Burnout Research 2 (2015) 8–18

Contents lists available at ScienceDirect

Burnout Research

journal homepage: www.elsevier.com/locate/burn

Research Article

Measuring job and academic burnout with the Oldenburg Burnout Inventory (OLBI): Factorial invariance across samples and countries

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ARTICLE INFO

Article history:
Received 29 June 2014
Received in revised form 3 November 2014
Accepted 24 November 2014

Keywords:
Employees
Factorial invariance
Germany
Greece
Latent mean difference
Oldenburg Burnout Inventory

ABSTRACT

This study examined the factor structure and measurement invariance of the Oldenburg Burnout Inventory (OLBI) across different groups (German employees vs. German students) and tested academic burnout across samples from different countries (Greek vs. German students). Our results supported the proposed two-factor structure for each sample separately. In addition, multigroup analyses partially supported the equivalence of job and academic burnout within the German samples and the equivalence of academic burnout across Greek and German students. In sum, we suggest that the OLBI is a robust instrument for the measurement of burnout in both contexts: work and academic.

1. Introduction

Burnout was originally defined as a syndrome of exhaustion, depersonalization, and reduced professional efficacy that is encountered among employees who work with other people, such as in social work, health care, and teaching (Maslach & Jackson, 1981). Over the years, empirical research has shown that burnout concerns all employees irrespective of the job that they do (Leiter & Schaufeli, 1996; Maslach, Leiter, & Schaufeli, 2008) as long as they face an imbalance between their job demands and the available resources (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Karasek, 1979). At the same time, scholars began to investigate the burnout phenomenon in students (e.g., Gold & Michael, 1985; McCarthy, Pretty, & Catano, 1990). Given that the structure of the activities that students are involved in as well as the characteristics of the tasks that they have to fulfill greatly resemble those of numerous occupations (e.g., students have to attend classes and to achieve specific goals, such as passing exams; Schaufeli, Martínez, Pinto, Salanova, & Bakker, 2002), it is likely that students also feel exhausted and may develop an attitude of withdrawal with regard to their studies (Schaufeli & Taris, 2005).

Equivalent to employee burnout, student burnout has been defined as a three-dimensional syndrome that is characterized by feelings of exhaustion due to the demands of studying, a cynical attitude of withdrawal and detachment, and reduced personal efficacy regarding academic requirements (Schaufeli et al., 2002). In line with empirical evidence on job burnout, previous studies have shown that burnout symptoms are common in all students irrespective of the context of study or discipline. For instance, burnout was observed in both medical students (Boudreau, Santen, Hemphill, & Dobson, 2004; Dyrbye et al., 2006; Willcock, Daly, Tennant, & Allard, 2004) and students majoring in technical subjects (Yang & Farn, 2005). Considering how long it takes for burnout symptoms to subside (Taris, Le Blanc, Schaufeli, & Schreurs, 2005), it is likely that the symptoms of academic burnout will still exist when students begin their careers as first-time employees and young professionals. Thus, it is important to investigate the burnout phenomenon in university students because there is evidence suggesting that job burnout follows a developmental process that may have already been initiated during students' academic studies (Dyrbye et al., 2006).

Despite the fact that there are numerous studies on student burnout, very limited attention has been paid to the measurement of the construct. In most studies, academic burnout was measured by adapting the Maslach Burnout Inventory-General Survey (MBI-GS; Schaufeli, Leiter, Maslach, & Jackson, 1996) to the academic context and the three-factor structure was only partially supported

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http://dx.doi.org/10.1016/j.burn.2014.11.001

in student samples (MBI-SS; Schaufeli et al., 2002). A major drawback of this approach is that it was automatically assumed that the concept of burnout was equivalent across employees and students. In other words, it has been taken for granted that employees and students refer to the same experiences when evaluating job and academic burnout, respectively. However, no empirical evidence has supported this assumption so far. Hence, it is important to determine whether the concept of burnout is equivalent for students and employees.

Furthermore, some scholars have criticized the psychometric qualities of the MBI-GS (Schaufeli et al., 1996) by emphasizing that it measures only affective exhaustion, that it includes the subdimension of professional efficacy, and that the wording of its items is one-directional (Halbesleben & Demerouti, 2005). On the basis of this criticism, we decided to use an alternative instrument to measure the concept of burnout: the Oldenburg Burnout Inventory (OLBI; Demerouti, Bakker, Vardakou, & Kantas, 2003), which was initially developed to overcome most of the limitations of the MBI-GS (Demerouti & Nachreiner, 1998; Demerouti et al., 2001). With this study, we examine the factor structure of the student version of the OLBI (OLBI-S) in a sample of German students. Second, we evaluate the equivalence of this instrument across German students and employees. Third, we test the ecological validity of the OLBI-S by investigating its invariance across German and Greek students and look for latent mean differences between these two samples.

1.1. Burnout: definition and measurement

Many scholars (e.g., Kristensen, Borritz, Villadsen, & Christensen, 2005; Shirom & Melamed, 2006) have commented that the current research on the construct of burnout and its history, development, and measurement are strongly related to the Maslach Burnout Inventory (MBI; Maslach, Jackson, & Leiter, 1996) and its different versions (e.g., MBI-GS; Schaufeli et al., 1996). Accordingly, burnout is defined and measured as a work-related syndrome that is characterized by emotional exhaustion (i.e., a state of energy draining), cynicism (i.e., a sense of disengagement and gradual loss of concern about the contents or the recipients of one's work), and reduced professional efficacy (i.e., feelings of incompetence) that individuals experience in relation to their work. As a matter of fact, the MBI is considered the gold standard for measuring burnout (Schaufeli & Taris, 2005) given that it is used in over 90% of the studies on the syndrome (Shirom & Melamed, 2006). Consequently, this close link between theory and measurement has resulted in "ignoring all other conceptual approaches to burnout" (Shirom & Melamed, 2006, p. 177) and in hindering the investigation of unsolved issues, such as the conceptualization of the underlying phenomenon and the development of an overarching theory of burnout (Shirom, 2005).

Furthermore, the MBI exhibits several weak points both at the theoretical and at the psychometric level. Some authors have noted that the two subscales of the MBI (i.e., exhaustion and cynicism) are completely negatively worded, whereas the third subscale (personal accomplishment) is only positively worded (Demerouti et al., 2001). Although the correlations between the two other burnout dimensions and personal accomplishment increase when the latter is assessed with negatively worded items (Schaufeli & Salanova, 2007), some have argued that the wording has led to an artificial clustering of the subfactors (Halbesleben & Demerouti, 2005). For instance, an extensive review of 45 factor analytic studies on the MBI demonstrated that besides the original three-factor solution, empirical data have also supported alternative models (i.e., two-, four-, or five-factor solutions and models with a higher order factor; Worley, Vassar, Wheeler, & Barnes, 2008). In addition, previous findings have indicated that exhaustion and cynicism might be considered the core symptoms of burnout, whereas personal accomplishment might instead be interpreted as an antecedent or as a consequence of burnout (Taris et al., 2005).

To resolve these issues, Kristensen et al. (2005) developed the Copenhagen Burnout Inventory (CBI). However, this measure minimizes burnout to only one dimension (i.e., physical and mental fatigue/exhaustion) and differentiates only between personal, work-related, and client-related exhaustion. Similarly, Shirom and Melamed (2006), building on Hobfoll's Conservation of Resources Theory (COR; Hobfoll, 1998, 1989), developed the Shirom-Melamed Burnout Measure (SMBM; Shirom & Melamed, 2006) to assess burnout as the depletion of energetic resources. Nevertheless, the reduction of burnout to a unidimensional construct has been strongly discouraged by several researchers (e.g., Maslach, Schaufeli, & Leiter, 2001; Maslach et al., 2008; Schaufeli & Taris, 2005) because the second aspect of withdrawal and detachment appears essential for differentiating burnout from chronic fatigue (Huibers et al., 2003; Leone, Huibers, Knottnerus, & Kant, 2008).

An alternative instrument that was proposed to address the content-related and methodological disadvantages of the above-mentioned measures of burnout is the Oldenburg Burnout Inventory (OLBI; Demerouti & Nachreiner, 1998; Demerouti et al., 2003). In this scale, burnout is operationalized by means of (physical, affective, and cognitive) exhaustion and disengagement, whereas personal accomplishment is excluded. Specifically, the OLBI consists of 16 positively *and* negatively formulated items that are used to evaluate the two dimensions of burnout. These positive and negatively framed items reflect the theoretical assumption that the two main dimensions of burnout can be interpreted in terms of a continuum that ranges from disengagement to dedication (i.e., the identification continuum) and a continuum that ranges from exhaustion to vigor (i.e., the energy continuum). These two dimensions are supported by the fact that exhaustion and disengagement do not share the same antecedents (Demerouti et al., 2001; Demerouti, Mostert, & Bakker, 2010). Furthermore, the OLBI items assess cognitive and physical components of exhaustion in addition to the affective component included in the MBI. Finally, the OLBI (just like the MBI-GS; Schaufeli et al., 1996) is not restricted to human services, but it can be used to measure burnout in all employees, irrespective of their occupation.

Previous studies have demonstrated the convergent validity of the OLBI and the MBI-GS among Greek (Demerouti et al., 2003) and American (Halbesleben & Demerouti, 2005) employees. Furthermore, Halbesleben (2010) reported time stabilities of the OLBI dimensions ranging from $r = .45$ to $r = .68$. The reliability of the exhaustion subscale has been found to range from $\alpha = .74$ to $\alpha = .85$, and the reliability of the disengagement subscale from .73 to .85 across studies (Demerouti & Bakker, 2008; Demerouti et al., 2003; Halbesleben & Demerouti, 2005; Halbesleben, 2010; Sonnentag, Binnewies, & Mojza, 2010; Timms, Brough, & Graham, 2012). The above-mentioned empirical findings demonstrate that the OLBI is a psychometrically robust instrument that can be used to measure burnout. To add to these previous findings, the goal of the current investigation of its factor structure across different groups (i.e., German employees vs. German students) as well as its equivalence in an academic context (across German and Greek students) is to provide further support for the psychometric justification (i.e., construct and ecological validity) of the measure.

1.2. Academic burnout

One of the advantages of the MBI that explains its broad use is the fact that the instrument is available in several validated versions. Besides the original version, the MBI-HSS, which was addressed to employees who do "people work," and the later developed MBI-GS, which can be used in all kinds of occupations (Schaufeli et al., 1996),

Schaufeli et al. (2002) also proposed a version that was adapted for students (MBI-SS). In this version, the wording was changed from "work" to "study," "university," or "class," and the proposed three-factor model (i.e., exhaustion, cynicism, and reduced personal efficacy) was assumed to remain unchanged.

Several studies translated the MBI-SS into other languages (Galán, Sanmartín, Polo, & Giner, 2011; Gumz, Erices, Brähler, & Zenger, 2013; Hu & Schaufeli, 2009), without, however, being able to clearly justify its psychometric qualities. For example, some studies reported low reliabilities for the subscales (Galán et al., 2011). In other cases (Gumz et al., 2013; Hu & Schaufeli, 2009), although the three-factor model was replicated in student samples, the statistical strategy that was adopted raised serious methodological and statistical concerns (i.e., error terms had to be correlated for at least two items in order to achieve satisfactory fit). These findings further support our decision to use the OLBI to assess burnout in students. Moreover, at least to the best of our knowledge, no study has yet investigated the factorial invariance of burnout across employees and students. This significant limitation of the existing research does not allow for the evaluation of possible differences across these different groups (e.g., employees vs. students) or cross-cultural comparisons across student samples (e.g., Germans vs. Greeks) because the fundamental assumption of measurement and structural equivalence of job and academic burnout has not been satisfied.

Building on the two dimensions of job burnout proposed by the OLBI (Demerouti et al., 2003, 2010), we define academic burnout as a phenomenon that is characterized by feelings of (emotional, physical, and cognitive) exhaustion due to the demands of studying and an attitude of withdrawal and detachment from one's studies. According to the main assumptions of the job demands-resources model (Demerouti et al., 2001), the study characteristics that university students usually face are likely to initiate feelings of exhaustion (due to increased levels of study demands) and disengagement (due to the absence of study resources). More specifically, university students have to deal with high levels of cognitive (e.g., studying, preparing for classes/exams, working on papers), and/or quantitative (e.g., meeting deadlines) demands that may deplete their energy resources and lead to exhaustion. In a similar vein, lack of instrumental (e.g., control) or socio-emotional resources (e.g., support from teachers or administrative staff) may demotivate students and enhance their feelings of disengagement from their studies. Although there are good reasons supporting this assumption as the structure of the activities pursued by students resembles the structure found in numerous occupations, the necessity of justifying it through modern invariance testing procedures (Cheung & Rensvold, 2002) still remains. In this study, we aimed to fill this void in the literature by investigating the invariance of academic and job burnout across students and employees.

To date, no study has proposed a validated version of the OLBI suitable for students except for a Portuguese version introduced by Campos, Carlotto, and Marôco (2012). In this study, the original two-factor structure of the OLBI was replicated with an acceptable fit but only after deleting two items. Also, this version demonstrated low internal consistency (i.e., Cronbach's α for the exhaustion subscale was .57) and low to moderate validity. In addition, the study failed to achieve measurement invariance across Portuguese and Brazilian students (even though the same language version was used). Thus, we aimed to replicate the two-factor structure of job burnout proposed for the original version of the OLBI using its adapted version for the assessment of academic burnout (OLBI-S). Furthermore, we examined the equivalence of work and academic burnout by testing for measurement invariance across German students and German employees. Building on the premises that (a) the activities students are involved in highly resemble the activities and job characteristics of many occupations, and (b) to date, numerous empirical studies have examined academic burnout as equivalent to job burnout without empirically testing this assumption, we formulated the following hypotheses:

Hypothesis 1. The proposed two-factor structure of the student version of the OLBI (OLBI-S) will be superior to the alternative one-factor structure.

Hypothesis 2. The proposed two-factor structure of the OLBI will be equivalent across German students and employees.

1.3. A comparison of academic burnout across Greek and German students

To date, various studies have examined the construct of job burnout and its equivalence across countries (Xanthopoulou, Bakker, Kantas, & Demerouti, 2012). The present study focused on the equivalence of academic burnout across samples of Greek and German students. Testing for the same structure across different groups is critical for a meaningful interpretation of the underlying constructs (van de Schoot, Lugtig, & Hox, 2012). That is, to compare test scores between Greek and German students, the test items must have invariant quantitative relations with their respective latent variables (Meredith, 1993; Widaman & Reise, 1997). Therefore, it is important from a theoretical point of view to test for factorial invariance across different national samples because only then can we be sure that we are measuring the same construct across nations and can we thus compare means across samples with generalizable results (Vandenberg & Lance, 2000).

Several recent studies have revealed that German students are reporting increased levels of stress due to the changes implemented in their study schedules as a result of the Bologna reform (e.g., Gusy, Lohmann, & Drewes, 2010). Namely, the study curriculum has become much more structured, accompanied by obligatory attendance and decreased levels of autonomy. Similar changes have been implemented in the Greek Higher Education system as a result of the Bologna reform. It is noteworthy that these changes took place in a highly unstable economic environment and have been accompanied by budgetary constraints in all public organizations, including Greek Universities (Deloitte, 2013), resulting in limited available resources (e.g., fewer faculty members per student, less study benefits, etc.). In addition, the increased unemployment rates in Greece (Eurofound, 2012) and the related feeling of job insecurity pose a further risk factor for lower well-being in Greek students. Increased strain levels in the daily experiences of students might result in increased levels of psychosomatic complaints (e.g., Dyrbye et al., 2006) or in study burnout (Gusy et al., 2010).

Building on research on the equivalence of work burnout across countries (e.g., Schaufeli et al., 2002; Xanthopoulou et al., 2012), we expected that the factor structure of the OLBI-S would be invariant across Greek and German students. Furthermore, and in line with the main assumption of the job demands-resources model (Demerouti et al., 2001), we expected that due to differences in the study environment between the two countries (e.g., higher levels of economic pressure, lower levels of resources in academia, higher unemployment rates and job insecurity in Greece), Greek students would report higher levels of exhaustion and disengagement from their studies than German students.

Hypothesis 3. The factor structure of the OLBI-S will be invariant across Greek and German students.

Hypothesis 4. Greek students will report higher levels of exhaustion and disengagement than German students.

2. Method

2.1. Procedure and participants

The participants in this study were German employees and German and Greek students. German employees were nurses recruited from different hospitals and nursing homes for the elderly in Southern Germany. In addition, we invited participants from Facebook groups and nursing discussion forums. The data were collected via an online questionnaire on "health in the nursing profession." Due to the use of an online link, the response rate could not be determined. The German students' data were part of an extensive three-wave questionnaire study on academic well-being stemming from three German universities. The time lags between the three points of measurement were 10 weeks. The OLBI-S was implemented at only the third measurement occasion, which took place at the end of the semester. In both German samples, participants received an informed consent form reassuring them about anonymity, confidentiality, and the solely scientific purpose of the studies.

With regard to the Greek student sample, the data were collected from two public Greek Universities located in Northern and Southern Greece. Five hundred questionnaires were distributed to students who were enrolled mainly in the Psychology departments of these two universities. However, students from other disciplines were also approached. Students were contacted during course hours, were informed about the purposes of the study, and were invited to participate by filling out an anonymous questionnaire on "academic well-being." Participants were reassured that their responses would be treated confidentially and that their participation could not harm their studies in any way. Those who agreed to participate filled out the study survey and returned it to the authors upon completion.

Sample 1 included 560 German students (66% response rate). The sample consisted of 416 women (74.3%) and 137 men (24.5%); seven participants did not provide information on their gender. Their ages ranged from 16 to 55 years ($M = 23.52$, $SD = 4.14$). The number of semesters ranged from one to 20 ($M = 5.14$, $SD = 3.75$). Students majored in educational science (23.6%), psychology (9.8%), medicine (9.8%), and other subjects (52.5%).

Sample 2 consisted of 385 German nurses. In the sample, 300 (77.9%) nurses were female and 76 (19.7%) were male. The remaining participants (2.3%) did not report their gender. Their ages ranged from 17 to 67 years ($M = 37.1$, $SD = 10.9$).

Sample 3 consisted of 303 Greek students (61% response rate). The majority of this sample was female ($N = 245$; 81%). Participants' average age was 23.3 years ($SD = 4.9$; range 20–50), and they had been studying for an average period of 3.6 years ($SD = 1.1$; range 1–8) when the study took place. The participants' field of study varied; 179 (59.1%) were studying psychology, 66 (21.8%) were studying educational sciences, 33 (10.9%) were studying social sciences (other than psychology), and 25 (8.3%) were studying humanities.

2.2. Measures

2.2.1. Job burnout

Burnout was measured with the German version of the Oldenburg Burnout Inventory (OLBI; Demerouti & Nachreiner, 1998). The OLBI consists of 16 items, eight of which measure the exhaustion dimension of burnout (e.g., "There are days when I feel tired before I arrive at work") and eight measuring the disengagement dimension of burnout (e.g., "It happens more and more often that I talk about my work in a negative way"). Both subscales include four positively worded items and four negatively worded items. Participants were asked to respond to the items by using a scale ranging from 1 (*strongly agree*) to 4 (*strongly disagree*). In all cases, responses were recoded so that high scores would refer to high levels of exhaustion and disengagement. Both the exhaustion (Cronbach's $\alpha = .87$) and the disengagement (Cronbach's $\alpha = .81$) subscales were reliable.

2.2.2. Academic burnout

First, we used the English version of the OLBI (Demerouti et al., 2010) to adapt its items so that we could capture academic burnout (OLBI-S). A typical example item from the exhaustion subscale is: "There are days when I feel tired before I arrive at class or start studying." A typical example of an item from the disengagement subscale is: "It happens more and more often that I talk about my studies in a negative way." Then we used the English version of the OLBI-S and applied the translation – back translation procedure (Brislin, 1970) to ensure linguistic and conceptual equivalence in developing the corresponding Greek and German versions of OLBI-S. All three versions of the OLBI-S are presented in the Appendix. Participants were asked to respond to the scale items by using a scale that ranged from 1 (*strongly agree*) to 4 (*strongly disagree*).

2.3. Analytical strategy

Hypotheses were tested by means of structural equation modeling, using the AMOS 20 software (Arbuckle, 2011). The covariance matrix was analyzed with the maximum likelihood method. To test Hypothesis 1, two competing models were examined using confirmatory factor analysis (CFA) to support the factor structure of the OLBI-S in the German student sample. Specifically, we compared the proposed two-factor model (i.e., disengagement and exhaustion) of academic burnout (in which the underlying items loaded on the proposed factors) with an alternative one-factor model (in which all items were hypothesized to load on a single latent burnout factor). The same process was followed to replicate the two-factor structure of the OLBI in the German employee sample and to support the two-factor structure of the OLBI-S in the Greek sample of students.

To test Hypotheses 2 and 3, we conducted multigroup CFAs (MGCFAs) to examine the measurement and structural invariance of the proposed two-factor structure of the scale across groups (i.e., German employees vs. German students) and across countries (i.e., German vs. Greek students). The first step in establishing measurement invariance (MI) involves testing whether the same factor structure exists across two samples. A well-fitting unconstrained model would indicate that a common factor structure is shared across groups (Vandenberg & Lance, 2000). This first type of invariance is called configural invariance. Next, we tested for metric (or weak) invariance, which indicates whether all participants, irrespective of their group membership, respond to the scale items in the same way. Metric invariance sets an equivalent factor pattern (as in configural invariance) but adds the condition of equivalent factor loadings across the different groups. Then we imposed constraints on factor loadings and item intercepts to test for scalar (or strong) invariance. Establishing scalar invariance indicates that participants who have the same score on the latent construct will obtain the same score on the observed variable irrespective of their group membership. Finally, to test for structural invariance (i.e., all latent variables have the same scores and relations across groups), we tested a model in which, in addition to equal factor loadings and item intercepts, all factor variances and covariances were set equal across groups.

We used the following indices to assess the fit of the model to the data: the chi-square (χ^2) statistic and the related degrees of freedom (*df*), the comparative fit index (CFI), the Tucker–Lewis index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). In general, a χ^2/df value <3.00 and CFI and TLI values >.90 indicate an

acceptable fit (with values >.95 being ideal; Brown, 2006). Further, RMSEA and SRMR values ≤.08 indicate a reasonable fit to the data, whereas values ≤.05 indicate excellent fit (Hu & Bentler, 1999). Traditionally, the chi-square test is used to compare nested models, but this statistic is sensitive to sample size (Bentler, 1990). Thus, we have also used the Akaike's Information Criterion (AIC) for model comparisons. Accordingly, the model with the lower AIC value fits best to the data. Furthermore, we used additional criteria to test for invariance; specifically, we used the ΔCFI, ΔRMSEA, and ΔSRMR indices. The criteria for invariance when taking into consideration the number of items in each subscale (eight indicators) and the size of our sample (300–500) were ΔCFI ≤ −.02, ΔRMSEA ≤ .015, and ΔSRMR ≤ .03 for tests of factor loading invariance and ΔCFI ≤ −.01, ΔRMSEA ≤ .015, and ΔSRMR ≤ .01 for test of scalar invariance (Chen, 2007).

To test Hypothesis 4, we estimated the differences between different group means on both sub-cales (i.e., disengagement and exhaustion). We chose German students to serve as the reference group and Greek students to serve as the comparison group. To compare means, we fixed the means of the latent factors to zero in the reference group and let them vary freely in the comparison group. Comparisons of latent means were based on the critical ratio (CR) index. Accordingly, CR values ≥ ±1.96 indicate statistically significant differences in means at $p \leq .05$. A positive CR value suggests that the comparison group has higher latent mean values than the reference group. Importantly (full or partial) scalar invariance is a prerequisite for testing for latent mean differences (Vandenberg & Lance, 2000). Thus, support for Hypothesis 3 was required before proceeding with the test of Hypothesis 4.

3. Results

3.1. Descriptive statistics and internal consistency

First, we examined whether the assumption of univariate and multivariate normality of the data were satisfied. Finney and DiStefano (2006) suggest that values closer to .0 for univariate skewness and kurtosis indicate a normal distribution. Unfortunately, there is no clear consensus regarding an "acceptable" degree of non-normality. Studies examining the impact of univariate normality on ML-based results suggest that problems may occur when univariate skewness and univariate kurtosis approach values of 2 and 7 respectively, and that skewness >2 and kurtosis >7 indicate a severely non-normal distribution (e.g., Muthén & Kaplan, 1985). Using the SPSS macro developed by DeCarlo (1997) we found that the majority of the skewness and the kurtosis values were not significant, suggesting univariate normality. In addition, multivariate normality was examined using Mardia measure of multivariate kurtosis (Mardia, 1970). For the German data, the Mardia's coefficients for student and employee samples were 34.39 and 32.00, respectively. For the Greek data, the Mardia's coefficient for the student data was 30.72. In all cases, values were lower than the value of 288 computed based on the formula $p\ (p+2)$, were p equals the number of observed variables in the model (Raykov & Marcoulides, 2008). On this basis, multivariate normality of the data in this study was assumed.

Table 1 presents means, standard deviations, and correlations between the study variables for all three samples. As expected, the two dimensions of burnout were positively correlated in all samples. It is interesting to note that the correlation between the study variables was stronger for the samples of German employees and German students when compared with the respective correlation in the sample of Greek students.

To estimate the internal consistencies of the German and Greek student versions of the OLBI, the omega (ω) composite reliability index (Raykov, 2004) was used. This method of estimating the internal consistency provides more precise estimates than the popular alpha index, especially in cases in which the assumptions for using the alpha index are not met. One such assumption is tau equivalency (Jöreskog, 1971) in which all components are assumed to assess the same latent construct with the same units of measurement (i.e., equal factor loadings). To test whether this assumption was satisfied in our data, we used a CFA to compare an unrestricted model (in which all factor loadings on one factor were allowed to vary freely) with a restricted model (in which all factor loadings on one factor were set equal). For the subsequent analysis, we found that the chi-square difference test was statistically significant, $\Delta\chi^2\ (13) = 114.27$, $p < .001$. This indicates that there was a violation of the essential tau equivalence of the components of our measure, and thus, the alpha index as an estimation of internal consistency was not appropriate. Instead, the omega index was preferred (Raykov, 2004). For the Greek version of the OLBI-S, the corresponding ω indices for the disengagement and exhaustion subscales were .98 and .97, respectively. For the German version of the OLBI-S, the corresponding ω values for the disengagement and exhaustion subscales were .98 and .99, respectively.

3.2. Hypothesis testing

To test Hypothesis 1, we focused on the sample of German students. We performed CFAs in order to compare the proposed two-factor model of academic burnout, in which the underlying items loaded on the proposed two factors (exhaustion and disengagement; M1 in Table 2) to an alternative one-factor model, in which all the scale items loaded on a general burnout factor (M2; Table 2). As shown in Table 2, Hypothesis 1 was supported because the proposed two-factor model of academic burnout showed an acceptable fit to the data provided by German students and fit better than the alternative one-factor model, $\Delta\chi^2(1) = 415.66$, $p < .001$. In addition, the two-factor model had a lower AIC value than the one-factor model indicating a superior fit.

According to Hypothesis 2, we expected that the proposed two-factor structure of the OLBI would be invariant across student and employee samples. An imperative step before testing this hypothesis across German students and employees was to support the superiority of the proposed two-factor structure as compared with the alternative one-factor structure in both samples separately. Analyses concerning Hypothesis 1 already supported this requirement for German students (see Table 2). Additional CFAs were performed to compare the proposed two-factor model of burnout (M3; Table 2) with the alternative one-factor model (M4; Table 2) in the sample of German employees. Table 2 shows that the proposed two-factor model fit the data better than the alternative one-factor model, $\Delta\chi^2(1) = 158.17$, $p < .001$. However, the fit of the two-factor model was not acceptable. Inspection of the parameter estimates indicated that one item of the disengagement subscale (i.e., "I find my work to be challenging") did not load significantly on the respective factor ($\lambda = .12$, $SE = .07$, $p = .07$). For this reason, we tested the fit of an alternative model that did not include this nonsignificant item (M5; Table 2). The fit of the alternative two-factor model was acceptable and superior to an alternative one-factor model, $\Delta\chi^2\ (1) = 155.10$, $p < .001$ (M6; Table 2).

On the basis of these results, we used the alternative two-factor model (in which the nonsignificant item from the disengagement subscale was not included in both samples) to examine the invariance of the proposed factor structure of the OLBI across German students and employees. To do so, we performed MGCFAs to test for configural, metric, scalar, and structural invariance across the two samples. Table 3 shows that the unconstrained model that we used to test for configural invariance (M1) fit the data well across German students and employees, thus supporting factorial invariance

Table 1
Means, standard deviations, and correlations between the study variables for German employees ($N = 385$), German students ($N = 560$), and Greek students ($N = 303$).

	Sample:	German employees			German students			Greek students		
	Variables	Mean	SD	r	Mean	SD	r	Mean	SD	r
1	Exhaustion	2.58	.64	.64**	2.28	.61	.62**	2.59	.49	.36**
2	Disengagement	1.96	.59		1.99	.55		1.90	.51	

** $p < .01$.

Table 2
Fit of alternative factor models of the OLBI for German students ($N = 560$), German employees ($N = 385$), and Greek students ($N = 303$) separately: results of confirmatory factor analyses.

Model	χ^2	df	χ^2/df	CFI	TLI	RMSEA	SRMR	Comparison	$\Delta\chi^2$	df	AIC
German students											
M1. 2-factor proposed	417.42	103	4.05	.92	.91	.07	.06				483.42
M2. 1-factor	833.08	104	8.01	.82	.79	.11	.08	M1–M2	415.66***	1	897.08
German employees											
M3. 2-factor proposed	389.12	103	3.78	.89	.87	.09	.07				455.12
M4. 1-factor proposed	547.29	104	5.26	.82	.80	.11	.07	M3–M4	158.17***	1	611.29
M5. 2-factor alternative	319.94	89	3.59	.91	.89	.08	.06				381.94
M6. 1-factor alternative	475.04	90	5.28	.84	.82	.11	.07	M5–M6	155.10***	1	535.04
Greek students											
M7. 2-factor proposed	198.88	103	1.93	.91	.89	.06	.06	–			264.88
M8. 1-factor	384.78	104	3.70	.73	.68	.10	.09	M7–M8	185.90***	1	448.78

Note. df = degrees of freedom; CFI = comparative fit index; TLI = Tucker–Lewis Index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual; AIC = Akaike's Information Criterion; M5 and M6 excluded one item from the disengagement subscale.
*** $p < .001$.

(namely, that the same number of factors best represented the data in both groups). Next, the model that was used to test for metric invariance (M2; Table 3) also fit the data well, and the CFI difference, the RMSEA difference, and the SRMS difference showed that the additional constraints that were imposed on this model did not alter its fit significantly. The next step was to test for scalar invariance (M3). The analyses did not support scalar invariance because the additional constraints that were set (i.e., item intercepts were also set equal across groups) caused a meaningful drop in model fit (ΔCFI = .07).

Given that full scalar invariance was rejected, we tested whether partial invariance could be supported. To test for partial invariance, only one set of parameters is constrained to invariance across groups, whereas the rest are freely estimated (Byrne, Shavelson, & Muthén, 1989). Modification indices showed that four items from the exhaustion subscale ("When I work/study, I usually feel energized"; "After working/studying, I have enough energy for my leisure activities"; "After work/studying, I tend to need more time than in the past in order to relax and feel better"; and "After work/studying, I usually feel worn out and weary"), and one item from the disengagement subscale ("It happens more and more often that I talk about my work/studies in a negative way") lacked invariance. When the intercepts of these items were freely estimated, partial invariance was supported because the fit of M4 was not significantly different from the fit of M2 (ΔCFI = .01). Finally, structural invariance was also supported because adding additional constraints to M4 did not change the fit significantly. All in all, these results supported Hypothesis 2.

In Hypothesis 3, we expected that the proposed two-factor structure of the OLBI-S would be invariant across German and Greek students. Analyses regarding Hypothesis 1 supported the superiority of the proposed two-factor structure of the OLBI-S in the German sample of students. Additional CFAs were performed to compare the proposed two-factor structure of the OLBI-S with the alternative one-factor structure in the sample of Greek students. Table 2 shows that the two-factor model provided a good fit to the Greek students' data and was superior to the alternative one-factor model, $\Delta\chi^2$ (1) = 185.90, $p < .001$ and lower AIC value.

Next, we performed MGCFAs to test the invariance of the OLBI-S between the German and Greek student samples. Table 3 shows

Table 3
Test of invariance of the proposed two-factor structure of the OLBI between German ($N = 560$) and Greek ($N = 303$) students and between German students ($N = 560$) and German employees ($N = 385$): results of multigroup confirmatory factor analyses.

Model	χ^2	df	χ^2/df	CFI	TLI	RMSEA	SRMR	Comparison	ΔCFI	ΔRMSEA	ΔSRMR
German students vs. employees											
M1. Configural invariance – unconstrained alternative	695.10	178	3.91	.914	.898	.059	.0574				
M2. Metric invariance	728.94	191	3.82	.910	.901	.055	.0619	1–2	.004	.004	.0045
M3. Scalar invariance	1163.95	206	5.65	.840	.837	.070	.0676	2–3	.070	.015	.0057
M4. Partial scalar invariance	797.81	201	3.96	.900	.896	.056	.0617	2–4	.010	.001	.0020
M5. structural invariance	806.58	204	3.95	.899	.897	.056	.0666	4–5	.001	.000	.0049
Greek vs. German students											
M6. Configural invariance-unconstrained	616.27	206	2.99	.917	.904	.048	.0582	–			
M7. Metric invariance	674.46	220	3.07	.908	.900	.049	.0596	1–2	.009	.001	.0012
M8. Scalar invariance	1065.71	236	4.52	.833	.830	.064	.0604	2–3	.075	.015	.0008
M9. Partial scalar invariance	759.40	231	3.29	.894	.889	.052	.0599	2–4	.014	.003	.0003
M10. Structural invariance	814.24	234	3.48	.883	.880	.054	.0719	4–5	.011	.002	.0120

Note. df = degrees of freedom; CFI = comparative fit index; TLI = Tucker–Lewis Index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual.

that the unconstrained model (M6) provided a good fit to the data in both the German and Greek student samples, showing that the same number of factors best represented the data in both samples. The model that was used to test for metric invariance (M7; Table 3) also fit the data well, whereas the additional constraints that were imposed did not significantly alter the fit of the model. The analyses did not support full scalar invariance because setting all of the item intercepts to equality between the two groups caused a meaningful drop in model fit (ΔCFI = .075; M8 in Table 3). Thus, we opted for partial invariance (M9; Table 3). Modification indices showed that one item from the exhaustion subscale (i.e., "There are days when I feel tired before I arrive at class or start studying") and four items from the disengagement subscale (i.e., "It happens more and more often that I talk about my studies in a negative way"; "I find my studies to be a positive challenge"; "Sometimes I feel sickened by my studies"; and "I feel more and more engaged in my studies") lacked invariance. When the intercepts of these items were freely estimated, partial invariance was supported (ΔCFI = .014; ΔRMSEA = .003; ΔSRMR = .0003). Finally, structural invariance was also supported because adding additional constraints to M9 did not significantly change the fit of M10 (ΔCFI = .011; ΔRMSEA = .002; ΔSRMR = .012). These results supported Hypothesis 3.

To test Hypothesis 4, we examined latent mean differences. Given that partial scalar invariance was supported across the German and Greek student samples in our test of Hypothesis 3, we proceeded with testing Hypothesis 4. To be able to compare means between groups, the average must be constrained to zero in one group to identify the model. Such a comparison does not allow for the absolute mean in each group to be estimated, but rather allows for an estimation of the mean difference in the latent variables (i.e., exhaustion and disengagement) between the groups. The analysis showed that German students had higher scores than Greek students on the disengagement subscale, but this difference was not significant ($CR = -.21$). On the other hand, Greek students had higher scores than their German counterparts on the exhaustion subscale, and this difference was statistically significant ($CR = 6.26$). On the basis of these results, we concluded that Hypothesis 4 was partially supported.

4. Discussion

The present study investigated the factor structure of the academic version of the OLBI (i.e., OLBI-S) in a sample of German students and tested the equivalence between academic and employee burnout. In addition, we examined the invariance of the OLBI-S across German and Greek students and compared the levels of exhaustion and disengagement in both samples by estimating latent mean differences. To the best of our knowledge, this study is the first to test and support the equivalence of academic and job burnout within the same cultural context and the first to provide evidence for the psychometric properties of the Greek and German versions of the OLBI adapted for the assessment of academic burnout.

4.1. Academic and employee burnout

We found that the two-factor model of job burnout proposed by the original OLBI (Demerouti et al., 2003, 2010) could be replicated with the new OLBI-S as a measure of academic burnout. However, we encountered difficulties in modeling the original two-factor structure in our sample of German nurses. More specifically, one item from the disengagement scale did not load significantly on its respective latent factor. We argue that the reason for this non-significant loading may be the differences in the wording of the item between the original German (Demerouti & Nachreiner, 1998) and the English (Demerouti et al., 2010) versions of the OLBI. Namely, in the original German version, the item is "I find my work to be a challenge," whereas the respective item in the English version reads "I find my work to be a positive challenge." In our sample of nurses—in Germany, a profession with high levels of job demands such as time pressure (Wassermann, Hoppe, Reis, & Uthmann, 2014)—90.3% of the participants agreed or strongly agreed with this statement, and this may mean that in this specific context, the concept of challenge is not perceived as motivating. In studies that were used to validate the English version of the OLBI (Demerouti et al., 2010; Halbesleben & Demerouti, 2005), such difficulties regarding this item did not emerge. These results suggest that the item that refers to a "positive challenge" in the English version of the instrument may be more accurate. In addition, we did not encounter any difficulties with this item in the German or Greek versions of the OLBI-S as these were based on the English version of the OLBI (i.e., the respective item was "I find my studies to be a *positive* challenge"). Thus, we strongly recommend revising the German version of the item accordingly to provide consistency with the validated English version.

Our comparison of employee and academic burnout between German employees and German students revealed that our model achieved full metric invariance. This means that participants in the two samples interpreted the items of the scale in the same way. Hence it seems that extending the concept of job burnout into the academic context is meaningful as it captures a similar phenomenon. The adapted OLBI-S items addressed the same issues as the original OLBI, the only difference being that they pertained to "studying" and "attending classes." Although we do not suggest that burnout can be conceptualized as a generic, context-free phenomenon (cf. Schaufeli, Leiter, & Maslach, 2009)—that occurs in various life domains, we do believe that the structure of academic tasks allows the items to maintain equivalence, when transferred from the work to the academic context. Future prospective research has to clarify how academic burnout is related to later job burnout in the same occupational field, perhaps by using school burnout as a starting point.

The differences we found in the intercepts of five items across student and employee samples suggests that nurses provided different scores on these observed variables, when compared to students. Future studies comparing academic and employee burnout should examine whether these differences originated from the heterogeneity of our participants: Whereas the employee sample consisted of only nurses, our student sample was rather heterogenous. It is possible that an examination of equivalence between academic and employee burnout using, for example, students from medical school and physicians would yield results with even greater invariance. However, this lack of scalar invariance may not be attributed necessarily to the fact that we compare a homogeneous sample of nurses to a heterogeneous sample of students, but rather to the different nature of real jobs vs. academic studies. In an attempt to explain the lack of full scalar invariance theoretically, it is important to observe that most items whose intercepts were invariant across employee and student samples concerned how participants feel during their free time after work/studying and the related energy levels. Considering that leisure time (1) is likely to be more limited for working adults than for students, and (2) is extremely important for employee recovery from work-related demands as an attempt to prevent the chronic accumulation of burnout symptoms (Xanthopoulou & Meier, 2014), the observed lack of invariance may be attributed to the fact that employees are likely to value their free time and their energy replenishment more highly than students do. As a result, they provide different scores to these items.

4.2. Comparison of academic burnout across Greek and German students

The present study examined the invariance of the OLBI-S between German and Greek students. In the multigroup CFAs, we achieved full metric measurement invariance, whereas scalar invariance was only partially supported. These results, similar to our results for the students vs. employees comparison, indicate that Greek and German students interpret the OLBI-S items in the same way. The confirmation of factorial invariance is important for future cross-national studies that aim to further investigate academic burnout as factorial invariance allows for ecologically valid comparisons across cultures. In addition, the OLBI-S seems to offer a more stable solution for the assessment of academic burnout than the MBI-SS (Schaufeli et al., 2002). First, Schaufeli and colleagues achieved an acceptable fit of the proposed three-factor solution in each of their three samples separately only after allowing for correlations between error terms. Nevertheless, correlated error terms indicate that the items in the analysis lack unidimensionality. Second, the MBI-SS showed no factorial invariance across the samples (save for single pairs of items). By contrast, our results supported partial scalar invariance of the OLBI-S, and this is a prerequisite for comparing mean levels of academic burnout across countries. This is notable because none of the previous studies on cross-national comparisons on student burnout have supported scalar invariance (e.g., Schaufeli et al., 2002), which raises concerns about the validity of comparisons across different settings.

Hypothesis 4 predicted that Greek students would report higher levels of burnout than German students. Although we found no significant differences regarding the disengagement scale, the levels of exhaustion in Greek students were substantially higher than in German students. This finding is in line with previous research comparing Greek and Dutch employees (Demerouti et al., 2003; Xanthopoulou et al., 2012), thus further underlining the conceptual similarity between academic and employee burnout. Also, these findings imply that the demands that Greek students face with regard to their studies during times of socio-economic recession may explain why they appear more exhausted than German students. Although both national samples had to adapt to substantial changes because of the Bologna reform, the additional demands that Greek students were confronted with due to the financial recession appear to be particularly draining.

Despite the fact that the factor [covariance] structure of the burnout construct was replicated between the student samples from the two countries, one has to be cautious about interpreting the differences found in the latent means between the two samples on the exhaustion scale due to the fact that only partial (rather than full) invariance was established. Steenkamp and Baumgartner (1998) stated that in order to test for latent mean differences, at least two items per factor (one marker item and one additional item) must have invariant factor loadings and intercepts (i.e., must meet the conditions for scalar invariance). However, Thompson and Green (2006) were more stringent with regard to this issue and argued that "in models with equivalent factor loadings but differing intercepts, differences in the means on that measure are a function of both the latent factors and the varying intercepts which can be interpreted in terms of a biased measure" (p. 149).

4.3. Limitations and directions for future studies

Although our study provided a strong design as it relied on data from three independent samples, future studies should enhance this research in at least five ways that will automatically counteract the limitations of the current study. First, the convergent and divergent validity of academic burnout should be further investigated, optimally by applying the CFA-multitrait multimethod approach (Eid et al., 2008). Ideally, this analytical strategy should also include observer ratings to allow for an examination of how observer ratings relate to self-report assessments. Second, next to examining the equivalence of academic burnout in terms of test scores, the patterns of relations with other variables should be compared as well. In the present study, we found differences in the levels of exhaustion between the Greek and German students, but we could only make assumptions about how these different levels were related to possible predictors or outcomes of academic burnout. This is important to examine further because the dimensions of burnout have been shown to relate to academic success in different ways across different European countries (Schaufeli et al., 2002). By confirming measurement invariance of the OLBI across employees and students, we made the first, essential step in supporting construct validity. Only when measurement invariance is established, it makes sense to look for evidence supporting the construct validity of the instrument (e.g., by testing whether job and academic burnout share the same antecedents or consequences). Thus, future studies should point toward that direction.

Third, to investigate true cross-cultural differences in a robust way, future studies should recruit representative samples that are comparable in terms of sociodemographic attributes potentially relevant for burnout. The results of our study support the ecological validity of the OLBI-S across two students samples, but by no means provide robust cultural comparisons. Fourth, our study reported only cross-sectional data. So far, we have limited knowledge about long-term processes pertaining to the development of academic burnout. More prospective research is needed, even by using burnout in the school context as a starting point (Salmela-Aro & Upadyaya, 2014). Fifth, in our comparison of academic and employee burnout, we used a heterogenous sample of students and a rather homogenous sample of nurses, meaning that our employee and student samples were not comparable. Focusing on a sample of nurses was a conscious decision, because for the purposes of this study we thought important to investigate an occupation that is of particular relevance for the occurrence of the burnout syndrome and the development of the construct (Maslach & Jackson, 1981). Furthermore, the level of measurement invariance achieved across dissimilar samples underlines the stability of the instrument, as it accounts for a more restrictive test of invariance. However, future studies should replicate our findings across samples with similar compositions. In addition, all three samples were not randomly selected but were rather self-selected. This issue is important because our modifications (i.e., relaxing the constraints in order to achieve partial scalar invariance) might be specific to our samples and might not be generalizable to others, and this is an essential issue for cross-national studies.

4.4. Practical implications

Longitudinal studies have shown that burnout exhibits notable stability, demonstrating its chronic nature (Shirom, Melamed, Toker, Berliner, & Shapira, 2005). Indeed, it is remarkable that students and employees both experience the burnout phenomenon. In comparison with previous studies, our results raise the question of when prevention and intervention should be implemented. For instance, it may be necessary that practitioners' efforts to maintain employee well-being should begin even earlier, namely, during prospective employees' university studies. However, further research is needed on the antecedents, consequences, and concurrent symptoms of academic burnout.

4.5. Conclusion

In total, our study showed that the OLBI (Demerouti et al., 2010) can be adapted to the academic context with high psychometric

quality and that both subdimensions of employee burnout can be reproduced in academic burnout. Moreover, our study extends previous research by confirming the equivalence of burnout in work and academic contexts. In addition, as the OLBI-S showed factorial invariance across countries, this provides a good starting point for meaningful comparisons in future studies addressing issues concerning the development of burnout across time from early adolescence into later work life.

Conflict of interest statement

The authors declare that there are no conflicts of interest.

Acknowledgement

The authors would like to thank Marios Biskas for his valuable help in collecting the data from the Greek students.

Appendix A.

The original English version of the OLBI (Demerouti et al., 2010, p. 222) has been adapted to capture academic burnout (OLBI-S).

A.1. OLBI-S English version

1. I always find new and interesting aspects in my studies.
2. It happens more and more often that I talk about my studies in a negative way.
3. Lately, I tend to think less about my academic tasks and do them almost mechanically.
4. I find my studies to be a positive challenge.
5. Over time, one can become disconnected from this type of study.
6. Sometimes I feel sickened by my studies.
7. This is the only field of study that I can imagine myself doing.
8. I feel more and more engaged in my studies.
9. There are days when I feel tired before I arrive in class or start studying.
10. After a class or after studying, I tend to need more time than in the past in order to relax and feel better.
11. I can tolerate the pressure of my studies very well.
12. While studying, I often feel emotionally drained.
13. After a class or after studying, I have enough energy for my leisure activities.
14. After a class or after studying, I usually feel worn out and weary.
15. I can usually manage my study-related workload well.
16. When I study, I usually feel energized.

A.2. OLBI-S Greek version

1. Ανακαλύπτω συνεχώς νέες ενδιαφέρουσες πλευρές στις σπουδές μου.
2. Μου συμβαίνει όλο και συχνότερα να εκφράζομαι υποτιμητικά για τις σπουδές μου.
3. Τελευταία, έχω την τάση να σκέφτομαι λιγότερο για τα ακαδημαϊκά μου καθήκοντα και να τα διεκπεραιώνω σχεδόν μηχανικά.
4. Θεωρώ ότι οι σπουδές μου είναι μια θετική πρόκληση.
5. Με την πάροδο του χρόνου χάνει κανείς το αρχικό ενδιαφέρον για αυτές τις σπουδές.
6. Μερικές φορές αισθάνομαι απόλυτη απέχθεια για τις σπουδές μου.
7. Αυτό είναι το μόνο αντικείμενο που θα φανταζόμουν τον εαυτό μου να σπουδάζει.
8. Με την πάροδο του χρόνου αισθάνομαι όλο και περισσότερο δεσμευμένος/η με τις σπουδές μου.
9. Υπάρχουν μέρες που νιώθω κουρασμένος/η πριν ακόμα αρχίσω την μελέτη ή πάω στο μάθημα.
10. Μετά το μάθημα ή τη μελέτη, χρειάζομαι συχνά περισσότερες ώρες ξεκούρασης από ότι παλιότερα για να έρθω σε φόρμα.
11. Η πίεση από τις σπουδές μου είναι αρκετά υποφερτή.
12. Έχω όλο και συχνότερα την αίσθηση ότι οι σπουδές μου με εξαντλούν συναισθηματικά.
13. Μετά το μάθημα ή τη μελέτη, έχω γενικά διάθεση να ασχοληθώ με τις άλλες μου δραστηριότητες.
14. Μετά το μάθημα ή τη μελέτη, αισθάνομαι γενικά εξουθενωμένος/η και εξαντλημένος/η.
15. Συνήθως, μπορώ να καταφέρω τον φόρτο εργασίας των σπουδών μου.
16. Όταν μελετώ, αισθάνομαι συνήθως γεμάτος/η ενέργεια.

A.3. OLBI-S German version

1. In meinem Studium entdecke ich immer wieder neue, interessante Aspekte.
2. Es passiert mir immer öfter, dass ich negativ über mein Studium rede.
3. Ich neige in letzter Zeit vermehrt dazu, weniger über meine Aufgaben im Studium nachzudenken und sie fast mechanisch zu erledigen.
4. Ich empfinde mein Studium als positive Herausforderung.
5. Mit der Zeit verliert man die innere Beziehung zum eigenen Studium.
6. Manchmal bin ich von meinem Studium richtiggehend angewidert.
7. Ich kann mir für mich kein anderes Studium vorstellen.
8. Ich engagiere ich mich immer mehr in meinem Studium.
9. Es gibt Tage, an denen ich mich schon müde fühle, noch bevor ich zur Universität gehe.
10. Nach den Veranstaltungen oder nach dem Lernen brauche ich mittlerweile oft längere Erholungszeiten als früher, um wieder fit zu werden.
11. Ich vertrage die Belastung durch mein Studium sehr gut.
12. Während ich für mein Studium arbeite, habe ich immer häufiger das Gefühl, emotional ausgelaugt zu sein.
13. Nach den Veranstaltungen oder nach dem Lernen habe ich genug Energie für meine Freizeitaktivitäten.
14. Nach den Veranstaltungen oder nach dem Lernen fühle ich mich in der Regel schlapp und abgespannt.
15. In der Regel kann ich das Arbeitspensum meines Studiums gut bewältigen.
16. Während ich für mein Studium arbeite, fühle ich mich total belebt.

References

Arbuckle, J. L. (2011). *Amos 20 user's guide*. Chicago, IL: IBM/SPSS.

Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, *107*(2), 238–246. http://dx.doi.org/10.1037/0033-2909.107.2.238

Boudreau, D., Santen, S. A., Hemphill, R. R., & Dobson, J. (2004). Burnout in medical students: Examining the prevalence and predisposing factors during the four years of medical school. *Annals of Emergency Medicine*, *44*(4), S75–S76. http://dx.doi.org/10.1016/j.annemergmed.2004.07.248

Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, *1*(3), 185–216. http://dx.doi.org/10.1177/135910457000100301

Brown, T. A. (2006). *Confirmatory factor analysis for applied research*. New York, NY: Guilford Press.

Byrne, B. M., Shavelson, R. J., & Muthén, B. (1989). Testing for the equivalence of factor covariance and mean structures: The issue of partial measurement

invariance. *Psychological Bulletin*, *105*(3), 456. http://dx.doi.org/10.1037/0033-2909.105.3.456
Campos, J. A. D. B., Carlotto, M. S., & Maroco, J. (2012). Oldenburg Burnout Inventory-Student Version: Cultural adaptation and validation into Portuguese. *Psicologia: Reflexão e Crítica*, *25*(4), 709–718. Retrieved from http://www.scielo.br/scielo.php?pid=S0102-79722012000400010&script=sci_arttext
Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling*, *14*(3), 464–504. http://dx.doi.org/10.1080/10705510701301834
Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, *9*(2), 233–255. http://dx.doi.org/10.1207/S15328007SEM0902_5
DeCarlo, L. T. (1997). On the meaning and use of kurtosis. *Psychological Methods*, *2*(3), 292. http://dx.doi.org/10.1037/1082-989X.2.3.292
Deloitte. (2013). *Researchers' Report 2013*. Greece: Country Profile. Retrieved from http://ec.europa.eu/euraxess/pdf/research_policies/country_files/Greece_Country%20Profile_RR2013_FINAL.pdf
Demerouti, E., & Bakker, A. B. (2008). The Oldenburg Burnout Inventory: A good alternative to measure burnout and engagement. In J. Halbesleben (Ed.), *Handbook of stress and burnout in health care* (pp. 65–78). Hauppauge, NY: Nova Science Publishers.
Demerouti, E., & Nachreiner, F. (1998). Zur Spezifität von Burnout für Dienstleistungsberufe: Fakt oder Artefakt [The specificity of burnout for human services: Fact or artefact]. *Zeitschrift für Arbeitswissenschaft*, *52*, 82–89.
Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology*, *86*(3), 499–512. http://dx.doi.org/10.1037/0021-9010.86.3.499
Demerouti, E., Bakker, A. B., Vardakou, I., & Kantas, A. (2003). The convergent validity of two burnout instruments. *European Journal of Psychological Assessment*, *19*(1), 12–23. http://dx.doi.org/10.1027//1015-5759.19.1.12
Demerouti, E., Mostert, K., & Bakker, A. B. (2010). Burnout and work engagement: A thorough investigation of the independency of both constructs. *Journal of Occupational Health Psychology*, *15*(3), 209–222. http://dx.doi.org/10.1037/a0019408
Dyrbye, L. N., Thomas, M. R., Huntington, J. L., Lawson, K. L., Novotny, P. J., Sloan, J. A., et al. (2006). Personal life events and medical student burnout: A multicenter study. *Academic Medicine*, *81*(4), 374–384. http://dx.doi.org/10.1097/00001888-200604000-00010
Eid, M., Nussbeck, F. W., Geiser, C., Cole, D. A., Gollwitzer, M., & Lischetzke, T. (2008). Structural equation modeling of multitrait–multimethod data: Different models for different types of methods. *Psychological Methods*, *13*(3), 230–253. http://dx.doi.org/10.1037/a0013219
Eurofound. (2012). *Fifth European working conditions survey*. Luxembourg: Publications Office of the European Union.
Finney, S. J., & DiStefano, C. (2006). Nonnormal and categorical data in structural equation models. In G. R. Hancock, & R. O. Mueller (Eds.), *A second course in structural equation modeling* (pp. 269–314). Greenwich: Information Age.
Galán, F., Sanmartín, A., Polo, J., & Giner, L. (2011). Burnout risk in medical students in Spain using the Maslach Burnout Inventory-Student Survey. *International Archives of Occupational and Environmental Health*, *84*(4), 453–459. http://dx.doi.org/10.1007/s00420-011-0623-x
Gold, Y., & Michael, W. B. (1985). Academic self-concept correlates of potential burnout in a sample of first-semester elementary-school practice teachers: A concurrent validity study. *Educational and Psychological Measurement*, *45*(4), 909–914. http://dx.doi.org/10.1177/0013164485454022
Gumz, A., Erices, R., Brähler, E., & Zenger, M. (2013). Faktorstruktur und Gütekriterien der deutschen Übersetzung des Maslach-Burnout-Inventars für Studierende von Schaufeli et al. (MBI-SS) [Factorial structure and psychometric criteria of the German translation of the Maslach Burnout Inventory – Student Version by Schaufeli et al. (MBI-SS)]. *Psychotherapie, Psychosomatik, Medizinische Psychologie*, *63*(02), 77–84. http://dx.doi.org/10.1055/s-0032-1323695
Gusy, B., Lohmann, K., & Drewes, J. (2010). Burnout bei Studierenden, die einen Bachelor-Abschluss anstreben [Burnout in undergraduate students]. *Prävention Gesundheitsförderung*, *5*(3), 271–275. http://dx.doi.org/10.1007/s11553-010-0251-4
Halbesleben, J. R. B. (2010). The role of exhaustion and workarounds in predicting occupational injuries: A cross-lagged panel study of health care professionals. *Journal of Occupational Health Psychology*, *15*(1), 1–16. http://dx.doi.org/10.1037/a0017634
Halbesleben, J. R. B., & Demerouti, E. (2005). The construct validity of an alternative measure of burnout: Investigating the English translation of the Oldenburg Burnout Inventory. *Work and Stress*, *19*(3), 208–220. http://dx.doi.org/10.1080/02678370500340728
Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, *44*(3), 513–524. http://dx.doi.org/10.1037/0003-066X.44.3.513
Hobfoll, S. E. (1998). *Stress, culture, and community*. New York: Plenum Publishing Corporation.
Hu, L.-T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1–55. http://dx.doi.org/10.1080/10705519909540118
Hu, Q., & Schaufeli, W. B. (2009). The factorial validity of the Maslach Burnout Inventory-Student Survey in China. *Psychological Reports*, *105*(2), 394–408. http://dx.doi.org/10.2466/PR0.105.2.394-408
Huibers, M. J. H., Beurskens, A. J. H. M., Prins, J. B., Kant, I. J., Bazelmans, E., Van Schayck, C. P., et al. (2003). Fatigue, burnout, and chronic fatigue syndrome among employees on sick leave: Do attributions make the difference? *Occupational and Environmental Medicine*, *60*(Suppl. 1), i26–i31. http://dx.doi.org/10.1136/oem.60.suppl_1.i26
Jöreskog, K. G. (1971). Simultaneous factor analysis in several populations. *Psychometrika*, *36*(4), 409–426. http://dx.doi.org/10.1007/BF02291366
Karasek, R. A. (1979). Job demands, job decision latitude, and mental strain: Implications for job redesign. *Administrative Science Quarterly*, *24*(2), 285–308. http://dx.doi.org/10.2307/2392498
Kristensen, T. S., Borritz, M., Villadsen, E., & Christensen, K. B. (2005). The Copenhagen Burnout Inventory: A new tool for the assessment of burnout. *Work and Stress*, *19*(3), 192–207. http://dx.doi.org/10.1080/02678370500297720
Leiter, M. P., & Schaufeli, W. B. (1996). Consistency of the burnout construct across occupations. *Anxiety, Stress, and Coping*, *9*(3), 229–243. http://dx.doi.org/10.1080/10615809608249404
Leone, S. S., Huibers, M. J., Knottnerus, J. A., & Kant, I. (2008). The prognosis of burnout and prolonged fatigue in the working population: A comparison. *Journal of Occupational and Environmental Medicine*, *50*(10), 1195–1202. http://dx.doi.org/10.1097/JOM.0b013e31817e7c05
Mardia, K. V. (1970). Measures of multivariate skewness and kurtosis with applications. *Biometrika*, *57*(3), 519–530. http://dx.doi.org/10.1093/biomet/57.3.519
Maslach, C., & Jackson, S. E. (1981). The measurement of experienced burnout. *Journal of Organizational Behavior*, *2*(2), 99–113. http://dx.doi.org/10.1002/job.4030020205
Maslach, C., Jackson, S. E., & Leiter, M. P. (1996). *Maslach Burnout Inventory: Manual* (3 ed.). Palo Alto, CA: Consulting Psychologists Press.
Maslach, C., Schaufeli, W. B., & Leiter, M. P. (2001). Job burnout. *Annual Review of Psychology*, *52*(1), 397–422. http://dx.doi.org/10.1146/annurev.psych.52.1.397
Maslach, C., Leiter, M. P., & Schaufeli, W. B. (2008). Measuring burnout. In C. L. Cooper, & S. Cartwright (Eds.), *The Oxford handbook of organizational well-being* (pp. 86–108). Oxford: Oxford University Press.
McCarthy, M. E., Pretty, G. M., & Catano, V. (1990). Psychological sense of community and student burnout. *Journal of College Student Development*, *31*(3), 211–216. Retrieved from http://psycnet.apa.org/psycinfo/1990-26907-001
Meredith, W. (1993). Measurement invariance, factor analysis and factorial invariance. *Psychometrika*, *58*, 525–543. http://dx.doi.org/10.1007/BF02294825
Muthén, B., & Kaplan, D. (1985). A comparison of some methodologies for the factor analysis of non-normal Likert variables. *British Journal of Mathematical and Statistical Psychology*, *38*(2), 171–189. http://dx.doi.org/10.1111/j.2044-8317.1985.tb00832.x
Raykov, T. (2004). Point and interval estimation of reliability for multiple-component measuring instruments via linear constraint covariance structure modeling. *Structural Equation Modeling*, *11*(3), 342–356. http://dx.doi.org/10.1207/s15328007sem1103_3
Raykov, T., & Marcoulides, G. A. (2008). *An introduction to applied multivariate analysis*. New York, NY: Routledge.
Salmela-Aro, K., & Upadyaya, K. (2014). School burnout and engagement in the context of demands-resources model. *British Journal of Educational Psychology*, *84*(Pt 1), 137–151. http://dx.doi.org/10.1111/bjep.12018
Schaufeli, W. B., & Salanova, M. (2007). Efficacy or inefficacy, that's the question: Burnout and work engagement, and their relationships with efficacy beliefs. *Anxiety, Stress, and Coping*, *20*(2), 177–196. http://dx.doi.org/10.1080/10615800701217878
Schaufeli, W. B., & Taris, T. W. (2005). The conceptualization and measurement of burnout: Common ground and worlds apart. *Work and Stress*, *19*(3), 256–262. http://dx.doi.org/10.1080/02678370500385913
Schaufeli, W. B., Leiter, M. P., Maslach, C., & Jackson, S. E. (1996). Maslach burnout inventory – General survey. In C. Maslach, S. E. Jackson, & M. P. Leiter (Eds.), *The Maslach Burnout Inventory-Test Manual* (pp. 19–26). Palo Alto, CA: Consulting Psychologists Press.
Schaufeli, W. B., Martínez, I. M., Pinto, A. M., Salanova, M., & Bakker, A. B. (2002). Burnout and engagement in university students. A cross-national study. *Journal of Cross-Cultural Psychology*, *33*(5), 464. http://dx.doi.org/10.1177/0022022102033005003
Schaufeli, W. B., Leiter, M. P., & Maslach, C. (2009). Burnout: 35 years of research and practice. *Career Development International*, *14*(3), 204–220. http://dx.doi.org/10.1108/13620430910966406
Shirom, A. (2005). Reflections on the study of burnout. *Work and Stress*, *19*(3), 263–270. http://dx.doi.org/10.1080/02678370500376649
Shirom, A., & Melamed, S. (2006). A comparison of the construct validity of two burnout measures in two groups of professionals. *International Journal of Stress Management*, *13*(2), 176–200. http://dx.doi.org/10.1037/1072-5245.13.2.176
Shirom, A., Melamed, S., Toker, S., Berliner, S., & Shapira, I. (2005). Burnout and health review: Current knowledge and future research directions. *International Review of Industrial and Organizational Psychology*, *20*, 269–308.
Sonnentag, S., Binnewies, C., & Mojza, E. J. (2010). Staying well and engaged when demands are high: The role of psychological detachment. *Journal of Applied Psychology*, *95*(5), 965–976.
Steenkamp, J.-B. E. M., & Baumgartner, H. (1998). Assessing measurement invariance in cross-national consumer research. *Journal of Consumer Research*, *25*(1), 78–107. http://dx.doi.org/10.1086/209528
Taris, T. W., Le Blanc, P. M., Schaufeli, W. B., & Schreurs, P. J. G. (2005). Are there causal relationships between the dimensions of the Maslach Burnout Inventory? A review and two longitudinal tests. *Work and Stress*, *19*(3), 238–255.
Thompson, M. S., & Green, S. B. (2006). Evaluating between-group differences in latent variable means. In G. R. Hancock, & R. O. Mueller (Eds.), *Structural equation modeling: A second course* (pp. 119–169). Charlotte, NC: Information Age.

Timms, C., Brough, P., & Graham, D. (2012). Burnt-out but engaged: The co-existence of psychological burnout and engagement. *Journal of Educational Administration*, *50*(3), 327–345. http://dx.doi.org/10.1108/09578231211223338

van de Schoot, R., Lugtig, P., & Hox, J. (2012). A checklist for testing measurement invariance. *European Journal of Developmental Psychology*, *9*(4), 486–492. http://dx.doi.org/10.1080/17405629.2012.686740

Vandenberg, R. J., & Lance, C. E. (2000). A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods*, *3*(1), 4–70. http://dx.doi.org/10.1177/109442810031002

Wassermann, M., Hoppe, A., Reis, D., & Uthmann, L. V. (2014). Sinnstiftung als persönliche Ressource bei Altenpflegekräften: Zu direkten und moderierenden Effekten von Sinnstiftung auf emotionale Erschöpfung und Vitalität [Meaning-making as a personal resource among elderly care nurses: Direct and moderating effects on emotional exhaustion and vigor]. *Zeitschrift für Arbeits- und Organisationspsychologie*, *58*(2), 51–63. http://dx.doi.org/10.1026/0932-4089/a000142

Widaman, K. F., & Reise, S. P. (1997). Exploring the measurement invariance of psychological instruments: Applications in the substance use domain. In K. J. Bryant, M. Windle, & S. G. West (Eds.), *The science of prevention: Methodological advances from alcohol and substance abuse research* (pp. 281–324). Washington, DC: American Psychological Association.

Willcock, S. M., Daly, M. G., Tennant, C. C., & Allard, B. J. (2004). Burnout and psychiatric morbidity in new medical graduates. *Medical Journal of Australia*, *181*(7), 357–360.

Worley, J. A., Vassar, M., Wheeler, D. L., & Barnes, L. L. B. (2008). Factor structure of scores from the Maslach burnout inventory: A review and meta-analysis of 45 exploratory and confirmatory factor-analytic studies. *Educational and Psychological Measurement*, *68*(5), 797–823. http://dx.doi.org/10.1177/0013164408315268

Xanthopoulou, D., & Meier, L. L. (2014). Daily burnout experiences: Critical events and measurement challenges. In M. P. Leiter, A. B. Bakker, & C. Maslach (Eds.), *New perspectives on burnout research* (pp. 80–97). New York: Psychology Press.

Xanthopoulou, D., Bakker, A. B., Kantas, A., & Demerouti, E. (2012). Measuring burnout and work engagement: Factor structure, invariance, and latent mean differences across Greece and the Netherlands. *International Journal of Business Science and Applied Management*, *7*(2), 40–52. Retrieved from http://www.beanmanaged.com/doc/pdf/arnoldbakker/articles/articles_arnold_bakker_301.pdf

Yang, H.-J., & Farn, C. K. (2005). An investigation the factors affecting MIS student burnout in technical–vocational college. *Computers in Human Behavior*, *21*(6), 917–932. http://dx.doi.org/10.1016/j.chb.2004.03.001