bergen (Bergen Study Addiction Scale, BStAS) (Atroszko i wsp., 2015). **Materiał i metody:** Badaniem objęto próbę 374 studentów uczelni wyższych w wieku od 18 do 47 lat ( $M_{wiek} = 24,30 \pm 4,85$ ). Grupa badana była zróżnicowana pod względem roku studiów wyższych oraz studiowanego kierunku. Dokonano eksploracyjnej oraz confirmacyjnej analizy czynnikowej (*exploratory factor analysis* oraz *confirmatory factor analysis*, odpowiednio EFA i CFA) struktury badanego narzędzia psychometrycznego. Dokonano również oceny jego spójności wewnętrznej oraz trafności dywergencyjnej. **Wyniki:** Włoskojęzyczna wersja skali BStAS nie posiada w pełni satysfakcjonujących właściwości psychometrycznych. EFA oraz CFA wykazały, iż problematyczne są dwa elementy skali, tj. dominacja oraz tolerancja. **Wnioski:** Niniejsze badanie potwierdza użyteczność skali BStAS w przyszłych badaniach mających na celu pogłębioną analizę cech charakterystycznych postulowanej nowej jednostki klinicznej, którą jest uzależnienie od uczenia się. Konieczne są jednak szerzej zakrojone badania w celu poprawy właściwości psychometrycznych tego narzędzia w populacji włoskich studentów.

**Słowa kluczowe:** uzależnienia, uzależnienia behawioralne, uzależnienie od nauki, zaangażowanie w naukę, naukoholizm

## INTRODUCTION

In literature, a lot of attention has been devoted to workaholism (or work addiction) (Oates, 1971). However, despite the wide interest in the well-being of workers, students have received little attention. Yet, a similar clinical condition could apply in the school context as well, given that in modern society students have to face many academic pressures (Atroszko et al., 2015; Loscalzo and Giannini, 2017). This could lead some students to develop study addiction (Atroszko et al., 2015) or studyholism (i.e. obsession toward study) (Loscalzo and Giannini, 2017). Study addiction and studyholism are related to the same problem-behaviour, namely to a negative psychological condition associated with overstudying. However, there are some differences regarding their theoretical conceptualisation (Loscalzo and Giannini, 2017). One of the two main differences is their internalising/externalising nature. Atroszko et al. (2015) have highlighted that it is a behavioural addiction, namely an externalising disorder, which is characterised by the seven core components of substance-related addictions (i.e. salience, tolerance, mood modification, relapse, withdrawal, conflict, and problems). On the other hand, Loscalzo and Giannini (2017), in line with Kardefelt-Winther (2015), have pointed out the importance of going beyond the addiction framework when studying new potential behavioural addictions. Hence, they have proposed the hypothesis that studyholism is characterised by both addiction and obsessive-compulsive symptoms, suggesting that it is more similar to an obsession than an addiction (Loscalzo et al., in press). Moreover, Loscalzo and Giannini (2017), in line with Billieux et al. (2015), have stressed the importance of not overpathologising a common behaviour such as studying. To reach this aim, they suggested distinguishing among three kinds of heavy study investors (see Snir and Harpaz, 2012 for heavy work investment): engaged students, engaged studyholics, disengaged studyholics. More specifically, they have suggested that disengaged studyholics could be more impaired than engaged studyholics, and that engaged students should not be labelled as problematic students. Currently, the few studies that have examined this problem-behaviour and its negative outcomes have focused on the construct of study addiction (Andreassen et al., 2013; Atroszko et al., 2015, 2016a, 2016b). They have been conducted in populations of Polish and Norwegian students, using the Bergen Study Addiction Scale (BStAS) (Atroszko et al., 2015), which is a 7-item self-report instrument that conceptualises study addiction as a pure addiction. Each item corresponds to one of the seven core components of addictions. It has been created by changing in the items of the Bergen Work Addiction Scale (BWAS) (Andreassen et al., 2012) the term “work” with “study.” Atroszko et al. (2015) found good fit indices for the 7-item model in the Norwegian sample and acceptable fit indices among Polish students.

Given the issue related to the externalising and/or internalising nature of the clinical condition that could be associated with overstudying (Loscalzo and Giannini, 2017), it is valuable to have instruments with good psychometric properties that allow measuring both study addiction and studyholism. In literature, there are the Polish and Norwegian versions of BStAS (Atroszko et al., 2015). Moreover, there are the Italian and Polish versions of the Studyholism Inventory (SI-10) (Loscalzo et al., in press). We believe that it is important to have an Italian and Polish version of both instruments, to use them for further research. This could help clarify if these two constructs are actually different, for example by analysing their relationships with some antecedents and outcomes proposed by Loscalzo and Giannini (2017) in their theoretical model. Since in literature there is no Italian version of BStAS yet, we have aimed to analyse its psychometric properties among Italian university students for further use in cross-cultural studies.

## MATERIAL AND METHODS

### Material

The participants were 374 Italian university students, aged between 18 and 47 years old ( $Mage = 24.30 \pm 4.85$ ). They were mostly female (74.6% girls) and lived in Tuscany (51.3%). In terms of their year of study, the following group composition was noted: 28.1%, 19.3%, 22.7%, 13.9%, 15.8% from the first to the fifth year, respectively. Moreover, one medicine student was in their sixth year (in Italy, a medical degree takes 6 years to complete).

The participants studied various fields, i.e. Humanities (27.8%), Psychology (25.4%), Math, Physics and Natural Sciences (15%), Social Sciences (including Law and Economy; 14.2%), Medicine (8.8%) and Health Sciences (8.8%).

A subsample of 80 participants (78.8% females,  $Mage = 25.16 \pm 6.24$ ) was selected for divergent validity analysis. Then, we randomly split the remaining 294 students into two samples in order to carry out exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The sample used for EFA comprised 147 students (70.1% females;  $Mage = 23.85 \pm 4.48$ ). The sample used for CFA comprised 147 students as well (76.9% females,  $Mage = 24.29 \pm 4.27$ ).

### Methods

#### Bergen Study Addiction Scale (BStAS)

The participants filled out our Italian translation of BStAS (Atroszko et al., 2015). They had to respond to each of the seven items, using a 5-point Likert scale ranging from 1 (“never”) to 5 (“always”). BStAS one-factor structure demonstrated a good fit among Norwegian students and an acceptable fit among Polish students. Its Cronbach’s alpha reliability coefficient was 0.74 in the Norwegian sample and 0.75 in the Polish sample (Atroszko et al., 2015).

### Utrecht Work Engagement Scale – Student version (UWES-S-9)

A subsample of 80 students also filled out the Italian translation (Loscalzo and Giannini, in press) of UWES-S-9 (Schaufeli and Bakker, 2004). It is a 9-item self-report instrument assessing study engagement by means of three subscales: Vigor, Dedication, and Absorption. The psychometric properties of the Italian version are as good as those of the original version. The fit of the three-factor model is better than of the one-factor model, and the internal reliability is good for both the total scale of the Italian version ( $\alpha = 0.90$ ) and for Vigor, Dedication and Absorption subscales, at 0.82, 0.88, and 0.76, respectively (Loscalzo and Giannini, in press).

### Procedure

First, we asked for the ethical approval of the Department of Health Sciences of the University of Florence (protocol number 153913). Then, we created an online-survey comprising BStAS, UWES-S-9 (for the second administration only), and a demographics section, including information such as gender, age, city of living, year and area of study. The first page of the online questionnaire presented all the informed consent information. At the end of this page, it was highlighted that by continuing to fill out the questionnaire the participants agreed to take part in the study and thereby provided their informed consent.

### Data analysis

We carried out the analysis using SPSS.25 and AMOS.22. First, aiming to evaluate if the one-factor model of BStAS fits the data well by means of EFA (principal axis factoring) and CFA (maximum likelihood estimation) in two different samples, we created two groups, each comprising 174 participants. We performed both EFA and CFA (even though

usually only CFA is performed for already published scales), since overstudying is a construct proposed only recently, and it is conceptualised by means of two different theorizations (i.e. study addiction and studyholism).

Then, we calculated the Cronbach's alpha of the scale for the total sample ( $n = 374$ ), in order to assess its internal reliability. Finally, we evaluated the divergent validity of BStAS by means of Pearson's correlations between its total score and UWES-S-9 scales in the subsample of 80 students who also filled out this questionnaire.

## RESULTS

First, we performed EFA (principal axis factoring) on the first sample ( $n = 174$ ), which showed a one-factor solution, with the factor explaining 39.85% of the variance. The factor loadings ranged between a minimum of 0.46 (items 1 and 2) and a maximum of 0.63 (item 4). However, there were two low communalities, namely for items 1 and 2, which had a value of 0.21. For the remaining five items, the values of communality ranged between 0.29 and 0.40.

In order to evaluate further the factor structure of BStAS, we performed CFA to test the one-factor solution on the second sample ( $n = 174$ ). The values of the fit indices did not support this solution: CMIN/DF = 3.95, GFI = 0.91, CFI = 0.77, TLI = 0.65, NFI = 0.72, RMSEA = 0.14. Moreover, this analysis confirmed that items 1 and 2 were the most critical ones, since their standardised factor loadings were the lowest (0.23 and 0.25, respectively). However, following the indication of the modification indices, and hence correlating the error terms of items 1 and 3, the fit improved: CMIN/DF = 1.98, GFI = 0.93, CFI = 0.93, TLI = 0.88, NFI = 0.87, RMSEA = 0.08. Nevertheless, the factor loadings are still problematic for items 1 and 2, with their values being 0.17 and 0.25, respectively (Fig. 1).

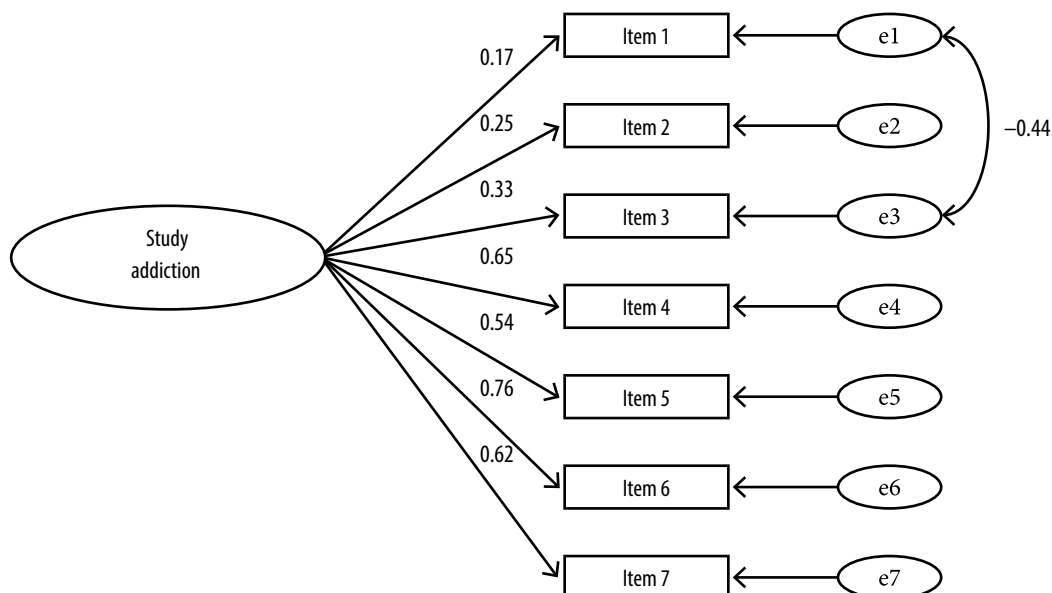


Fig. 1. One-factor model, BStAS,  $n = 174$

Next, referring to the original 7-item structure of the test, we calculated the internal reliability of the scale ( $n = 374$ ). We found an alpha of 0.72, supporting its satisfactory internal reliability. Moreover, the item-total correlations ranged between 0.30 (item 1) and 0.53 (item 6).

Finally, concerning the divergent validity of BStAS, the correlation analysis did not show any statistically significant correlations, neither for the total score of UWES-S-9 ( $r = -0.12$ ,  $p = 0.31$ ) nor for its three subscales of Vigor ( $r = -0.19$ ,  $p = 0.10$ ), Dedication ( $r = -0.14$ ,  $p = 0.20$ ), Absorption ( $r = 0.04$ ,  $p = 0.73$ ).

## DISCUSSION

This study has shown that the Italian version of BStAS has acceptable psychometric properties. EFA highlighted a one-factor solution, as for the original version of the test, even if items 1 and 2 have low values of communality (0.21). These low communalities and a low number of items that constitute the one-factor solution might explain the percentage of variance that we found (i.e. 39.85%). In line with this, also CFA analyses has shown that items 1 and 2 are the most critical since they have the lowest standardised regression weights. The scale has satisfactory internal reliability ( $\alpha = 0.72$ ), in line with the previous results obtained in Polish and Norwegian samples (0.75 and 0.74, respectively) (Atroszko et al., 2015).

Finally, we found negative values of correlation between BStAS and UWES-S-9, except for the Absorption scale. However, these correlations were not statistically significant. We speculate that these statistically non-significant correlations could support Loscalzo and Giannini (2017) conceptualisation of studyholism in the heavy study investment framework, i.e. studyholism is a type of hard studying that could be characterised either by low or high study engagement. Indeed, both studyholism and study engagement are associated with high time and energy expenditure. Hence, in some students (engaged studyholics) they could be co-present, while in other students they are not (engaged students and disengaged studyholics).

A possible implication could be that BStAS does not adequately distinguish between study addiction and study engagement. Accordingly, Atroszko et al. (2015) found that Polish students showed a statistically significant correlation of 0.48 between BStAS and the single-item measure they used for evaluating learning engagement (i.e. student was asked to indicate how much he/she was engaged in studying on a scale ranging between 1 and 7).

Given the present findings about the divergent validity of the Italian version of BStAS, which this study addressed only by means of the correlations with UWES-S-9, we suggest that future studies should evaluate further BStAS validity using other criterion variables, such as typical addiction features for convergent validity and characteristic internalising features for divergent validity.

In sum, the Italian version of BStAS did not show fully satisfying psychometric properties, especially as far as items 1 and 2 were concerned.

It should be noted that the issue with the tolerance item (item 2) is hardly surprising, as it is in line with the recent criticism about the aprioristic and confirmatory application of the addiction model to excessive behaviours, without taking into account the difficulty in the operationalisation of some key addiction components, such as tolerance (Billieux et al., 2015). BStAS tolerance item (i.e. spending much more time studying than initially intended) could also address the positive behaviour of study absorption (i.e. a study engagement component), rather than the negative addictive aspect of tolerance. Similarly, salience is evaluated by an item that is too general, as a student could think how to free up more time for study because he/she usually spends little time studying, and not only because he/she is study addicted. Moreover, he/she could also think how to study more because he/she could be either study addicted or engaged.

Thus, these two items could be endorsed by either engaged or addicted students, as they are too general and could be interpreted in both directions by the students who fill out the questionnaire.

Accordingly, the modification indices of CFA analysis suggest a negative correlation between the error terms of items 1 and 3. The theoretical justification for allowing the correlation between the errors of item 1 (i.e. the student thought how to free up more time for study) and item 3 (i.e. the student studied in order to reduce feelings of guilt, anxiety, helplessness and depression) is related to the fact that item 1 could address a study engagement/positive component, while item 3 addresses an addiction/negative component.

Hence, further analysis of the psychometric properties of BStAS in a population of Italian students and in populations of students from other countries is necessary to determine *if* items 1 and 2 should be deleted from the scale. Moreover, we suggest the need for qualitative studies (e.g. focus groups) performed on Italian students, aimed at understanding how they interpret these two items. It would also be helpful to test the psychometric properties of an Italian version of the scale with modified items to address more clearly the salience and tolerance addiction components.

The main limitation of this study is that the participants were mostly female (74.6%), even if this is in line with the predominantly female composition of the Polish and Norwegian samples used for evaluating BStAS (Atroszko et al., 2015). Future studies should analyse the psychometric properties of the BStAS on a sample comprising a higher number of males. However, the sample is heterogeneous as far as year and area of study are concerned. Another limitation of our study is related to the divergent validity analysis, as we used only UWES-S-9 for analysing it. Future studies should use other criterion variables for testing both divergent and convergent validity.

As far as the study's strengths are concerned, it has identified the psychometric properties of an instrument that has been recently proposed for the measurement of a new potential behavioural addiction, and that was previously evaluated only in Poland and Norway. The instrument, if used together with SI-10 (Loscalzo et al., in press), will be useful in shedding light on the externalising and/or internalising nature of this new potential clinical condition that could be associated with overstudying. However, it must be highlighted that the Italian version of BStAS does not have fully satisfying psychometric properties, which should be kept in mind when using the instrument. We strongly recommend analysing it further with the aim of improving its psychometric properties for Italian students.

In conclusion, in line with the suggestions of Kardefelt-Winther (2015), we believe that it is necessary to go beyond the addiction framework when studying a new potential behavioural addiction. Hence, future studies using both BStAS and SI-10 will be of great importance for the analysis of overstudying.

#### Conflict of interest

*The authors do not report any financial or personal links to other persons or organizations that might negatively affect the content of this publication and/or claim rights thereto.*

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