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# Basic Psychological Needs as a Motivational Competence: Examining Validity and Measurement Invariance of Spanish BPNSF Scale

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**Abstract:** Motivation is an essential component in higher education. In this area, researchers have described three psychological needs that drive human behavior: Autonomy, competence, and relatedness. These three needs are central dimensions of Self-Determination Theory. Various measurement tools have been used to evaluate these dimensions. Despite the universality of these, the literature lacks validation of them in the Spanish university context. The present study aims to analyze the psychometric properties of the Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS) in this context. This scale was administered to a sample of 1075 Spanish university students. Confirmatory factor analysis yielded that the six-factor structure fitted the data. Results supported the reliability and validity of all the subscales. The obtained factor structure provided evidence in support of the comparability of the model between male and female students and different types of studies.

**Keywords:** basic psychological needs; BPNSFS scale; self-determination theory; validation; higher education; Spanish university students

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## 1. Introduction

Learning is associated with variables of diverse nature whose in-depth study is essential to optimize the quality of educational processes and academic performance. Various studies have found that academic performance is influenced by psychological variables, such as self-determined motivation [1], the satisfaction of basic psychological needs [2], or commitment [3].

For these purposes, the Self Determination Theory (SDT) developed by Deci and Ryan [4], which analyzes motivation and personal development, has been useful in explaining behaviors in various educational contexts. One of the fundamental concepts in SDT is that of basic psychological needs, defined as something innate, universal, and essential for health and well-being [5,6].

Specifically, basic psychological needs are a natural aspect of human beings that influence the intrinsic motivation of individuals, causing them to act in a certain way, instead of another, regardless of the group to which they belong, their gender or cultural context [2,7].

This theory differentiates the existence of three basic psychological needs (BPNs) (i.e., autonomy, competence, and relatedness) that every individual must satisfy to guarantee good psychological functioning [8]. The literature indicates that the satisfaction of the BPNs has been associated with positive consequences, such as greater autonomous motivation, greater self-control, or greater intention

to want to learn [9]. BPNs, in addition to being satisfied, can also be frustrated. Bartholomew et al. [10] defined NPB frustration as a negative state experienced by a person when he or she feels that his NPB is being actively restricted. It is important to note that the frustration of BPNs is not conceptually equivalent to their lack of satisfaction.

It is also important to differentiate between motivation and commitment. Motivation refers to a private and unobservable psychological process that serves as an antecedent to observable behavior such as commitment [11,12]. Therefore, it is important to investigate the factors that influence commitment to identify which teaching strategies can best favor it, in our case, to know the BPNs. However, to have good knowledge of BPNs, we need a good tool with which to be able to properly evaluate them. Good knowledge implies good evaluation. Therefore, in the present study, we propose the evaluation of the BPNs.

The specialized literature has explained motivation as sustainable competence and as an engine of the learning process [13]. Generally, it is assumed that motivation is an internal process that guides and leads students to carry out a series of activities proposed in the learning process, acting as a mediator in the acquisition of information, and that affects school performance [14,15]. Therefore, it seems appropriate to look into the intrinsic aspects that drive people to act, as well as their psychological needs, which are the basis of personality development, to achieve greater self-awareness and self-determination [16]. This is especially relevant for university students, as it can help them in choosing their professional careers.

To measure these psychological needs, Deci and Ryan [8] developed an instrument called the Basic Psychological Needs Scale (BPNS), both in general and in specific areas. For example, in the family environment [17–19], religious [20,21], sports [22–25], educational [26–28], and in the workplace [29–31], extending its adaptation and use in different countries and cultural contexts.

The original scale consisted of 21 items [32], seven items assessed autonomy, six assessed competence, and eight assessed relatedness. This subdivision has been questioned by many scholars who have advocated the use of an equal number of voices assessing each need [33].

The nature of the BPNS scales was also discussed [33–35]. Specifically, the need for frustration should not simply be considered the opposite of need for satisfaction, but a related construct that deserves separate investigation.

Various attempts have, therefore, been made to develop alternative scales that evaluate the satisfaction and frustration of the need separately and not simply in opposition to each other [33–35].

Among the various scales proposed, the one that has obtained wide consensus is the Basic Psychological Satisfaction and Frustration Scale (BPNSFS) developed by Chen et al. [34]. In the instrument proposed by Chen et al., each need consisted of three subscales (Autonomy, Competence and Relatedness Satisfaction and Autonomy, Competence, Relatedness Frustration) for a total of six subscales and 24 items.

Chen et al. [34] have validated the BPNSFS in four different cultures: China, Belgium, the United States, and Peru. The authors provided empirical evidence that the 24-element scale has a multidimensional structure and separately measures the three psychological needs (autonomy, competence, relationship) of satisfaction and frustration, resulting in a six-factor model. To conduct the analysis, a sample of 1051 college students with an average age of 20 years was used.

The outcomes obtained from the cross-validation showed an internal consistency for each dimension varying between 0.64 and 0.89. The six-factor model proposed by the authors had a good fit,  $SBS-\chi^2(231) = 441.99$ ,  $CFI = 0.95$ ,  $RMSEA = 0.04$  and  $SRMR = 0.04$ . The results showed the validity of the six-factor model, which led to a good adaptation of the model in the four cultures [34].

Subsequently, Cordeiro et al. [36] translated the BPNSFS into Portuguese, examining the validation of the instrument in a sample of 417 university students with an age mean of 20 years. The results obtained showed good internal consistency of the scale for, both, satisfaction and frustration (varied between 0.70 for autonomy frustration and 0.85 for competence satisfaction), and the confirmatory factor analysis showed

good model fit indices:  $\chi^2(237) = 519.128$ , CFI = 0.95, RMSEA = 0.05 and SRMR = 0.05, which supports the data from the original six-factor model.

Similar results were also found in the study by Del Valle et al. [37] and Liga et al. [38], in the Italian context.

Nevertheless, the literature review in this regard allows us to affirm that currently, there are no validation studies of this instrument for university students in the Spanish context. Some works related to this topic can be found in Longo et al. [39], who analyzed basic psychological needs using the “Need Satisfaction and Frustration Scale” (NSFS) developed by Longo et al. [35], González-Cutre et al. [40], who evaluated the need for satisfaction, with the General Basic Needs Satisfaction in General Scale (BNSG-S), Rodríguez-Meirinhos et al. [41] that provided evidence of validity for the Spanish version adapted for children of the Basic Psychological Need Satisfaction and Frustration Scale, Menéndez Santurio et al. [42] that evaluated the basic psychological needs in adolescents, high school students, Burgueño et al. [29] who validated the Basic Psychological Need Satisfaction in Active Commuting to and from School (BPNS-ACS) Scale, also in high school students. However, none of these studies have been conducted in the context of university higher education and, above all, none have specifically validated the Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS).

Given the importance of studying self-determination and psychological needs in university students, and taking into account the above, we have tried to fill this literature gap. Therefore, this study was carried out with the aim of analyzing and validating the psychometric properties of the Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS) developed by Chen et al. [34] in a sample of Spanish university students. In this sense, we also carried out a multi-group analysis to test the invariance of the instrument based on sex and type of studies in the sample.

## 2. Materials and Methods

### 2.1. Participants

The study sample comprised 1075 university students, of whom 527 (49%) were male and 548 (51%) female, aged between 17 and 31 years ( $M = 20.35$ ,  $SD = 1.878$ ) and from different fields of knowledge: Social sciences (446), health sciences (377), and humanities (252). The selection of degrees in each of these fields was made on the basis of completely random sampling, and the students voluntarily participated in the development of the research anonymously.

Once the factor model of the scale with the best fit was determined, we proceeded to test its measurement invariance by gender ( $n = 527$  males and  $n = 548$  females) and type of studies ( $n = 446$  social sciences,  $n = 377$  health sciences and  $n = 252$  humanities) through multi-group analysis.

### 2.2. Instrument

All participants completed the Spanish version of the BPNSFS scale. The form was translated into Spanish by two bilingual translators and then back-translated into English by a bilingual, native-English-speaking researcher, after which differences between the two English versions were discussed. Only minor differences in style between the back-translated and the original version were found. The Spanish version was distributed to a sample of 50 university students who reported no problems with the meaning and clarity of the items. The original form was retrieved from the Self Determination Theory website (<https://selfdeterminationtheory.org>).

The scale was made up of 24 items grouped into six factors, which account for a multidimensional structure of basic psychological needs, as described in Self Determination Theory (SDT), developed by Deci and Ryan [4].

Specifically, three of these scales analyze the satisfaction needs of the three basic psychological needs such as autonomy (four items AS1, AS2, AS3, AS4: For example, “I feel that my decisions reflect what I really want”), relatedness (four items RS1, RS2, RS3, RS4: For example, “I feel close and connected with other people who are important to me”), and competence (four items CS1, CS2, CS3, CS4: Example, “I feel I can successfully complete difficult tasks”). The other three remaining scales assess the level of frustration for each basic psychological needs; that is, autonomy (four items AF1, AF2, AF3, AF4: For example, “Most of the things I do feel like ‘I have to’”), relatedness (four items RF1, RF2, RF3, RF4: Example, “I have the impression that people I spend time with dislike me”), and competence (four items CF1, CF2, CF3, CF4: Example, “I have serious doubts about whether I can do things well”). The 24 items were evaluated through a five-point Likert-type scale, varying from 1 (completely false) to 5 (completely true).

### 2.3. Procedure

The participation of the students was voluntary and anonymous, which included handling a letter of informed consent, explaining the objectives of the study, determining the risks and benefits for the study participants, without limiting their freedom [30]. All participants gave their informed consent for inclusion before they participated in the study. Along with the BPNSFS scale, students were asked to indicate certain information for the construction of sociodemographic variables of our interest (for example: Age, gender, type of studies). The application was made collectively at the end of the first semester of the academic period 2019/2020. Students completed the questionnaire in approximately 20 min and received no credit for participating in the study. In this article, we provide the measures collected from the respondents. All respondents answered all questions. There were no missing data. The study was conducted in accordance with the Declaration of Helsinki. Ethical review and approval were not required for the study on human participants in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study. Data availability was according to the journal guidelines. However, the data are available upon request from interested researchers.

### 2.4. Statistical Analysis

Confirmatory factor analysis (CFA) was conducted with JASP 0.12.2 software using the SEM module (Rosseel’s R package lavaan) and the Diagonally Weighted Least Squares (DWLS) estimator. This method performs well across many conditions [31]. Moreover, in this study, the data were collected using Likert scales and the assumption of normality was not satisfied. Thus, the data were ordered categorical. The DWLS estimator based on the polychoric correlation matrix avoids biased parameter estimates that could appear with the maximum likelihood estimations.

The DWLS estimator is considered a more reliable option with ordered categorical variables [43,44]. In this study, an attempt was made to test how the data fit the model and to check whether the proposed model fits the data [45] to support the validity of the proposed model of six factors that measure satisfaction and frustration of the three basic psychological needs of autonomy, competence, and relationship made by Chen et al. [34].

The most common fit indices were used to fit the model. Goodness to fit indices were used when the ratio between the chi-squared value and the degree of freedom was lower than 3,  $\chi^2/\text{degrees of freedom}$  ( $\chi^2/\text{df}$ ), the comparative fit index (CFI), Tucker–Lewis index (TLI) and Goodness of fit index (GFI) (acceptable fit:  $\geq 0.95$ ), the root mean square error of approximation (RMSEA) was also included as a goodness of fit index and it must be lower than 0.05 or assumes a maximum value of 0.08 [46].

The Kaiser–Meyer–Olkin (KMO) adequacy of sample measure and the Bartlett’s test of sphericity were calculated. The Cronbach’s alpha coefficient and Mc Donald’s omega were used to analyze the reliability of the scale.

Finally, to verify that the factor structure of the Spanish version measured was invariant by gender and type of studies, a multiple-group confirmatory factor analysis (MGCFA) was performed.

In MGCFA, nested models are organized in a hierarchical ordering with increasing degrees of freedom, which entails adding parameter constraints one at a time. These increasingly restrictive models are tested in terms of their fit of the data to the model [47]. Because each new model is nested in the previous model, measurement invariance models become increasingly more restrictive. MGCFA following this approach is widely accepted to be the most powerful approach for testing measurement invariance [48]. Hence, the four measurement invariance (MI) steps considered are: Configural, equivalence of model form; weak *metric*, equivalence of factor loadings; strong metric, equivalence of item intercepts or thresholds; and strict metric, equivalence of items residuals or unique variances [49]. Specifically, the latent intercepts were fixed to 0 in all the steps described above. Classically, the measurement invariance was assessed using a single criterion, i.e., the variation of  $\chi^2$  for nested models [50,51]. However, some researchers have moved from a focus on absolute adaptation in terms of  $\chi^2$  to a focus on alternative adaptation indices because  $\chi^2$  is excessively sensitive to small minor deviations from a “perfect” model in large samples [52,53]. In this study according to Chen [54] we used a criterion of a  $-0.01$  change in CFI, paired with changes in RMSEA of 0.015 and SRMR of 0.030 (for metric invariance) or 0.010 (for scalar or residual invariance).

### 3. Results

#### 3.1. Descriptive Analysis

As shown in Table 1, the means and standard deviation of the items that make up the scale (BPNSFS) were calculated. As it was logical to expect and in line with previous studies [34–38], high scores in items related to the satisfaction domains related to low scores on frustration domains, and vice versa.

The KMO index showed a value of 0.866 and the Bartlett’s sphericity test was statistically significant ( $\chi^2 = 5277.660$ ;  $p < 0.001$ ). These values indicate that performing a factor analysis is possible.

The internal consistency of the scale was evaluated with two indices: Cronbach’s alpha and Mc Donald’s omega [55]. The results show an alpha 0.843 and Mc Donald’s omega of 0.846 for the psychological needs satisfaction dimension and an alpha 0.813 and omega 0.815 for the needs frustration dimension. The values obtained for the case of the six subscales or factors were: For factor I (Autonomy Satisfaction) Cronbach’s alpha was 0.787 and Mc Donald’s omega was 0.794; factor II (Autonomy Frustration) showed a Cronbach’s alpha of 0.727 and Mc Donald’s omega of 0.728, factor III (Relatedness Satisfaction) showed a Cronbach’s alpha of 0.787 and Mc Donald’s omega of 0.805. For factor IV (Relatedness Frustration) Cronbach’s alpha was 0.761 and Mc Donald’s omega was 0.778; for factor V (Competence Satisfaction) Cronbach’s alpha was 0.843 and Mc Donald’s omega was 0.849, and, lastly, factor VI (Competence Frustration) showed a Cronbach’s alpha of 0.782 and a Mc Donald’s omega of 0.785.

Table 2 shows correlations between the six first order latent factors. Specifically, the latent factor “Autonomy Satisfaction” is formed by the items AS1, AS2, AS3, AS4, “Relatedness Satisfaction” is formed by the items: RS1, RS2, RS3, RS4, “Competence Satisfaction” is formed by the items CS1, CS2, CS3, CS4, “Autonomy Frustration” is formed by the items AF1, AF2, AF3, AF4, “Relatedness Frustration” is formed by the items: RF1, RF2, RF3, RF4, “Competence Frustration” is formed by the items CF1, CF2, CF3, CF4 (see Table 1).

**Table 1.** Mean and standard deviations of the Basic Psychological Need Satisfaction and Frustration Scale (BPNSF) Scale.

Items	Mean	SD
AS1. I feel a sense of choice and freedom in the things I undertake	4.10	0.853
AS2. I feel that my decisions reflect what I really want	3.81	0.866
AS3. I feel my choices express who I really am	3.87	0.887
AS4. I feel I have been doing what really interests me	3.80	0.975
Autonomy Satisfaction	3.89	0.700
AF1. Most of the things I do feel like 'I have to'	2.98	1.04
AF2. I feel forced to do many things I wouldn't choose to do	2.78	1.15
AF3. I feel pressured to do too many things	2.53	1.15
AF4. My daily activities feel like a chain of obligations	2.44	1.08
Autonomy Frustration	2.68	0.821
RS1. I feel that the people I care about also care about me	4.20	0.887
RS2. I feel connected with people who care for me, and for whom I care	4.38	0.805
RS3. I feel close and connected with other people who are important to me	4.21	0.848
RS4. I experience a warm feeling with the people I spend time with	4.09	0.945
Relatedness Satisfaction	4.22	0.681
RF1. I feel excluded from the group I want to belong to	1.65	0.972
RF2. I feel that people who are important to me are cold and distant towards me	1.50	0.818
RF3. I have the impression that people I spend time with dislike me	1.52	0.808
RF4. I feel the relationships I have are just superficial	1.72	0.987
Relatedness Frustration	1.59	0.686
CS1. I feel confident that I can do things well	3.79	0.977
CS2. I feel capable at what I do	3.87	0.890
CS3. I feel competent to achieve my goals	3.92	0.893
CS4. I feel I can successfully complete difficult tasks	3.73	0.916
Competence Satisfaction	3.82	0.758
CF1. I have serious doubts about whether I can do things well	2.38	1.08
CF2. I feel disappointed with many of my performance	2.81	1.10
CF3. I feel insecure about my abilities	2.49	1.08
CF4. I feel like a failure because of the mistakes I make	2.22	1.13
Competence Frustration	2.47	0.858

SD = Standard Deviation.

**Table 2.** Correlation between satisfaction and frustration in basic psychological needs.

Factors	1	2	3	4	5
Need for Satisfaction					
1 Autonomy Satisfaction	-				
2 Relatedness Satisfaction	0.374 **	-			
3 Competence Satisfaction	0.429 **	0.298 **	-		
Need for Frustration					
4 Autonomy Frustration	-0.320 **	-0.150 **	-0.228 **	-	
5 Relatedness Frustration	-0.281 **	-0.534 **	-0.231 **	0.306 **	-
6 Competence Frustration	-0.384 **	-0.234 **	-0.528 **	0.400 **	0.341 **

Note. \*\*  $p < 0.001$ .

As hypothesized, there is a positive and significant correlation between the factors that measure the satisfaction of the psychological needs of autonomy, relatedness, and competence, and a similar situation is observed for the correlation between the factors that measure the frustration of these three psychological needs. Furthermore, as logically expected, there is a negative and significant correlation between the factors that measure satisfaction and frustration, respectively.

### 3.2. Confirmatory Factor Analysis

A total of 1075 university students participated in a confirmatory factorial analysis (CFA), to evaluate the fit of the model. The six-factor solution was then compared to an alternative measurement model, a two-factor model that measures the need satisfaction, consisting of the Autonomy Satisfaction (four items: AS1, AS2, AS3, AS4), Relatedness Satisfaction (four items: RS1, RS2, RS3, RS4) and Competence Satisfaction (four items: CS1, CS2, CS3, CS4); and the need frustration, formed by the subscales Autonomy Frustration (four items: AF1, AF2, AF3, AF4), Relatedness Frustration (four items: RF1, RF2, RF3, RF4) and Competence Frustration (four items: CF1, CF2, CF3, CF4) (Table 3).

**Table 3.** Fit indices for the two models (Sample n = 1.075).

Models	$\chi^2$	df	<i>p</i>	CFI	GFI	TLI	RMSEA
Two-factor model	2270.296	251	<0.001	0.869	0.994	0.856	0.087
Six-factor model	423.016	237	<0.001	0.988	0.999	0.986	0.027

Note. Best fit model is in bold.

As shown in Table 3, the two-factor model yielded a marginal fit to the data  $\chi^2 (251) = 2270.296$   $p < 0.001$ , CFI = 0.869, GFI = 0.994, TLI = 0.856 and RMSEA = 0.087, compared to the six-factor model, supporting this last solution as the preferred for interpreting the theoretical structure of the BPNSFS data. The initial confirmatory factor analysis of the scale of satisfaction and frustration of the basic psychological needs showed an adequate fit of the data to the model. Although the chi-square was significant ( $\chi^2 (237) = 423.016$   $p < 0.001$ ), due to the large sample size [56], while the other fit measurements confirmed excellent compatibility, with a CFI = 0.988, GFI = 0.999, TLI = 0.986, and RMSEA = 0.027. The results support the validity of the proposed six-factor model to the data used. Table 4 shows the results of the CFA with consideration of the correlations among the errors. Item factorial loadings were acceptable, additionally, the overall fit indexes were satisfactory.

**Table 4.** Estimated factor loadings.

	AtS	AtF	RIS	RIF	CmS	CmF
AS1	0.691					
AS2	0.768					
AS3	0.669					
AS4	0.658					
AF1		0.573				
AF2		0.652				
AF3		0.648				
AF4		0.649				
RS1			0.741			
RS2			0.806			
RS3			0.757			
RS4			0.500			
RF1				0.677		
RF2				0.730		
RF3				0.755		
RF4				0.532		
CS1					0.772	
CS2					0.872	
CS3					0.832	
CS4					0.559	
CF1						0.723
CF2						0.596
CF3						0.711
CF4						0.725

Note. AtS = Autonomy Satisfaction; AtF = Autonomy Frustration; RIS = Relatedness Satisfaction; RIF = Relatedness Frustration; CmS = Competence Satisfaction; CmF = Competence Frustration.

Table 5 shows the values of the inter-factor correlations.

**Table 5.** Inter-factor correlations.

	AtS	AtF	RIS	RIF	CmS	CmF
AtS	1.000	−0.421	0.470	−0.361	0.528	−0.483
AtF		1.000	−0.203	0.403	−0.302	0.524
RIS			1.000	−0.652	0.354	−0.301
RIF				1.000	−0.276	0.435
CmS					1.000	−0.654
CmF						1.000

Note. AtS = Autonomy Satisfaction; AtF = Autonomy Frustration; RIS = Relatedness Satisfaction; RIF = Relatedness Frustration; CmS = Competence Satisfaction; CmF = Competence Frustration.

### 3.3. Multiple-Group Confirmatory Factor Analysis

Once the factorial model of the scale with the best fit was found (6 factors and 24 items), a multiple-group approach was used to test measurement invariance across gender and different type of study.

Model 1 verified whether the proposed structure would have been the same among the groups. Since the excellent adaptation of the six-factor structure had been established independently for each group previously, configuration invariance could be expected to be supported. The adaptation indices confirmed this. As can be seen in Table 6, Model 1 provided a good fit to the data, both for sex and for the different types of studies, indicating that the factorial structure of the construct is the same between the groups. Since configural invariance was supported, the factor model coefficients were therefore constrained to be equal. Model 2 had good fit indices (RMSEA and SRMR < 0.06, CFI > 0.95). The chi-square test was significant, indicating that the imposition of the constraints (loadings with equal factors between the groups) resulted in statistically significant reductions in the adaptation of Model 2 with respect to Model 1. However, considering the other comparative fit indexes ( $\Delta$ CFI,  $\Delta$ SRMR,  $\Delta$ RMSEA), the overall results indicate that the feasibility of the factor loading constraint is the same between the groups (sex and type of study). The scalar invariance model (Model 3) and the strict measurement invariance model (Model 4) also provide a good fit for the data. In fact, both for sex and for different types of studies, the general goodness of fit indexes and the tests for fit differences between consecutive models (Model 3 versus Model 2 and Model 4 versus Model 3) support all levels of measurement invariance.

**Table 6.** Fit statistics for invariance test.

Models	$\chi^2$ (df)	$\chi^2/df$	<i>p</i>	$\Delta\chi^2$	CFI ( $\Delta$ CFI)	SRMR ( $\Delta$ SRMR)	RMSEA (90% C.I.) ( $\Delta$ RMSEA)
Sex							
Model 1: Configural Invariance	550.681 (474)	1.16	0.008	-	0.995	0.048	0.017 (0.009–0.023)
Model 2: Metric Invariance	579.953 (492)	1.17	0.004 *	29.27 **	0.994 (0.001)	0.049 (0.001)	0.018 (0.011–0.024) (0.001)
Model 3: Scalar Invariance	607.747 (510)	1.19	0.002	27.79 **	0.994 (0.000)	0.048 (0.001)	0.019 (0.012–0.024) (0.001)
Model 4: Strict Invariance	626.566 (534)	1.17	0.003	18.82 **	0.994 (0.000)	0.050 (0.002)	0.018 (0.011–0.024) (0.001)
Type of Studies							
Model 1: Configural Invariance	666.077 (711)	0.936	0.885		1.000	0.051	0.000 (0.000–0.008)
Model 2: Metric Invariance	777.986 (747)	1.04	0.210 **	111.91 **	0.998 (0.002)	0.055 (0.004)	0.011 (0.000–0.019) (0.011)
Model 3: Scalar Invariance	795.720 (783)	1.01	0.368	17.73 **	0.999 (0.001)	0.055 (0.000)	0.007 (0.000–0.017) (0.004)
Model 4: Strict Invariance	836.275 (831)	1.00	0.442	40.56 **	1.000 (0.001)	0.057 (0.002)	0.004 (0.000–0.016) (0.003)

Comparison: Model 1 vs. Model 2; Model 2 vs. Model 3; Model 3 vs. Model 4. \*\* *p* < 0.001; \* *p* < 0.005.

#### 4. Discussion

The main objective of this study was to analyze the psychometric properties of the BPNSFS scale in a large sample of university students in order to validate its use in the Spanish context. The results confirm the validity of this version. The results obtained were consistent with those provided in previous studies using different languages and cultures [34–38], which also reflected a six-factor solution, thus confirming our data; that is, the satisfaction and frustration of the three needs are best represented as different constructs.

Furthermore, this fact finds consensus, from a theoretical point of view, in the theory of basic psychological needs, according to which the need for frustration should not be considered simply as a lack of satisfaction, but as a different and separate construct [57]. Supporting this distinction is important, especially in the academic field, because it allows us to analyze the positive component in greater depth [35,58].

Several conclusions can be drawn from the present study. First, the analysis carried out has shown that the Spanish version of the BPNSFS has an adequate internal consistency, a Cronbach's alpha and McDonald's omega of 0.85 and 0.81 for the dimensions of the need satisfaction and frustration, respectively. For the six factors, the alpha and omega values ranged from 0.72 to 0.84. These results seem very similar to those indicated in the cross-validation process of the original scale, in particular, if we take into account the internal consistency found in Peruvian university students (alpha values range between 0.64 and 0.88) [34].

The results of the study show the existence of a negative and significant correlation between the factors that measure satisfaction and frustration of psychological needs, and a positive and significant correlation between the three components of the need for satisfaction, on the one hand, and the three components of frustration, on the other, confirming, once again, the six-factor structure proposed by Chen et al. [34].

Furthermore, as it was possible to demonstrate from the confirmatory factor analysis, the six-factor model presented a better fit of the model compared to the two-factor model. These values relate to previous studies carried out in different cultural contexts (for example, in Italy see Liga et al. [38]).

In this sense, and in the context of STD, the importance of motivation and its multidimensional nature are recognized with different levels located on a continuum, from the highest level of self-determination, with high intrinsic motivation, to the lowest level, in which there is a lack of motivation [27]. A construct of extreme importance since, as has been widely discussed, it plays a fundamental role in the psychological health of students, their academic performance, the decision to continue university studies, and in their career choices.

Furthermore, in the educational field, many researchers have provided sufficient evidence of the influence exerted by various psychological, social, institutional, and cultural variables on basic psychological needs [59,60]. As such, it is important to have a scale with adequate psychometric properties that measures these needs, to know the connection with these variables, and with the objective to identify different areas in which to intervene to improve the well-being of students and their desire to continue in the higher education system. The validation of the scale in the Spanish context that was carried out in this study further expands its possibilities of use.

However, we also have to consider some limitations. The first refers to the type of sample used. Although students of different degrees participated, they all belong to the same Autonomous Community, which makes it a fairly homogeneous sample. Future research to support the validity and reliability of the scale should expand the sample by incorporating other Autonomous Communities to reduce possible errors or biases. Another limitation is its cross-sectional nature and the lack of support that show convergent and/or divergent validity in other scales. Future research should explore the proposed factor structure and the relationship that could exist with other scales to analyze the influence of these factors on the well-being of students and their motivations.

## 5. Conclusions

In conclusion, the results of our study confirm the evidence that BPNSFS is a valid scale to assess basic psychological needs in the Spanish context, becoming a useful tool in the context of higher education, as it could help students in their professional career choices. Furthermore, presently, as the literature has widely demonstrated, research on basic psychological needs is an emerging but constantly growing field of study that has received attention from researchers around the world, this explains the assumed importance and the repercussions that psychological needs may have in parents, teachers, educators, and operators who play important roles in social relationships.

Going deeper into this field of study means beginning to shed light on all those variables that contribute, when satisfied, to the healthy growth of the individual or, conversely, to its discomfort. This means effectively contributing to the development of individuals who are active and competent actors in their lives.

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