**Title:**

Assessing stress-induced sleep reactivity in college students: The European Portuguese version of the Ford Insomnia Response to Stress Test (FIRST)

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## Abstract

**Objective/Background:** Over the past few years, the comprehensive models of insomnia have exhibited impressive developments. However, there is scarce knowledge on predisposing or vulnerability factors for insomnia. One of the most promising constructs to aid in filling this gap is stress-induced sleep reactivity assessed through self-report. Our aim was to study the psychometric properties of the European Portuguese version of the Ford Insomnia Response to Stress Test (FIRST). **Participants:** We recruited a large sample of students attending medical school (*N*=699). **Methods:** Several analyses were carried out such as internal consistency, construct validity, and discriminant groups' analysis. **Results:** It was observed that FIRST-PT shows good internal consistency (Cronbach´s alpha = .81) and validity indicators. Interestingly, and contrary to what was observed in the previously published studies on psychometric properties of the FIRST, it was observed that a two-factor solution (Factor I=rumination, Factor II=worry) was the most adequate one to explain the correlation matrix, accounting for approximately 44 % of the total variance. **Conclusions:** The FIRST-PT proved to be a useful and reliable tool to measure stress-induced sleep reactivity. However, these results should be replicated in other groups, particularly clinical samples, in order to verify the stability of its factorial dimension.



**Keywords:** sleep reactivity; insomnia; psychometric; FIRST; stress

## 1. Introduction

Insomnia is a common problem in community and clinical populations (AASM, 2014; APA, 2013). One of the most widely accepted models of insomnia and also influencing clinical practice is the 3-P model of Spielman (Spielman, Caruso, & Glovinsky, 1987; Perlis, Shaw, Cano, & Espie, 2011). In this model, it is proposed that in insomnia´s conceptualization one should consider the predispositions, the precipitants and the perpetuating factors. Although few have been identified, predisposing factors reflect the set of characteristics that make someone more prone to develop insomnia: genetics, critical incidents across the life-span, personality traits, among others (Riemann et al., 2010).

The Ford Insomnia Response to Stress Test (FIRST) is a self-report scale which assesses sleep disturbance in response to common stressful events and more broadly described periods of stress occurring during the day or evening. The FIRST consists of 9 items which are scored on a four point-scale: 1=Not likely, 2=somewhat likely, 3=moderately likely, 4=very likely. High scores are indicative of greater vulnerability to sleep disruption. Total FIRST scores range from 9 to 36 (Drake, Richardson, Roehrs, Scofield, & Roth, 2004). Individuals are asked how likely is it for him/her to have difficulty sleeping before an important meeting the next day, before having to speak in public, before going on vacation the next day or after a stressful experience during the day, after a stressful experience in the evening, after getting bad news during the day, after watching a frightening movie or TV show, after having a bad day at work, and after an argument.

Beyond the original version of the FIRST (Drake et al., 2004), to our knowledge, there are few studies focusing on the psychometric properties of the FIRST (Nakajima et al., 2014; Palagini et al., 2015).

According to Harvey, Gehrman and Espie (2014), studies incorporating the FIRST or other similar measures are recommended in future research exploring vulnerability to insomnia. Similarly, it is important to fully explore the psychometric properties of this scale. The internal consistency values pertaining to FIRST found in the literature have been good (Drake et al., 2004 - healthy individuals $\alpha = .83$; Drake et al., 2011 - community individual twins $\alpha = .81$; Nakajima et al., 2014 - insomnia and healthy controls $\alpha = .89$ and .87, respectively; Vargas et al., 2015 - community sample $\alpha = .86$; Yang et al., 2014 - college students $\alpha = .85$). More recently, Palagini et al. (2015) found that the Italian version of the FIRST achieved good Cronbach alphas for insomnia ($\alpha = .86$) and healthy controls´ samples ($\alpha = .79$).

Despite the limited literature regarding psychometric properties of the FIRST, various studies have used this instrument. Drake, Jefferson, Roehrs, Richardson and Roth (2004) presented preliminary data suggesting that the FIRST has predictive validity in determining the development of insomnia over a 13-month follow-up period. Drake, Jefferson, Roehrs and Roth (2006) observed that individuals with high FIRST scores (>18, median score of the FIRST of the participants of the study) were likely to show longer sleep onset latency on n-PSG (polysomnography) after ingestion of caffeine than those with low FIRST scores. Drake, Scofield and Roth (2008) demonstrated a familial aggregation of vulnerability to stress-related sleep disturbance in the absence of insomnia. Among twins, Drake, Friedman, Wright and Roth (2011) demonstrated that sleep reactivity to stress had both genetic as well as environmental components. The findings that FIRST scores and insomnia symptoms share genetic influences are consistent with the hypothesis that sleep reactivity may constitute a genetic vulnerability for insomnia. Yang, Chou and Hsiao (2011) used the FIRST with a sample encompassing poor and good sleepers and

found that dysfunctional attitudes regarding sleep and insomnia as measured by the Dysfunctional Beliefs About Sleep (DBAS-10) correlated significantly with stress-related sleep vulnerability. Fernandez-Mendoza et al. (2014) used the FIRST to study the heritability from parents to offspring regarding sleep reactivity and showed that parents presenting a past personal history of insomnia were more likely to show high FIRST scores and to have offspring with high stress-related insomnia. Yang, Hung, and Lee (2014) found that stress-related sleep vulnerability as measured by the FIRST was one of the most important predisposing factors for insomnia in a sample of college students (FIRST mean = 21.74). In the same vein, Jarrin, Chen, Ivers, and Morin (2014) observed that vulnerability to insomnia is associated with an increased risk of developing new-onset subsyndromal and persistent insomnia in good sleepers. Nakajima et al. (2014) found that insomnia patients scored higher in FIRST than a group of healthy controls. Another study used the FIRST to examine information processing during sleep in a non-insomniac sample with high vulnerability to stress-related sleep disturbances (Lin, Jen and Yang, 2014). Vargas, Friedman and Drake (2015), in a sample of community participants, observed that sleep reactivity was associated with greater depressive symptoms, and this link was partially mediated by insomnia.

Therefore, given its importance in insomnia research and lacking a Portuguese Language validation, the major aims of this study were to develop a European Portuguese version of the FIRST and to examine its psychometric properties in a sample of college students.

## 2. Methods

### Participants

For this study, we enrolled 713 Medical undergraduate students. We excluded all the participants who did not respond to all the FIRST questions ($n$ = 14). Thus, the final sample was comprised of 699 participants (mean age = 19.2; *SD* = 1.25; range: 17-24) of which 241 (34.5%) were males (mean age = 19.2; *SD* = 1.23) and 458 (65.5%) were females (mean age=19.3; *SD* = 1.25). A greater number of participants were female [$\chi^2_{(1)}$ = 67.36; $p$ < .001]. This was expected as the majority of college students are female. No differences concerning mean age were found between men and women [$t_{(696)}$ = -0.999; $p$ = .75]. One female participant did not report her age.

### Measures

For the current study, the following self-report measures were used:

#### *Ford Insomnia Response to Stress Test (FIRST)*

The FIRST was designed to assess sleep-related 'reactivity' i.e., the tendency to exhibit pronounced sleep disturbance in response to a sleep challenge (Drake, Pillai, Roth, 2014). "It is not intended to identify insomniacs per se, but rather to determine individuals who may be 'at risk' for developing insomnia in the future" (Drake, Jefferson, Roehrs, & Roth, 2006).

The FIRST was translated from English into Portuguese by a psychiatrist (MD / PhD) who has extensive experience with the assessment and treatment of patients with insomnia and on the translation of psychological assessment instruments (MHPA). It was then back-translated into English by a bilingual translator without previous knowledge of the test and

a total overlap with the original English version was found. The guidelines reported in Hambleton (2005) for this procedure were in general followed.

*Eysenck Personality Inventory (EPI)*

The short version of the EPI (EPI-12, Eysenck & Eysenck, 1964) was used to evaluate Neuroticism (NE). Each item is scored from 1=almost never to 4=almost always. The item 12 "I suffer from sleeplessness" was removed from NE scoring, as it might constitute a confounding variable. In this study, the Cronbach´s alpha for the Neuroticism dimension was .63.

*Self-reported insomnia*

Self-reported insomnia was assessed with item 12 (i.e., "I suffer from sleeplessness/insomnia") from the EPI-12.

*Pre-Sleep Arousal Scale (PSAS)*

The PSAS contains 16 items, each rated on a 5-point scale that describes symptoms of arousal at bedtime (Nicassio, Mendlowitz, Fussell, & Petras, 1985). Eight items evaluate cognitive arousal and eight items evaluates somatic arousal. Higher scores suggest higher pre-sleep arousal. In the current study the Cronbach´s alpha for cognitive arousal subscale was .81 and for somatic arousal was .79.

*Arousal Predisposition Scale (APS)*

The Arousal Predisposition Scale (APS) comprises 12 items intended to assess vulnerability to arousal. Each item is scored on a 4-point scale. Higher score denote higher propensity to arousal (Coren & Mah, 1993). In this study, the Cronbach´s alpha was .85.

*Sleep Quality Index (SQI)*

SQI is a composite measure constituted by items concerning sleep depth, subjective sleep quality, sleep latency and nocturnal awakenings which has been used in some studies of our research group (e.g., Gomes et al., 2015; Marques, Gomes, Ferreira, & Azevedo, 2016). The score varies from 3 to 21. Higher scores denote poorer sleep quality. In this study, the Cronbach´s alpha was .65.

*Repetitive thought (Rumination/overthinking and Worry)*

The general tendency to worry and overthinking/rumination was measured with a scale comprising four items: Two items assess the tendency to worry: ("I worry a lot", "The people around me consider that I worry a lot") and two items assess the tendency to overthinking/rumination ("I think a lot over things", "The people around me consider that I think a lot over things"). Each item is scored from 1=almost never to 4=almost always (Pereira et al., 2012). In the current study, the Cronbach alphas for rumination and worry scales were .69 and .80, respectively.

Procedures

This study was approved by the Ethics Committee and the Scientific Council of the Faculty of Medicine of the University of Coimbra. Professors were contacted in order to obtain authorization to administer the questionnaires to the students at the beginning/ending of a class session (out of the evaluation period). The aims of the study were explained to the students, it was emphasized that their cooperation was voluntary, and confidentiality was ensured. All participants accepted participation in the study.

Data Analysis

All the data were analyzed using IBM SPSS Statistics™ v.22 for Windows. To compute inferential statistics we calculated Pearson product-moment correlations to examine associations among variables and *t*-tests and ANOVAs to explore differences among groups. The effect sizes were calculated based on Cohen´s *d*. For factorial validity purposes, we computed Factor Analysis (Maximum Likelihood) with Promax rotation. A *p* value < .05 was considered significant.

## 3. Results

*Descriptive statistics*

FIRST total mean score was 21.6 (*SD* = 5.05). For males, the total mean score was 19.1 (*SD* = 4.36) and for females was 23.0 (*SD* = 4.86). The difference was statistically significant with a large effect size [$t_{(536.623)}$ = -10.827; $p < .001$; Cohen´s $d = 0.85$]. Normality of variables was assumed according to univariate skewness and kurtosis coefficients. All the values were within the +2/-2 interval (max. skewness = .142; max. kurtosis = -.379).

*Reliability*

The FIRST showed a satisfactory internal consistency index ($\alpha = .81$). The corrected item-total correlation ranged between .27 (item 9) and .63 (item 3). The Cronbach´s alpha if item deleted increased to $\alpha = .82$ approximately whether the item 9 was deleted (cf. Table 1); however, considering the small increment of the result and the total items of the scale, this difference was considered not important (Field, 2013). Additionally, one should

note that for some authors, the mean inter-item correlation is a more accurate test of reliability than Cronbach´s alpha when scales have less than ten items. They recommend to consider an optimum value between .2 - .4 (Briggs & Cheek, 1986). In our study, the inter-item correlations mean was .32.

INSERT TABLE 1

*Factor Analysis*

To evaluate the structure of the FIRST-PT we reproduced the statistical analyses Nakajima et al. (2014) used for the Japanese version of the FIRST and we performed a Factor Analysis (Maximum Likelihood) with Promax rotation. All the requirements to carry out the technique were fulfilled (Field, 2013): 1) The *R*-matrix displayed mostly correlation coefficients (*r*) above 0.3 and none of the items presented high correlations with other items ($r > .80$), excluding multicollinearity and singularity problems; 2) Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy = .84 (> .60), and a significant Bartlett's Test of Sphericity ($\chi^2 = 1886.590$; $p < .001$). Regarding factor extraction, we used the Kaiser´s eigenvalue criterion > 1 and the Cattell´s Scree Plot. Both methods suggested the extraction of two factors which accounted for 43.59% of total variance. The loading of the items are displayed in Table 2. Factor I comprised items 2, 3, 4, 6 and 7 and was labeled “rumination” ($\alpha = .83$); factor II was labeled “worry” and comprised the items 1 and 8 ($\alpha = .66$). The items 5 and 9 were not retained in this analysis. Additionally, we forced the extraction of one-single factor and we found that only 35.4% was explained. Once again, items 5 and 9 did not load significantly on either of the factors.

As a sensitivity analysis, we performed a Principal Component Analysis with a Varimax rotation. It resulted in a two-component solution explaining 53.73% of total variance. The organization of the items in both factors were almost equal to the one achieved with Maximum Likelihood + Promax rotation extraction method. The exception was that items 5 and 9 saturated in Factor II and thus would not be discarded from the analysis.

INSERT TABLE 2

*Association between FIRST and other psychological measures*

In order to contribute to convergent validity, we performed Pearson Product-Moment Coefficient Correlations between FIRST and other sleep and personality constructs (Table 3). The lowest correlation coefficient was with rumination/overthinking measure ($r$ = .25; $p$ < .001) and the highest correlation was with the PSAS cognitive arousal ($r$ = .48; $p$ < .001). For a full correlation matrix among all the variables see Table 3.

INSERT TABLE 3

*Contrasts between high and low FIRST-PT scores*

To examine the FIRST's ability to differentiate individuals prone to insomnia from the good sleepers, we did a median split on the FIRST scores in our sample (*mdn* = 22). The first half was considered the group less vulnerable to insomnia; the other half was considered the group comprising the more vulnerable individuals. This was the approach used in the original study of FIRST psychometric properties (Drake et al., 2004). The

results are shown in Table 4. Overall, it was observed that the group with high FIRST-PT scores had higher scores on all of the nine items. In order to prevent familywise error rate, Bonferroni corrections were performed. Thus, the *p*-level was set at 0.005 (0.05/9). All the comparisons were then statistically significant. Importantly, the majority of these differences were of large magnitude, according to Cohen´s *d* formula (Cohen, 1992).

The group with high FIRST-PT scores also exhibited higher scores on neuroticism [$t_{(651.802)} = -7.60$; $p < .001$; $d = 0.59$], rumination/overthinking [$t_{(663)} = -5.537$; $p < .001$; $d = 0.43$], general tendency to worry [$t_{(661)} = -7.600$; $p < .001$; $d = 0.67$], arousability predisposition [$t_{(675)} = -12.755$; $p < .001$; $d = 0.99$], sleep quality index [$t_{(648.685)} = -7.745$; $p < .001$; $d = 0.60$], insomnia [$t_{(611.899)} = -7.355$; $p < .001$; $d = 0.57$], cognitive arousal [$t_{(658.951)} = -11.696$; $p < .001$; $d = 0.88$], and somatic arousal [$t_{(578.757)} = -7.656$; $p < .001$; $d = 0.57$] than the group with low FIRST-PT scores.

INSERT TABLE 4

*Total mean scores of FIRST by "insomnia complaint" groups*

To evaluate FIRST scores as to "insomnia" status – based on the item 12 of the EPI (i.e., "I suffer from sleeplessness/insomnia"), we observed that the three subgroups created were statistically different from each other. This finding was evident considering the total sample and observed in males and females´ groups as well (cf. Table 5). Overall, the FIRST discriminated the "insomnia complaint" groups.

INSERT TABLE 5

## Discussion

The purpose of the current study was to evaluate the psychometric characteristics of the European Portuguese Version of the FIRST. As this measure is a recommended tool to use in research on predisposition to insomnia, we think that it is important to have this instrument available in Portuguese (Harvey et al., 2014). Using a large sample size of college students we observed that the FIRST-PT had satisfactory indicators of reliability and validity.

The Cronbach´s alpha ($\alpha$ = .81) was similar to other studies (cf. (Drake et al., 2004; Drake et al., 2011; Nakajima et al., 2014; Palagini et al., 2015; Vargas et al., 2015; Yang et al., 2014).

Regarding factorial structure, we observed that the items 5 (i.e., After watching a frightening movie or TV show) and 9 (i.e., Before going on vacation the next day) do not load in either of the extracted factors. This finding is similar to the one presented in the original study of Drake et al. (2004) and the Japanese validation study by Nakajima et al. (2014), where the item 9 was always the weaker item. This might be explained by the affective valence of this item which is positive (i.e., vacations). The explanation for the item 5 low loading remains somehow unclear but in the study by Nakajima et al. (2014) it is the second weakest item. Perhaps the low loading of this item is related to the specificities of our sample (young adults). The study of the FIRST in older individuals might show other results. Interestingly, our findings suggest a theoretical division of the scale – a rumination related factor and a factor associated with worry (Carney, Harris, Moss, & Edinger, 2010). Further, the two median-split groups present significant and large differences pertaining to various psychological measures related to insomnia such as neuroticism (Gurtman, McNicol, & McGillivray, 2014), rumination and worry (Carney et

al., 2010), arousability (Riemann et al., 2010), poor reported sleep quality (Harvey, Stinson, Whitaker, Moskovitz, & Virk, 2008), and pre-sleep cognitive and somatic arousal (Riemann et al., 2010).

The present study has some limitations that one should note: First, the sample comprised participants who are university students and thus might not be generalizable to other populations. However, in our study, the prevalence of self-reported insomnia is similar to prevalence estimates in community epidemiological studies (cf. review Ohayon et al., 2002). Second, a single item was used to define insomnia. Nevertheless, this procedure was used in a very similar way to other studies such as "the Johns Hopkins Precursors Study" (Chang et al., 1997) and more recently in a general population prospective study on risk factors for incident chronic insomnia by Singareddy et al. (2012). Third, in the current study sleep parameters were based only on subject reports and not polysomnography to correlate the data of the FIRST-PT. In this regard it worth mention a recent study (Singareddy et al, 2012) in which perceived poor sleep, but not polysomnographic variables (e.g., sleep duration, sleep latency, and wake time after sleep onset) was a strong predictor of incident chronic insomnia. Finally, the temporal stability of the test was not studied. However, in a different college student sample ($n$=149) the test-retest reliability coefficient over one month was high ($r$ = .7; $p$ < .001).

In the future, it is recommended that the psychometric properties of the FIRST-PT be studied with insomnia patients. Also, additional factor analytic studies are needed to confirm the structural factors of the instrument as two different solutions are possible. Another important future research strategy is to use the bifactorial structure reported in this study in genetic studies and compare/verify its agreement with the FIRST total score (i.e., as a unifactorial structure). Finally, it is important to assess whether some items of the

original scale might be dispensable for the scoring purposes in the European Portuguese population.

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**Conflict of Interest Statement**

The authors declare that there are no conflicts of interest.

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**Table 1.** Corrected item-total correlations and Cronbach´s alpha if item is excluded

| Items | Corrected item-total correlation | Cronbach´s alpha if item is excluded |
|---|---|---|
| 1. Before an important meeting the next day | .547 | .787 |
| 2. After a stressful experience during the day | .616 | .779 |
| 3. After a stressful experience in the evening | .636 | .776 |
| 4. After getting bad news during the day | .609 | .780 |
| 5. After watching a frightening movie or TV show | .292 | .819 |
| 6. After having a bad day at work | .608 | .781 |
| 7. After an argument | .571 | .785 |
| 8. Before having to speak in public | .452 | .801 |
| 9. Before going on vacation the next day | .273 | .819 |

**Table 2.** Factorial solution for the FIRST-PT

| Items | I | II |
|---|---|---|
| 2. After a stressful experience during the day | **.85** | |
| 3. After a stressful experience in the evening | **.85** | |
| 4. After getting bad news during the day | **.60** | |
| 6. After having a bad day at work | **.55** | |
| 7. After an argument | **.51** | |
| 1. Before an important meeting the next day | (.52) | **.88** |
| 8. Before having to speak in public | | **.46** |
| 5. After watching a frightening movie or TV show | - | - |
| 9. Before going on vacation the next day | - | - |
| Eigenvalue | 3.77 | 1.06 |
| Variance explained (%) | 36.33 | 7.26 |
| Total variance explained (%) | 43.59 | |

*Note.* Only component loadings ≥ .40 were considered for Component Matrix. Secondary loadings under parenthesis. Extraction Method: Maximum Likelihood; Rotation: Promax.

**Table 3.** Matrix correlation of FIRST-PT with psychological and sleep variables

| *r* | FIRST-PT | Neuroticism | Rumination / Overthinking | Tendency to worry | Arousability | Sleep Quality Index | Insomnia | Cognitive Arousal | Somatic Arousal |
|---|---|---|---|---|---|---|---|---|---|
| FIRST-PT | - | | | | | | | | |
| Neuroticism | .37** | - | | | | | | | |
| Rumination / Overthinking | .25** | .46** | - | | | | | | |
| Tendency to worry | .36** | .57** | .58** | - | | | | | |
| Arousability | .53** | .62** | .39** | .54** | - | | | | |
| Sleep Quality Index | .37** | .20** | .14** | .20** | .26** | - | | | |
| Insomnia | .35** | .35** | .22** | .30** | .29** | .51** | - | | |
| Cognitive Arousal | .48** | .39** | .34** | .30** | .40** | .46** | .48** | - | |
| Somatic Arousal | .33** | .26** | .20** | .26** | .38** | .31** | .34** | .50** | - |

* p<.05 ** p<.001

**Table 4.** Mean differences between low and high FIRST-PT groups concerning individual items and total score

| | [1] Low FIRST Group ($n$ = 347) | [2] High FIRST Group ($n$ = 352) | Test[a] | | Effect Size |
|---|---|---|---|---|---|
| | *M* (*SD*) | *M* (*SD*) | *t* | df | *d* |
| 1. Before an important meeting the next day | 2.28 (.77) | 3.34 (.75) | -18.124** | 697 | 1.39 |
| 2. After a stressful experience during the day | 1.93 (.67) | 2.93 (.74) | -18.72** | 691.736 | 1.52 |
| 3. After a stressful experience in the evening | 2.23 (.71) | 3.28 (.69) | -19.60** | 697 | 1.49 |
| 4. After getting bad news during the day | 2.43 (.73) | 3.41 (.64) | -18.90** | 684.716 | 1.42 |
| 5. After watching a frightening movie or TV show | 1.45 (.72) | 2.07 (.97) | -9.66** | 648.241 | 0.72 |
| 6. After having a bad day at work | 1.68 (.59) | 2.57 (.78) | -16.93** | 654.447 | 1.28 |
| 7. After an argument | 2.19 (.72) | 3.22 (.71) | -18.95** | 697 | 1.44 |
| 8. Before having to speak in public | 2.03 (.80) | 3.04 (.90) | -15.73** | 689.597 | 1.18 |
| 9. Before going on vacation the next day | 1.35 (.67) | 1.90 (.90) | -9.05** | 648.237 | 0.69 |
| FIRST total | 17.5 (2.71) | 25.7 (3.15) | -36.85** | 684.342 | 2.79 |

** $p < .001$

[a] Bonferroni correction was applied.

Note. For the items 2, 4, 5, 6, 8, 9 and FIRST total score the homogeneity of variances was not assumed.

**Table 5**. Total mean scores of FIRST by "insomnia complaint" groups

| | | **1** Almost never | **2** Few times | **3** Many times + Almost always | *F* | *p* | *Post-hoc* (LSD) |
|---|---|---|---|---|---|---|---|
| Total Sample[a] | N | 386 | 208 | 72 | | | |
| | (%) | (55.2) | (29.8) | **(10.3)** | | | |
| | M | 20.28 | 22.87 | 25.61 | 48.374 | < .001 | 3 > 2 > 1 |
| | (SD) | (4.69) | (4.74) | (4.81) | | | |
| Males[b] | N | 144 | 62 | 23 | | | |
| | (%) | (59.8) | (25.7) | (9.5) | | | |
| | M | 18.02 | 20.16 | 23.04 | 17.754 | < .001 | 3 > 2 > 1 |
| | (SD) | (4.08) | (3.73) | (5.01) | | | |
| Females[c] | N | 242 | 146 | 49 | | | |
| | (%) | (52.8) | (31.9) | (10.7) | | | |
| | M | 21.63 | 24.02 | 26.81 | 31.954 | < .001 | 3 > 2 > 1 |
| | (SD) | (4.52) | (4.66) | (4.25) | | | |

*Note.* In boldface is displayed the prevalence of self-reported insomnia.
[a] Contains 33 (4.7%) missing values.
[b] Contains 12 (5.0%) missing values.
[c] Contains 21 (4.6%) missing values.