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A Spanish adaptation of the implicit positive and negative affect test (IPANAT)

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Abstract

Background: Self-report measures of affective states (i.e., explicit measure) underlie a variety of cognitive biasing factors. Therefore, measures for the indirect assessment of affect (i.e., implicit) have previously been developed, such as the Implicit Positive and Negative Affect Test. The IPANAT asks participants to make judgments about the degree to which artificial non-sense words sound like affective states, and has demonstrated good reliability and validity. **Methods:** We created a Spanish version of this test (IPANAT-SPAIN). After adapting artificial words to Spanish language, based on preliminary studies, the IPANAT-SPAIN was administered to a representative sample of N = 468 adults from Spain (225 men). Competing models of its latent structure were evaluated using confirmatory factor analysis. To assess convergent validity, we correlated the IPANAT-SPAIN with explicit measures of affect. **Results:** The best-fitting model consisted of two factors corresponding to positive implicit affect (PA) and negative implicit affect (NA). Reliability of the IPANAT-SPAIN was a = .94 for PA, and a = .88 for NA. The pattern of relationships between the IPANAT-SPAIN and explicit affect measures were consistent with previous findings. **Conclusions:** The results indicate that the Spanish adaptation of the IPANAT has satisfactory psychometric properties.

Keywords: Implicit affect, IPANAT, psychometric properties.

Resumen

Adaptación para población española de la escala de afecto positivo y negativo implícitos (IPANAT). **Antecedentes:** el uso de cuestionarios autoinformados para medir estado afectivo (i.e., medición explícita) puede conllevar sesgos cognitivos. Por ello, se han desarrollado medidas indirectas (i.e., implícitas), como el Test de Afecto Implícito Positivo y Negativo. En el IPANAT las personas deben realizar valoraciones acerca del grado en que creen que palabras artificiales expresan distintos estados afectivos, y ha demostrado buena fiabilidad y validez. **Método:** para crear la versión española se realizaron estudios preliminares para adaptar las palabras artificiales. La nueva versión adaptada se administró a una muestra representativa de personas adultas residentes en España (N = 468, 225 hombres). Se realizaron análisis factoriales confirmatorios para corroborar la estructura del instrumento. Asimismo, se correlacionaron las medidas de afecto implícitas con medidas explícitas, para estudiar su validez de convergencia. **Resultados:** el mejor modelo corresponde a dos factores (PA:afecto implícito positivo y NA:afecto implícito negativo), con coeficientes de fiabilidad de a = .94 y a = .88, respectivamente. Las relaciones entre las medidas del IPANAT-España y las medidas de afecto explícito fueron consistentes con hallazgos previos. **Conclusiones:** los resultados indican que el IPANAT-España tiene propiedades psicométricas adecuadas.

Palabras clave: afecto implícito, IPANAT, propiedades psicométricas.

Self-report or "explicit" measures of psychological constructs can be affected by several biasing factors such as repression (Derakshan, Eysenck, & Myers, 2007), social desirability (Morey & Lanier, 1998), limitations or impairments in introspection, or self-deception (Paulhus & Vazire, 2007). This challenges the validity of self-report measures, self-reported affect included (see Meier, Robinson, & Clore, 2004; Quirin, Kazen, & Kuhl, 2009). Therefore, the usage of indirect measures of affect, which circumvent asking individuals about their affective states and traits, can be considered helpful. In order to fill this gap, Quirin, Kazén, and Kuhl (2009) developed the Implicit Positive and Negative Affect Test (IPANAT), which asks about the degree to which artificial words sound like positive and negative affect words. The present work describes the adaptation and validation of a Spanish version of the IPANAT.

Implicit affect can be conceived as the automatic activation of semantic representation of affective (including emotional and mood-related) states and processes (Quirin et al., 2009). Contemporary appraisal theories define affects as processes (Moors, 2013), in which affects are adaptive responses that reflect appraisals of characteristics of the environment that are important for the survival of the organism. According to Lieberman (2019), these appraisals are composed by a pre-reflective (i.e., automatic) and a reflective (i.e., rational) process. In this so-called dual-systems approach, where an analytic ("explicit") system, and an impulsive ("implicit") system is differentiated (e.g., Kahneman, 2011; Strack & Deutsch, 2004). Therefore, implicit measures of affect are of great interest to properly understand how affect is elicited or constructed, and how affective states may relate to

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the development of psychological and psychosomatic disease (Weil, Hernández, Suslow, & Quirin, 2019), for example, when individuals struggle with experiencing and regulating affect, or during stressing situations.

The IPANAT was developed for the assessment of implicit affect, conceptualized as the automatic and pre-reflective component of the affective experience. The test has been widely used to measure implicit affect and is assumed to operate according to the principle of affect infusion (Forgas, 1995), which means that affect exerts an influence on judgments of objects (including artificial words) that show no relation to the affective experience at hand. According to the authors, the IPANAT measures the automatic activation of cognitive representations of affective experiences.

There is empirical evidence showing that the IPANAT is an important addition to explicit affect measures. For example, it was found that implicit PA predicts total circadian cortisol over and above a corresponding explicit affect measure (Quirin, Kazén, Rohrmann, & Kuhl, 2009). A different study found that implicit NA showed a negative association with attachment anxiety and with affective recovery in response to an upsetting memory recall. This effect was incremental to effects of the corresponding explicit affect measures (Selcuk, Zayas, Günaydin, Hazan, & Kross, 2012). In addition, implicit PA was associated with faster physiological stress recovery, while explicit NA had no effect on recovery (Brosschot et al., 2014). Also, it was found that IPANAT measures change after emotion induction independently of explicit measures, and that implicit PA and implicit NA was related to cardiovascular activity during and after stressful tasks (when none of the explicit measures were related to cardiovascular activity) (van der Ploeg, Brosschot, & Verkuil, 2014). In summary, implicit affect as assessed via the IPANAT appears to strongly contribute to explain physiological and behavioral reactions, and thus finally to a more thorough understanding of affective phenomena. Developing different language versions makes this instrument broadly accessible and enables a comparison of affective phenomena between languages and cultures.

During the test, participants are instructed to provide ratings on the degree to which six artificial words (SAFME, VIKES, TUNBA, TALEP, BELNI, and SUKOV) sound like six mood adjectives (happy, cheerful, energetic, helpless, tense, and inhibited). The resulting 36 items are scored on a 4-point Likert scale ranging from *doesn't fit at all* to *fits very well*.

Scores are computed in two steps. First, scores for single mood adjectives are computed by averaging across ratings of the combination of the mood word at hand with the six artificial words. Then, scores for positive affect (PA) are calculated by averaging scores from judgments concerning the mood adjectives happy, cheerful, and energetic, whereas scores for negative affect (NA) are derived by averaging scores from judgments concerning helpless, tense, and inhibited. The IPANAT has been validated for several countries such as Germany (Quirin et al., 2009), USA, China, Italy, the Netherlands, Russia (Quirin et al., 2018), Japan (Shimoda, Okubo, Kobayashi, Sato, & Kitamura, 2014), and Macedonia (Sulejmanov & Spasovski, 2017), and is currently the instrument mostly used to assess implicit affect.

Here, we explore (1) the neutrality of the IPANAT's artificial words in the Spanish population, and (2) the construct validity of the IPANAT-SPAIN. For this end, (2a) a model on the latent structure of the test based on Quirin et al. (2009) was investigated for the IPANAT-SPAIN using Confirmatory Factor Analysis (CFA), and (2b) correlational analysis between explicit measures of affect and the IPANAT-SPAIN were conducted.

Method

Two phases were involved in the adaptation of the IPANAT's artificial words to the Spanish population. First, participants were asked to evaluate the neutrality of the words used in the original study (conducted in German population). Second, different participants were asked to judge the neutrality of a new set of artificial words, in order to determine the more neutral words for Spanish population. In addition, a third sample was collected to explore construct validity of Spanish version of the IPANAT.

Participants

Phase A. For the first phase of the adaptation of the IPANAT's neutral words to the Spanish population, a group of 20 subjects (12 males, M_{age} = 31.95, SD = 10.78) were recruited online (using social networks, i.e., Facebook) to participate in a linguistics study, participants were required to be above 18 years and residents of Spain. Participants received no compensation for their participation in the study. All participants reported being born in Spain. Sample size was similar to the one of previous studies (see Quirin et al., 2009; Sulejmanov & Spasovski, 2017)

Phase B. For the second phase of the adaptation of the IPANAT's neutral words to the Spanish population, a new group of 12 subjects (5 males, M_{age} = 24.58, SD = 7.99) were recruited online (as described on phase A) to participate in the evaluation of ten new artificial words (created during the original protocol for the IPANAT, but not selected for the original test in German). Participants received no compensation for their participation in the study. All participants reported being born in a Spanish province.

Phase C. Construct validity of the Spanish version of the IPANAT was assessed on a third phase of the present research. The sample included 468 (225 males) participants. Participants' age after classification into age bands of 18-24, 25-34, 35-44, 45-54, and 55-65 was distributed as follows: 14%, 19%, 28%, 22% and 17%. The corresponding percentage for each age band in the general adult population of Spain was 11, 18, 25, 24 and 22% respectively (Instituto Nacional de Estadística, 2018). Participants were recruited online by a Spanish market research firm (CERES), they received 12 euros as a compensation for their participation. Participants were required to be above 18 years and residents of Spain. More than 92% (i.e., 432) of participants reported to be born in Spain. Regarding the education level, the majority of participants reported to have a university degree or above (53%). Otherwise, 38% reported a high school degree, 8% reported a secondary school degree, 1% reported not to have studied.

Instruments and Procedure

Phase A. The original artificial words from the IPANAT (i.e., SAFME, VIKES, TUNBA, TALEP, BELNI and SUKOV; see Quirin, et al., 2009) were presented to the participants, they were asked to evaluate the words (by a dichotomy question) with respect to the following criteria: pleasantness, familiarity, and meaning (i.e., Do you find the word SAFME pleasant?). In addition, the criteria of associative value was evaluated by asking participants to provide a list of words associated to the stimuli.

Phase B. Once again, Spanish participants were asked to make evaluations of the words with respect of the following criteria: familiarity, pleasantness, and meaning. The familiarity criteria was evaluated by dichotomous questions, the pleasantness criteria was evaluated by a scale ranging from -4 (very unpleasant) to 4 (very pleasant), while the meaning criteria was evaluated by the number of times that participants describe the possible meaning of each stimuli words.

Phase C. *IPANAT-SPAIN*. The Spanish version of the Implicit Positive and Negative Affect Test was used. All testing took place online via Qualtrics (Qualtrics Provo, 2013). In total, the experiment took approximately 10 minutes to complete. A computerized version of the IPANAT-SPAIN presented one item each per screen, after the presentation of the instruction (i.e., cover story) of the IPANAT. Then, participants were asked to provide judgments of artificial words. For each of the artificial words (*SAFME, TALEP, BELNI, SUKOV, GOLIP, and KERUS*) participants indicated on a four-point answer scale (1 = *doesn't fit at all*, 2 = *fits somewhat*, 3 = *fits quite well*, and 4 = *fits very well*) to what extend does the sound of the artificial word convey each of the following moods: happy, helpless, energetic, tense, cheerful, and inhibited (in spanish: feliz, desamparado, activo, tenso, alegre, inhibido). The artificial words were randomly presented (to avoid order effects), each adjective within the same artificial word was also randomized, and the six items belonging to each artificial word were presented subsequently. Global scores for implicit PA and implicit NA were computed by averaging adjective scores derived from positively valenced and negatively valenced adjectives (following Quirin et al., 2009).

Explicit affect scales. After answering the IPANAT-SPAIN participants were presented with a series of affect questionnaires used to examine construct validity of the IPANAT. Explicit PA and NA were assessed with two instruments. First, we used the broadly applied Positive and Negative Affect Schedule (PANAS, Watson, Clark, & Tellegen, 1988; Spanish version: López, Hervas, & Vázquez, 2015). Second, explicit affect was also assessed by asking participants for explicit mood judgments of the same mood adjectives included in the IPANAT (i.e., asking individuals to report the extent to which they feel happy, cheerful, energetic, helpless, tense, and inhibited at the moment) on a rating scale from 0 (not at all) to 10 (absolutely) (following Quirin et al., 2009). Analogously to the original IPANAT, we composed a PA and an NA scale computing average scores for happy, cheerful, and energetic, versus helpless, tense, and inhibited, respectively.

Data analysis

Phase A. Overall scores for each of the stimuli words (on the first three criteria mentioned above) were calculated by the number of times the words were judged affirmatively to each of the dichotomous questions. Results showed that SAFME was judged to be familiar, pleasant and with a meaning 25% of the times, VIKES 40%, TUNBA 47.5%, TALEP 25%, BELNI 31% and SUKOV 28.75%. In addition, the associative value criteria was score by calculating the number of words listed by participants. Results showed that particularly two of the original artificial words of the IPANAT evocated more associative words among Spanish population. Specifically, the word TUNBA was frequently associated with the Spanish word for grave/tomb (i.e., TUMBA); similarly, the word VIKES was frequently associated with BIKES, an informal English word for bicycle (which is well known in Spain). Thus, taking the results from the four criteria evaluated, the words TUNBA and VIKES were discarded from the Spanish version of the IPANAT. In addition, following the normativity for test adaptations proposed by Muñiz, Elosua, & Hambleton (2013) we used expert judgments to examine the level of understanding of the Spanish translations of the six mood adjectives and the instructions of the IPANAT. Three different judges (two psychologist and one linguist) 100% concur that the adjectives and instructions were a good adaptation.

Phase B. The neutrality of the new set of words was calculated considering the stimuli words than on average were closes to 0 in the pleasantness criteria (mean scores: MALBI 1.75, BOREK -0.41, LONTA -0.75, MONUF -0.83, REMAL -0.91, FAMPO -0.89, GOLIP 0.33, KERUS 0.25, HIMAT 0.66 and PORAS -.50), and at the same time showed the lowest average scores on the familiarity and meaning criteria. Next, familiarity score were calculated by the number of affirmative responses, results showed that MALBI was found familiar 25% of the times, BOREK 16%, LONTA 25%, MONUF 16%, REMAL 66%, FAMPO 16%, GOLIP 16%, KERUS 16%, HIMAT 41% and PORAS 50%.

Meaning criteria scores were calculated by the number of times that participants were able to describe the possible meaning of the stimuli word. Results showed that only the words MALBI, BOREK and REMAL evocated a possible meaning on 16% of the participants for each of the three words. Then, from the new set of artificial words evaluated, the more neutral words for the Spanish population were found to be GOLIP and KERUS. Therefore, the IPANAT-SPAIN uses these two words to replace the words VIKES and TUNBA from the original IPANAT.

Phase C. Basic statistical analyses were conducted using IBM SPSS Statistics 22.0. In addition, Confirmatory Factor Analysis (CFA) were performed using R 3.6 and RStudio 1.2. To evaluate the psychometric properties of the IPANAT-SPAIN, the construct and criterion-based validity were explored. Specifically, we performed a descriptive analysis of the items, CFA based on the model proposed by authors of the original test and previous findings with the IPANAT, reliability analyses of the scales (Cronbach's alpha coefficients), and correlations with explicit measures of affect.

Confirmatory factor analysis. CFA is a confirmatory technique where the analysis is guided by hypothesized relationships among the observed and unobserved variables. In this model-driven approach, a hypothesized model to estimate a population covariance matrix is used that is compared with the covariance matrix of the sample (Schreiber, Nora, Stage, Barlow, & King, 2006). The goal is to have minimal differences between the two matrices. Based on the expected two factorial solution for the IPANAT (Quirin et al., 2009) we tested two models:

- Model 1 is a parsimonious model, therefore it is an unrestricted model that allowed all of the items to load on a unique factor. Testing for the most appropriate dimensionality of the measure is important in case the data is compatible with a solution in which there is a strong and dominant factor running through all the test items (see Garrido, González, Seva, & Piera, 2019).
- Model 2 hypothesizes that the IPANAT measures two factors, Implicit NA and Implicit PA. The latter model 2 tested the conception of bi-dimensionality of the test, in which 18 PA items were indicators of an implicit PA factor and that 18 NA items were indicators of the implicit NA factor. Scores for

each one of the six mood adjectives assessed (i.e., 3 for PA and 3 for NA) were computed by averaging across ratings of the combination of the mood adjective with the six artificial words, then the corresponding 3 adjectives were loaded to its belonging factor. The model allowed each of the items to only load on the respective predicted factor. Since previous cross-cultural validations of the IPANAT found that a correlation between the two underlying factors can occur (see Quirin et al., 2018) in our study these two factors were set to be non-orthogonal, to better explore this possibility. According with Izquierdo, Olea y Abad (2014), to allow the covariance of the latent factors of the model is the better way to corroborate its possible orthogonality.

Both models included error variances for each item and were set to load with a coefficient of 1. Factor loadings were estimated via an estimator of diagonally weighted least squares (DWLS), which is specifically designed for ordinal data (Cheng-Hsien, 2016). The fit of the CFA models was assessed using Chi-squared values and degrees of freedom for each model, as well as Comparative Fit Index (CFI; Bentler, 1990), the TLI (Tucker-Lewis index), the Root-Mean-Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR) as an example of a commonly used absolute measure of fit (Browne & Cudeck, 1992; Jackson, Gillaspy, & Purc-Stephenson 2009; Steiger & Lind, 1980).

Correlational analysis. Correlational analysis between the IPANAT-SPAIN and explicit affect instruments were also conducted. In line with previous research on the relationship between implicit attitudes and explicit attitudes (Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005), we expected a moderate strength of the relationships between implicit measures and explicit measures of the same affect type. In general, we expected that implicit PA to be more strongly correlated with explicit PA measures than with explicit NA measures. We also expect the opposite for implicit NA.

Results

After participants completed the test, they were asked to respond a question about the presumed underlying aim of the IPANAT-SPAIN. Twenty-two individuals suggested that the test might assess affective states and were excluded from the initial sample of 468 subjects (4.70% of the sample), there were no missing data. The sample size used in the present study is adequate for the stability of the parameter estimates, since 10 participants per estimated parameter are considered adequate (Schreiber et al., 2006). In our CFA we specified 6 regressions, one covariance, and 6 variances, that is 13 parameters in total that need to be estimated. Because we have a final sample size of 446, we have an acceptable ratio of 34.3 participants to one estimated parameter. Descriptive statistics (mean scores, standard deviations, skewness, and kurtosis) can be found in Table 1. We identified that the assumption of multivariate normality is slightly violated in our sample, therefore we used the diagonally weighted least squares (DWLS) estimator, since this method provides more accurate parameter estimates (Mîndrilă, 2010). Table 1 shows that the mean scores for PA are higher than the mean score for implicit NA, the latter is consistent with previous findings on the IPANAT (Quirin et al., 2009; Quirin et al., 2018). Additionally, Cronbach's alphas were .94 for implicit PA and .88 for implicit NA.

Confirmatory Factor Analysis

As shown in Table 2, model 2 obtained a χ^2/df (CMIN) of .48, with a CFI (comparative fit index) of .99, the TLI (Tucker-Lewis index) of .99, the RMSEA (root mean square error of approximation) was .00, and the SRMS (standardized root mean square residual) was .02. According to Hu and Bentler (1999) those values indicate a good fit between the model and the observed data (see also Schreiber, 2006). Standardized parameter estimates are provided in Figure 1; unstandardized estimates are shown in Table 3.

Thus, it can be concluded that for the IPANAT-SPAIN, the model fit for the two factorial solution proposed by the developers of the original test is acceptable (see Figure 1). The two factors were found to be non-orthogonal in our sample. No post-hoc

Table 1
Descriptive statistics of the Implicit Positive and Negative Affect Test – Spanish version

Mood adjective score	M	SD	SK	K
Happy (Feliz)	1.83	0.58	0.33	-0.56
Energetic (Activo)	1.88	0.63	0.27	-0.73
Cheerful (Alegre)	1.82	0.57	0.35	-0.56
IPA	**1.84**	**0.56**	**0.23**	**-0.65**
Helpless (Desamparado)	1.57	0.51	0.99	0.67
Tense (Tenso)	1.75	0.54	0.48	-0.19
Inhibited (Inhibido)	1.59	0.53	0.85	0.30
INA	**1.64**	**0.48**	**0.70**	**0.36**

Note: Mood adjective score from mean score of the 6 items belonging to each adjectives on the IPANAT-SPAIN. n = 446

Table 2
Fit Indices of Models Tested in Confirmatory Factor Analysis (n = 446)

Model	χ^2 (df)	χ^2/df	CFI	TLI	RMSEA	SRMR
1	55.87(9)	6.20	.97	.96	.11	.09
2	3.82(8)	0.47	1	1	.00	.02

Note: 1 = unrestricted one-factor parsimonious model, 2 = restricted bi-factorial model (Positive/Negative affect), not allowing for cross loadings between factors; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual

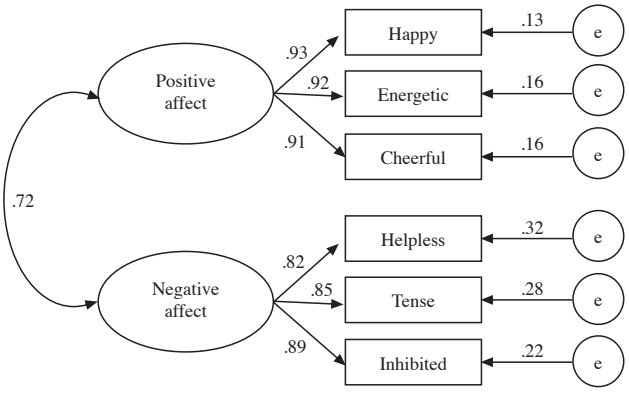

Figure 1. Results from Confirmatory Factor Analysis (model 2) for IPANAT-SPAIN (*n* = 446)

modifications were indicated from the analysis because of the good-fit indexes, the residual analysis did not indicate any problems, and the modification indices did not suggest significative discrepancies between the proposed and estimated model.

Table 3
Standardized and unstandardized coefficients for CFA Model 2 (n = 446)

Observed variable	Latent construct	β	B	SE
Happy (Feliz)	PA	0.93	1	
Energetic (Activo)	PA	0.92	1.06	0.06
Cheerful (Alegre)	PA	0.91	0.96	0.05
Helpless (Desamparado)	NA	0.82	1.0	
Tense (Tenso)	NA	0.85	1.09	0.07
Inhibited (Inhibido)	NA	0.89	1.11	0.07

Correlational analysis

As shown in Table 4, the relationships between implicit and explicit measures of the same affect type turned out to be of moderate strength. The latter finding is consistent with results reported for the original IPANAT. Specifically, Quirin et al. (2009) reported correlations of .20 for implicit and explicit PA and .22 for implicit and explicit NA. In addition, we also found that implicit NA was more strongly correlated with explicit NA measures than with explicit PA measures. The opposite was also found for implicit PA, with the exception of the correlation between implicit PA and the PANAS NA, however, the PANAS NA measure was more strongly correlated with implicit NA that with implicit PA.

In general, participant reported significantly higher mean levels of Implicit PA (M = 1.84, SD = .56) than Implicit NA (M = 1.64, SD = .48), t (445) = 9.93, p < .01; which suggested that on average they tended to judge the artificial words as carrying a more positive than negative connotation. The latter is consistent with previous findings with the IPANAT (see Quirin et al., 2018). This pattern was also observed in our sample by the explicit scales. We found that explicit PA assessed with the PANAS (M = 3.02, SD = .71) showed a significantly higher mean than explicit NA (M = 1.80, SD = .68), t (445) = 27.13, p < .01. In addition, explicit PA assessed with the Scale Same Adjectives used by the IPANAT also showed a significantly higher mean of explicit PA (M = 6.13, SD = 1.84) than explicit NA (M = 2.68, SD = 1.99), t (445) = 25.55, p < .01.

Implicit PA and implicit NA were positively correlated, r = .65, p < .01, most of the IPANAT validations conducted in different countries reported no positive correlation between the two factors, except for the cases of China, Italy, the Netherlands, the USA, and Uzbekistan (see Quirin et al., 2018).

Table 4
Pearson correlations among implicit affect, explicit affect (PANAS), and explicit scale (same adjectives than on IPANAT)

Measure	IPANAT PA	IPANAT NA
PANAS PA	**.20*****	.11**
Explicit scale PA (same adjectives)	**.18*****	.09**
PANAS NA	.28***	**.38*****
Explicit scale NA (same adjectives)	.12***	**.28*****

*Note: n = 446 **p < .05 ***p< .01*

Discussion

The present work attempted to create and validate a Spanish version of the IPANAT, a measure for the indirect assessment of affect. Based on the results from two pretests, we exchanged artificial words from the original IPANAT to have a next to neutral artificial-words version for the Spanish language. We ended up using the following words: *SAFME, TALEP, BELNI, SUKOV, GOLIP, and KERUS*. We explored the goodness of fit of IPANAT-SPAIN via CFA technique and found that the best fitting model supports a two-factor structure of the test, corresponding to implicit PA and implicit NA, which is in line with the factor structure found in the original IPANAT (see Quirin et al., 2009). As mentioned in the results section, chi-square and fit indexes indicated a good fit of the proposed model. In addition, the sample size used in the present study was adequate to produce relative stability of the parameter estimates. Internal consistency analyses showed a good reliability for both scales, and the CFA goodness of fit was comparable to findings from previous validations of explicit affect instruments (López et al., 2015). Not least, concordant and discriminant validity of the IPANAT-SPAIN was supported by valence-congruent findings of correlations with explicit affect scales.

In our study, the two dimensions were found to be non-orthogonal. Moreover, a strong positive correlation between mean values of implicit PA and implicit NA was found. The latter is consistent with previous cross-cultural studies on the IPANAT. According to Quirin et al. (2018), positive correlations between positive and negative affect could be due the fact that different cultures attribute slightly different meaning to mood adjectives, as found by for some adjectives referring to personality (Nye, Roberts, Saucier, & Zhou, 2008) . For example, when validating the short form of the PANAS in the Australian sample, it was found that the item excited significantly correlated with both positive and negative affect (Mackinnon et al., 1999). This suggests that in some cultures certain mood adjectives (especially those associated with activation or arousal) may carry ambiguous meanings (see also Thompson, 2007). Additionally, previous cross-cultural studies on the IPANAT showed that correlations between positive and negative affect could often be attibuted to positive correlations between mood adjectives *energetic* and *tense* (Quirin et al., 2009). Therefore, in order to clearly assess positive and negative affect, further research should explore the use of adjectives that do not share valence or arousal levels, in order to substitute adjectives like *energetic* or *tense* for equivalent ones. Another possible explanation for the high correlation between the two factors of the IPANAT could be that in some languages the mood adjectives provide a smaller variability on the responses range. Therefore, future studies in these languages should explore this hypothesis in a sample with a strong emotional context or under emotional priming. Nonetheless, a factor structure with a positive correlation between factors might be the better model fit (see Brown, 2006), particularly if the factor loadings are strong, and the fit indices are better that the one-factor model. Therefore, the original bi-factorial structure for the IPANAT is replicated in our sample.

In addition, the relationships between implicit and explicit affect were found to be of moderate strength. The moderate correlations between implicit and explicit measures are consistent with results previously reported for the original IPANAT, as well as for other implicit measures like the Implicit Association Test (Greenwald et al., 2003) or the Affect Misattribution Procedure (Payne et al., 2005)

(see Echebarria-Echabe, 2013; Hofmann et al., 2005). Arguably, these low correlations between implicit and explicit measures can be due to different aspects, for example, motivational biases in the explicit measure, reduced introspective abilities, or even complete independence of the underlying constructs (Hofmann et al., 2005). For example, it has been found that correlations between implicit and explicit measures systematically increased as a function of increasing spontaneity of self-reports (Quirin et al., 2009). Thus, researchers of attitudes have theorized that both: implicit and explicit measures tap into different underlying constructs.

The Associative-Propositional Evaluation model (APE, Gawronski & Bodenhausen, 2006) for example postulates the existence of two independent constructs, implicit versus explicit attitudes. While implicit attitudes are considered affective automatic reactions aroused by encounters with an object, explicit attitudes are considered conscious evaluations of the attitude's object. The fundamental mechanism that contributes to the formation and change of the attitudes is the processing of available information about the object. The proposed underlying mechanism for implicit attitudes is evaluative conditioning, seen as a change in the valence of a stimulus that is due to the pairing of that stimulus with another positive or negative stimulus (Hofmann, De Houwer, Perugini, Baeyens, & Crombez, 2010). In contrast, explicit attitudes are considered to be based on syllogistic inferences about propositional information that is relevant for a judgment (Gawronski & Bodenhausen, 2006). The later could explain why the correlation between both measures increases as a function of spontaneity of the explicit measure.

In conclusion, the present research provides evidence for the validity and reliability of a Spanish adaptation of the IPANAT. Future studies that use the IPANAT-SPAIN in complementation with indirect measures of health, attitudes, and personality traits may provide further evidence for criterion-based validity of the test.

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