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Spanish Adaptation of the Perth Alexithymia Questionnaire: Psychometric Properties

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Abstract

Background: Alexithymia study has been severely affected by the absence of psychometrically validated tests. Two tests stand out against all others: the *Toronto Alexithymia Scale-20* (TAS-20) and the *Perth Alexithymia Questionnaire* (PAQ). The aim of this study was to adapt the PAQ questionnaire to a Spanish sample.

Method: For that purpose, it was translated and revised to make both version match in meaning trough a backward translation procedure. The target construct was delimited through a battery of six tests measuring related to alexithymia constructs. The battery was administered to n = 762 (47.2% males), with a retest applied 30 days after with n = 117 subjects.

Results: The confirmatory factor analyses showcased a better adjustment in the model that included affective valence as a factor. The exploratory analysis delivered a trifactorial structure. The questionnaire obtained an excellent internal consistency (Cronbach's α = .955). Correlations with the related constructs confirmed all the hypotheses.

Conclusions: Our results confirm our hypothesis: PAQ is a valid and reliable assessment tool for alexithymia. The adapted version performed well contrasted with questionnaires assessing emotional expression, regulation and appraisal as well as psychological distress and even the TAS-20.

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1. Introduction

The concept of alexithymia has been around in the scientific literature since 1948, when Ruesch described psychosomatic patients with a primitive psychological organisation and immature and infantile personality. This line of thought was continued by Marty and De M'Uzan many years later in the 1963. They inserted the term *operational thinking* which referred to the cognitive style present in somatic patients with an apparent inability to fantasise and dream (Taylor & Bagby, 2021).

In 1973, Sifneos coined the term *"alexithymia"* as a way to refer to the set of cognitive characteristics present in psychosomatic patients, meaning literally lack of words for emotions (Martínez-Sánchez, 1996; Preece et al., 2018). The term was used to identify patients with difficulty identifying and describing feelings, difficulty distinguishing between bodily sensations and absence of fantasies (Preece et al., 2018; Taylor and Bagby, 2021; Haviland and Reise, 1996).

Two paths of understanding and describing the term have arisen since the term was created: one tackles it as a personality trait (persisting in time) which eases the appearance of psychological pathologies, and one which approaches it as a defense mechanism in response to high impact situations (Popov et al., 2016; Martínez-Sánchez et al., 2003; Craparo et al., 2018). In fact, it has been observed that alexithymia is much more frequent in clinical sample, both in psychopathology (i.e. eating disorders, addictions, post-traumatic stress disorders, depression, anxiety) and physical illness (i.e., gastrointestinal problems, dermatological problems and cardiovascular conditions) (Becerra et al., 2021; Preece et al., 2017; Páez et al., 1999; Haviland and Reise, 1996; Vingerhoets et al., 1995; Rieffe et al., 2006; Haviland et al., 2000; Craparo et al., 2018; Becerra et al., 2021).

The way alexithymia affects the onset and treatment of the clinical course of diverse chronical illnesses has been broadly studied. Alexithymia has been found to have negative effect on comprehension and self-regulation of emotions in chronic illnesses (Martino et al., 2019). Alexithymia may not be considered a primary disease itself, but its presence influences patients with chronical illnesses, increasing symptom perception, worse quality of life perception and post-treatment outcomes (Nouemssi et al., 2021; Gangemi et al., 2021). The construct has been widely studied in asthma outcomes by Ricciardi and colleagues (2023), in which they found high alexithymia levels to impair asthma control and cause incorrect perception of respiratory signs. It was also associated with poor metabolic control in patients with type 2 diabetes mellitus by Martino and colleagues (2019) and as a facilitator in the onset of burnout, activity related stress and posttraumatic stress disorder (Gangemi et al., 2021; Di Trani et al, 2022). In the last study, alexithymia was found to positively correlate with emotional exhaustion and depersonalization in burnout due to its reduction of the ability to regulate affect.

If anything, those studies show how important is to have detailed information on the construct and how it should be considered in most clinical interventions, since its treatment might enhance the outcome of the primary disease treatment. Some steps towards alexithymia treatment have already been made by Teixeira and colleagues (2022). They used both mindfulness-based cognitive therapy and mindfulness-based stress reduction program in an adult sample. Alexithymia levels decreased after the intervention, participants acquired a higher awareness of

their own feelings. This draws a hopeful future towards alexithymia management, but much has yet to be done.

Continuing with the concept, and as it became more relevant, the study of the concept progressed, different questionnaires were made. The main issue of most of them laid in the statistical validation, inexistent in many (i. e., *Alexithymia Provoked Response Questionnaire*, by Krystal and colleagues, 1986; *California Q-set Alexithymia Prototype*, by Haviland & Reise, 1996), or not reported factorial structure, internal consistency or concurrent and discriminant validity (i.e., *Observer Alexithymia Scale*, by Haviland et al., 2000; *Beth Israel Hospital Questionnaire*, by Sifneos, 1973; *Minnesota Multiphase Personality Inventory Alexithymia Scale*, by Kleiger & Kinsman, 1980).

A scale that follows the test construction standards with proper construct validation was very much needed by the 80s. That is when Taylor ad colleagues (1985) developed the *Toronto Alexithymia Scale* (TAS-26), the first of three revisions which would revolutionise the alexithymia field. The final version of the test, the *Toronto Alexithymia Scale-20* (TAS-20), a 20 item Likert-type scale is still the most used and translated test for the construct (Parker et al., 1993; Bagby et al., 1994). The factors it measures are difficulty identifying feelings (DIF), difficulty describing feelings (DDF) and externally oriented thinking (EOT).

Since its creation, the TAS-20 has been translated into 30 languages (Bagby et al., 2020). In Spain, it was validated by Martínez-Sánchez (1996). The validation was confirmed by a transcultural study by Páez et al. (1999).

Many of the studies replicate the original results and factors, but some of them find low consistency in the EOT factor (Sekely et al., 2018). Some other studies find only one factor (Bagby et al., 2020; Sekely et al., 2018; Leising et al.; 2009). From those studies derives some of the criticism on the scale. Just to cite some examples, Loas et al. (2001) found the original three factor structure, but also found that the TAS-20 explains only 31% of the variance, with the items distributed inhomogeneously between the factors. Tull and colleagues (2005), on the same line, concluded that the scale measures mostly negative affect expression and reduced ability to access and define emotions. As a conclusion, Leising et al. (2009) found out that the scores obtained in the scale reflected more of a general psychological distress in the sample over general alexithymia level, concluding that the scale and its theoretical model need a revision.

With the advance of the study of alexithymia, the badly developed scales and the revision necessity of the TAS-20, the development of a new theoretical framework was crucial. The response to this necessity was provided by Preece et al. (2017, 2018), who proposed a new

framework (the *Attention-Appraisal Model of Alexithymia*) and a whole new scale (the *Perth Alexithymia Questionnaire*). The details of both are described in the next paragraphs.

Various models have been developed in the attempt to describe the construct. The first one in relevance, parting from a psychoanalytic and operative thinking perspective, was proposed by the Toronto team (Taylor et al., 2000). They divided the concept in two big categories: affect conscience (DIF and DDF scales of the TAS-20), and operative thinking (EOT scale of the TAS-20 and difficulty fantasising). The second most relevant one was proposed by Vorst & Bermond (2001), which categorises alexithymia symptomatology in two categories: cognitive (related to the DIF, DDF and EOT scales of the TAS-20), and affective (difficulty fantasising and difficulty emotionalising). They also distinguish between two types of alexithymia: type I (both cognitive and affective categories presented) and type II (cognitive alexithymia) (Vorst & Bermond, 2001; De Vroege and colleagues, 2018; Taylor & Bagby, 2021; Preece et al., 2017). In both models criticism has been received, since the instruments created by both research groups are not congruent to the theoretical frameworks.

In 2017, the Preece et al. group proposed the *attention-appraisal model of alexithymia* (AAMA). Said model is based on two emotion theories: emotion regulation theory (Gross, 2015) and levels of emotional awareness theory (Lane & Schwartz, 1987).

The base of the AAMA is Gross' theory, in which four emotional valuation stages are proposed: situation-attention-valuation-response. A person generates, processes and regulates its emotions in said valuation system. Preece and colleagues (2017) propose that alexithymia is a result of a failure in certain fases of the process. The externally oriented thinking is conceptualised as a failure in the attention stage; the difficulty identifying and describing feelings, on the other hand, are described as a failure in the affective valuation stage.

At that point, Preece and colleagues (2017) insert the Lane and Schwartz (1987) theory, based on the level of emotional conscience in people (depending on the emotional schemas developed by the subject, which allows the processing of emotional stimuli). This model, thus, explains the variation in the difficulty people can develop in the stages of attention and valuation of emotional processing because of insufficiently developed emotional schemas (Preece et al., 2017).

After AAMA's proposal, Preece et al. (2018) developed the *Perth Alexithymia Questionnaire* (PAQ) as a response to the criticism present in the evaluation field of alexithymia. Three main points were considered to evaluate the alexithymia scales: 1) scales should measure the three dimensions of the construct (DDF, DIF and EOT), 2) to consider emotional valence when

evaluating DIF and DDF dimensions, and 3) results obtained should have good validity and reliability. None of the studied scales met all three criteria.

Based on the AAMA, the authors created a scale of 24 items (statements), answered in a 7 point Likert-type scale. Their sample was composed by 749 adults (280 males, 468 females; mean age 47.57 years). A higher result would indicate higher alexithymia. For the discriminant validity they used two questionnaires: *Emotion Regulation Questionnaire* (ERQ) and *Depression Anxiety Stress Scales-21* (DASS-21) (further described in the methods section).

The factorial structure showcased five dimensions: the initial three factors (DIF, DDF and EOT), with the affective valence consideration on the first two. The resulting factors were: 1) positive DIF, 2) negative DIF, 3) positive DDF, 4) negative DDF, and 5) EOT.

Since the scale was published, and even though not so much time has passed since, teams from various countries have been translating and adapting it to different languages. At the moment, there are four available adaptations: Farsi (Lashkari et al., 2021), Iranian (Mousavi Asl et al., 2020), Turkish (Bílge & Bílge, 2020) and Spanish (Becerra et al., 2021). There are also four available translations which are under revision at the moment: German (Kaemmerer et al., 2021), French (Luminet et al., 2021), Polish (Larionow & Preece, 2022) and Dutch (Walentynowicz et al., 2021). In German, there is additionally, an adapted to children translation (Jarvers et al., 2021).

Even though there is already an adaptation to Spanish, the validation process was made in Latin America, where common expressions and culture differ from the ones in Spain. Thus, we found relevant to make a whole new translation and adaptation.

In addition, and as a conclusion, Preece et al. (2020a) tested the PAQ against the TAS-20 in the same sample as a form to compare both instruments. Both scales assessed the alexithymia construct similarly, with good correlations, but the PAQ exceeded the TAS-20 in general internal consistency and the EOT sub scale. The differentiation in positive and negative valence was also a winning point in the PAQ, since both DIF and DDF of the TAS-20 weighted more on the negative valence. The TAS-20 showed low consistency in the EOT (a result that has been proven quite recurrent in the scale).

2.1 Method

2.1 Participants

The original sample was composed of n = 762 subjects. After reviewing suspicious answers, eliminating subjects that did not fit the age range (between 18 and 60 years old) and those

subjects with foreign nationalities (not Spanish), we ended up with a total of n = 709 subjects. Of those, 337 (47.5%) were male and 372 (52.5%) were female. The chi-square confirms no sex differences in the sample ($\chi^2 = 1.728$; $p = 0.189$). The mean age was 30.4 years (SD = 14.1).

The civil status of the sample was 418 (59.0%) singles, 264 (37.2%) married and 27 (3.8%) divorced. The study levels achieved were: 2 (.3%) subjects had no studies, 58 (8.2%) had only primary level, 237 (33.4%) had high school level, 113 (15.9%) had accomplished a vocational training and the rest, 299 (42.2%) had gone to university.

For the retest, one hundred and seventeen subjects chosen randomly from the main sample (mean age = 22.9; SD = 7.99) participated.

2.2 Instruments

In order to confirm the concurrent validity of the PAQ, and since the alexithymia concept is multidimenstional, we created a battery of multiple questionnaires:

Perth Alexithymia Questionnaire (PAQ) (Preece et al., 2018), translated to Spanish.

Emotion Regulation Questionnaire (ERQ) (Gross & John, 2003). The Emotion Regulation Questionnaire (ERQ), Spanish version validated by Cabello and colleagues (2012), is a 10-item self-report scale designed to assess the usage of two commonly used strategies to alter emotion: cognitive reappraisal and expressive suppression. Cognitive reappraisal involves thinking differently about a situation in order to change its meaning, altering one's emotional experience. Expressive suppression involves decreasing the outward expression of emotion. Six items contribute to the subscale for cognitive reappraisal (e.g., "When I want to feel happier, I think about something different"). Validations of the ERQ in Spanish have shown good psychometric properties, as they replicated the original factorial structure.

Depression Anxiety Stress Scales-21 (DASS-21) (Lovibond & Lovibond, 1995a) adapted to Spanish by Bados and colleagues (2005) is a self-report measure easy to apply in both clinical and non-clinical settings and is used to measure negative emotions experienced by individuals in the most recent week. The questionnaire consists of 21 items, 7 items per subscale: depression, anxiety and stress. They inquire about depressive symptoms (e.g., feeling down-hearted and blue), anxiety symptoms (e.g., feeling close to panic), and general stress symptoms (e.g., having a tendency to over-react to situations). Higher scores indicate more psychological distress (Lovibond & Lovibond, 1995b).

Toronto Alexithymia Scale-20 (TAS-20) (Bagby et al., 1994) adapted to Spanish by Martínez-Sánchez (1996). The TAS-20 is a 20 item self-report questionnaire, designed to measure

alexithymia within three subscales: difficulty identifying one's own feelings (DIF; 7 items) (e.g., "I am often confused about what emotion I am feeling"), difficulty describing feelings (DDF; 5 items) (e.g., "It is difficult for me to reveal my innermost feelings, even to close friends") and an externally orientated thinking style (EOT; 8 items) (e.g., "I prefer to analyze problems rather than just describe them"). All items are summed into a total alexithymia score. Higher scores indicating higher levels of alexithymia. Spanish adaptation has shown good psychometric properties, as they replicated the original factorial structure.

Emotional Expressivity Scale (EES) (Kring, Smith & Neale, 1994) translated to Spanish. The EES is a 17-item self-report measure that assesses the degree to which an individual communicates his emotional experience to others (both verbally and nonverbally). EES items do not mention specific positive or negative emotions, instead, they refer to general displays of emotions. EES was designed as a unifactorial scale. Higher means indicate greater levels of emotional expressivity.

Berkeley Expressivity Questionnaire (BEQ) (Gross & John, 1995) translated to Spanish. The BEQ is a 16-item self-report survey of individual differences in emotional expressivity. In addition to the Total Scale score, the BEQ has three subscales: Positive Expressivity (e.g., "When I'm happy, my feelings show"), Negative Expressivity (e.g., "Whenever I feel negative emotions, people can easily see exactly what I'm feeling"), and Impulse Strength (e.g., "I have strong emotions"). Higher total and facet scores represent higher levels of emotional expressivity.

For us, it was important to recreate the original study conducted by Preece and colleagues (2018), in order to compare the results they obtained with ours. We included the adapted to Spanish versions of the two scales (the DASS-21 and ERQ). We wanted to go a step further, so the TAS-20 was also included. The original team compared the scales in a follow-up study (Preece et al., 2020). And lastly, we used the EES and BEQ scales used for the TAS-20 adaptation by Martínez-Sánchez (1996), since the alexithymia construct includes not only emotion regulation deficits but also emotion expression.

2.3 Procedure

The original scale was translated by the first author and corrected by the second author (both Spanish-English bilinguals). Fellow psychology colleagues helped with further corrections. During this process, the primary goal was to match the meanings of the original statements and the translated ones.

#	Item	Strongly Disagree	—	—	Neither agree nor disagree	—	—	Strongly Agree
1	Cuando me siento *mal* (sintiendo una emoción desagradable), no consigo encontrar las palabras adecuadas para describir mi sentimientos.	1	2	3	4	5	6	7
2	Cuando me siento *mal*, no consigo decir si estoy triste, enfadado o asustado.	1	2	3	4	5	6	7
3	Tiendo a ignorar cómo me siento.	1	2	3	4	5	6	7
4	Cuando me siento *bien* (sintiendo una emoción agradable), no consigo encontrar las palabras adecuadas para describir mis sentimientos.	1	2	3	4	5	6	7
5	Cuando me siento *bien*, no puedo decir si estoy feliz, entusiasmado o divirtiéndome.	1	2	3	4	5	6	7
6	Prefiero dejar que mis sentimientos estén en un segundo plano, en vez de centrarme en ellos.	1	2	3	4	5	6	7
7	Cuando me siento *mal*, no consigo hablar con mucha profundidad o dar muchos detalles sobre estos sentimientos.	1	2	3	4	5	6	7
8	Cuando me siento *mal*, no consigo darle sentido a estos sentimientos.	1	2	3	4	5	6	7
9	No le presto atención a mis emociones.	1	2	3	4	5	6	7
10	Cuando me siento *bien*, no consigo hablar con mucha profundidad o dar muchos detalles sobre estos sentimientos.	1	2	3	4	5	6	7
11	Cuando me siento *bien*, no consigo darle sentido a estos sentimientos.	1	2	3	4	5	6	7

#	Item	Strongly Disagree	—	—	Neither agree nor disagree	—	—	Strongly Agree
12	Habitualmente, intento evitar pensar sobre lo que estoy sintiendo.	1	2	3	4	5	6	7
13	Cuando algo *malo* ocurre, me resulta difícil explicar cómo me siento.	1	2	3	4	5	6	7
14	Cuando me siento *mal,* me resulta difícil saber qué emoción estoy sintiendo.	1	2	3	4	5	6	7
15	Prefiero centrarme en las cosas que realmente puedo ver o tocar, más que en mis emociones.	1	2	3	4	5	6	7
16	Cuando algo *bueno* ocurre, me resulta difícil explicar cómo me siento.	1	2	3	4	5	6	7
17	Cuando me siento *bien*, me resulta difícil saber qué emoción estoy sintiendo.	1	2	3	4	5	6	7
18	No intento estar "en contacto" con mis emociones.	1	2	3	4	5	6	7
19	Cuando me siento *mal*, no sé qué decir cuando intento describir cómo me siento.	1	2	3	4	5	6	7
20	Cuando me siento *mal*, me desconciertan estos sentimientos.	1	2	3	4	5	6	7
21	Para mí no es importante saber lo que estoy sintiendo.	1	2	3	4	5	6	7
22	Cuando me siento *bien,* no sé qué decir cuando intento describir cómo me siento.	1	2	3	4	5	6	7
23	Cuando me siento *bien*, me desconciertan estos sentimientos.	1	2	3	4	5	6	7
24	Me resulta raro pensar en mis emociones.	1	2	3	4	5	6	7

The battery, as well as the informed consent form were applied trough an online survey via Google Forms. In the first phase, the link of the study was sent to Psychology students from the University of Murcia with a unique subject code. On a later point of the process, the initial subjects could resend the link and their subject code to family and friends (with the instruction to include one male and one female of two age groups, bellow 30 years and over 30 years, with a preference over the older age group). The students who participated were rewarded with additional credit points for the "Motivation and emotion" class. A month later, the PAQ was sent again to the initial sample for a retest.

Data analysis

All analyses were done using JAMOVI (2.0.0.0; R Core Team, 2021; Revelle, 2019)). For data cleaning and variable reprogramming, we used SPSS 26.

We followed the same strategy used by Preece et al. (2018) and Becerra et al. (2021). We performed a Confirmatory Factor Analysis for six theoretically congruent models, with the following fit index values: CFI, TLI, RMSEA, SRMR, AIC and factor loadings. For internal consistency, Cronbach α was calculated. A Pearson correlation was performed between the PAQ and the rest of the questionnaires applied. An exploratory factor analysis (EFA) was performed as well in order to calculate the discriminant validity.

Cutting points for each fit index value are:

Table 2. Fit index values

Index	**Acceptable value**
CFI	≥ 0.9
TLI	≥ 0.9
RMSEA	≤ 0.08
SRMR	≤ 0.08
AIC	lower values indicate better fit

A Confirmatory Factor Analysis (CFA) was conducted. A total of five theoretically congruent models were compared. We performed the same distinction as Preece et al. (2018) in the original study. Obtained results are reported in Table 2. Following the goodness-of-fit values, the better adjusting model is the five-factor one, which has in mind valence (positive and negative) in both difficulty identifying feelings (DIF) and difficulty describing feelings (DDF) dimensions, as well as a general externally oriented thinking (G-EOT).

The three factor model with no valence, which is the most commonly known alexithymia model since its the one represented in the TAS-20 scale, did not provide a good fit. It measures a general difficulty identifying feelings, a general difficulty describing feelings and a general externally oriented thinking.

Table 3. Goodness-of-fit index values

Model	Factors	X^2 (df)	CFI	TLI	RMSEA	SRMR	AIC
One-factor model	General Alexithymia	3978 (252)	0.704	0.676	0.144 (0.140-0.148)	0.0946	58583
Two-factor model	DAF and G-EOT	2243 (251)	0.842	0.826	0.106 (0.102-0.110)	0.0653	56850
Three-factor model (no valence)	G-DIF, G-DDF and G-EOT	1939 (227)	0.854	0.838	0.103 (0.0989-0.107)	0.0655	54770
Three-factor model (valence)	N-DAF, P-DAF and G-EOT	975 (249)	0.942	0.936	0.0641 (0.0599-0.0684)	0.0428	55586
Five-factor model	N-DIF, P-DIF, N-DDF, P-DDF and G-EOT	819 (242)	0.954	0.948	0.0580 (0.0536-0.0624)	0.0394	55444

Two different tests were performed. First, we tested internal consistency on a sub-scale (five-factor model) level. On this level, a Cronbach's α of .888 was obtained. The results showed that if the EOT composite was dropped, there would be a little improvement in the overall scale. On this analysis, we obtained a good, almost excellent reliability.

On an item level, a Cronbach's α of .955 was obtained, with no improvement if any item is dropped. Such coefficient showcases an excellent reliability of the scale.

A three factor structure was revealed when performing an exploratory factor analysis (principal axis factoring with oblimin rotation). Such structure is a perfect fit for the theoretical model in which the items were separated in two global categories: difficulty appraising feelings (DAF) and externally oriented thinking (EOT). The DAF factor, on the other hand, was divided in positive and negative valences.

For the test–retest reliability study, the participants filled out the Adapted-PAQ twice, with approximately 4 weeks between measurements. The test-retest reproducibility was calculated by Pearson's correlation coefficient.

Test-retest reliability coefficients were .77 for the total scale, and for the subscales N-DIF (.71), P-DIF (.65), N-DDF (.77), P-DDF (.60), EOT (.71).

A Pearson's correlation test was performed, comparing PAQ subscales (from the five-factor model) and the other questionnaires used. We also compared the TAS-20 as a baseline scale with the whole battery.

We calculated a Bonferroni type of adjustment in order to reduce Type I error rate. The original α value is .05, and we have 18 factors to compare. The Bonferroni-corrected p value results in .00278, but since the software we are using does not allow more than three decimals, we round it up to .003. Any value with a $p \leq .003$ is, therefore, judged as significant.

Table 4. DASS-21 and ERQ comparison to the translated version

		DASS-21			**ERQ**	
		Anxiety	**Depression**	**Stress**	**Supression**	**Reappraisal**
PAQ	**P-DIF**	0.306***	0.395***	0.293***	0.453***	-0.095*
	N-DIF	0.320***	0.396***	0.310***	0.452***	-0.116***
	P-DDF	0.262***	0.367***	0.263***	0.482***	-0.149***
	N-DDF	0.270***	0.371***	0.274***	0.546***	-0.14***
	EOT	0.184***	0.492***	0.160***	0.505***	-0.152***
	TOTAL	0.302***	0.414***	0.291***	0.576***	-0.156***

Note. P-DIF = Positive Difficulty Identifying Feelings; N-DIF = Negative Difficulty Identifying Feelings; P-DDF = Positive Difficulty Describing Feelings;N-DDF = Negative Difficulty Identifying Feelings; EOT = Externally Oriented Thinking ; * p < .05; ** p < .01; *** p < .003 (Bonferroni-corrected p)

The DASS-21 and the ERQ were the original scales used to validate the PAQ. It is expected that high PAQ scores correlate with low ERQ scores (negative correlation), which would reflect a deficient or maladaptive emotion regulation. For the DASS-21, it is expected more psychological distress with higher levels of alexithymia (positive correlation).

These hypotheses are confirmed in both TAS-20 and PAQ questionnaires within our sample. Since the PAQ and the DASS-21 are questionnaires that have very high correlation but measure different concepts, we performed an additional exploratory factor analysis with both scales together. We obtained that both questionnaires measure different factors. This way, we know that, even though they are highly correlated, the PAQ does not measure general distress (which the DASS-21 does).

Table 5. BEQ and EES comparison to the translated version

		BEQ			EES
		Positive Expression	**Negative Expression**	**Impulse Strength**	**Total**
PAQ	**P-DIF**	-0.385***	-0.275***	-0.086*	-0.451***
	N-DIF	-0.267***	-0.266***	0.034	-0.428***
	P-DDF	-0.434***	-0.342***	-0.15***	-0.503***
	N-DDF	-0.348***	-0.378***	-0.069	-0.571***
	EOT	-0.329***	-0.378***	-0.255***	-0.565***
	TOTAL	-0.430***	-0.394***	-0.142***	-0.602***

Note. P-DIF = Positive Difficulty Identifying Feelings; N-DIF = Negative Difficulty Identifying Feelings; P-DDF = Positive Difficulty Describing Feelings;N-DDF = Negative Difficulty Identifying Feelings; EOT = Externally Oriented Thinking ; * p < .05; ** p < .01; *** p < .003 (Bonferroni-corrected *p*)

Alexithymia is characterised by difficulty identifying and expressing feelings, which is why for us was important to check it out with questionnaires that measure emotion expressivity. The hypothesis was that if alexithymia punctuates high, the expressivity will decrease (negative correlation). The data supports the hypothesis and confirms it.

Table 6. TAS-20 compared to the translated PAQ

		TAS-20			
		F1	**F2**	**F3**	**Total**
PAQ	**P-DIF**	0.611***	0.509***	0.383***	0.654***
	N-DIF	0.738***	0.658***	0.310***	0.761***
	P-DDF	0.569***	0.6***	0.388***	0.670***
	N-DDF	0.633***	0.804***	0.292***	0.758***
	EOT	0.506***	0.558***	0.519***	0.659***
	TOTAL	0.703***	0.731***	0.460***	0.818***

Note. P-DIF = Positive Difficulty Identifying Feelings; N-DIF = Negative Difficulty Identifying Feelings; P-DDF = Positive Difficulty Describing Feelings;N-DDF = Negative Difficulty Identifying Feelings; EOT = Externally Oriented Thinking ; * p < .05; ** p < .01; *** p < .003 (Bonferroni-corrected *p*)

For the last comparison, we start in a field in which the TAS-20 is the most widely used instrument to measure alexithymia. That is the reason why we needed to check correlations

between both PAQ and TAS-20. Even if the TAS-20 is not the perfect instrument to measure the construct, we would expect that high scores in the TAS-20 would correlate positively with high scores in the PAQ. The data supports this hypothesis as well.

4. Discussion

This work was developed in order to validate the *Perth Alexithymia Questionnaire*, developed by Preece et al. (2018) to Spanish. There are many benefits of performing this research, such as: to have a better and more precise instrument for the measurement of the alexithymia construct in a Spanish sample, to update of the *Toronto Alexithymia Scale-20* adaptation made by Martínez-Sánchez (1996), and provide a more detailed vision of the alexithymia construct and its dimensions, expanding the available data of its relationships with similar constructs such as emotion regulation, emotion expression, depression, anxiety and stress.

Following the initial validation of the PAQ, we first performed one theoretical factor structure analysis, replicating the original study. As seen on Table 2, we tested five different models, one less than the original study due to restrictions in the Jamovi software (we could not test the 5b Model which included the factors from Model 5 plus Model 1). All models returned similar results to the ones obtained by Preece et al. (2018). We can conclude that the better fitting model was the fifth one, which distinguished between positive and negative emotions in DDF and DIF, with excellent fit index values.

We also performed an Exploratory Factor Analysis which returned us a three-factor structure from the data we provided. It resulted in a general difficulty appraising feelings factor, which distinguishes between negative and positive valence, and also the general EOT factor. This finding highlights the importance of the valence feature incorporated by the authors when developing the scale: it is more prevalent than the initial separation of identifying and describing feelings.

The test-retest reliability was good, on both sub-scale level and general scale level. Further research could include a bigger retest sample.

We measured internal consistency and reliability in two ways. First, we confirmed on item level, obtaining a Cronbach's alpha of .955 with no improvement if any item is dropped. This is an excellent reliability indicator. Second, we replicated the original study on a sub-scale level. The reliability level dropped to .888, but still being a very good score in terms of reliability. We can conclude from these analyses that the internal consistency of the scale is between very good and excellent.

At last, we compared the scale with measures of different parameters that usually have concurrent presentation in the alexithymia construct. We used different scales for that. All of the hypotheses we had were achieved: 1) from theory, we knew that a higher alexithymia would mean a higher emotional distress (depression, anxiety and stress), 2) emotional suppression as emotional regulation mechanism in high alexithymia versus reevaluation in low alexithymia, 3) less emotional expression (for both positive and negative emotions) in higher alexithymia scores, 4) positive significant correlation between PAQ and TAS-20 (since they both measure the same construct). All resulted true. The only ambiguous result we obtained was from the Impulse Strength factor in the EES scale. Further research on how Impulse Strength affects alexithymia should be done.

To conclude with the analyses we performed, we compared the factorial structure of the DASS-21 and the PAQ, in order to check out if they measure similar but not the same construct. This was made due to the previously explained usual critic of the TAS-20, which states that instead of alexithymia, it measured general psychological distress. We could corroborate that the DASS-21 saturated in two factors, independent from the PAQ's three factor structure previously explained.

We consider that this study could have a very positive impact in the current literature on the alexithymic term, as it evaluates and compares in close detail its components. It allows us, as well, to reconfirm the TAS-20's reliability. Even though we did not analyse its results in such a detailed manner, we compared it to the PAQ in the concurrent and discriminant validity, as well as to the other scales used to validate the PAQ.

This research also allows us to introduce, in a safely and statistically tested way, another very complete scale to measure the alexithymia construct. A scale which is easy to administer and analyse, which provides us with information in five different factors and also the general alexithymia in the subject.

On a practical level, it is beneficial in both clinical and experimental fields. In the clinical practice it allows the therapist and physician to get a better insight into their patients, which translates in better approach in the treatment and disease control. In research, it is beneficial to describe the sample, to perform better sample selection and to reduce unknown variables that may have a direct effect on research outcomes.

More investigations on the scale and alexithymia should be done, with the aim to help both clinical and research levels. On clinical level it could help prevent alexithymic patients to derive into different psychopathologies (i. e. depression, substance abuse, eating disorders), and also it

could improve the treatment of those which are already diagnosed with such psychopathologies. On research level, alexithymia is an important factor to have in mind in emotion studies, which it impacts directly, and language, attention and executive function studies (in an indirect way).

Ethical approval

The present study was positively evaluated by the Research Ethics Committee from the University of Murcia (ID: 2625/2019).

Informed Consent Statement

All subjects participated voluntarily and signed an informed consent.

Data Availability Statement

Data available within the article or its supplementary materials.

Conflict of interest statement

No conflicts of interest disclosed by the authors.

Author Contributions

NK (first author) translated the questionnaire, FMS (second author) helped to refine the translation. NK wrote the manuscript. Both NK and FMS assembled the battery of questionnaires. FMS recruited the sample and administered the questionnaire battery. Both NK and FMS performed the statistical analyses. Both authors have approved the final article and agreed to authorship order.

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